

1973

1973-1974 Southern Illinois University Bulletin Carbondale Campus (Graduate Catalog)

Southern Illinois University Carbondale

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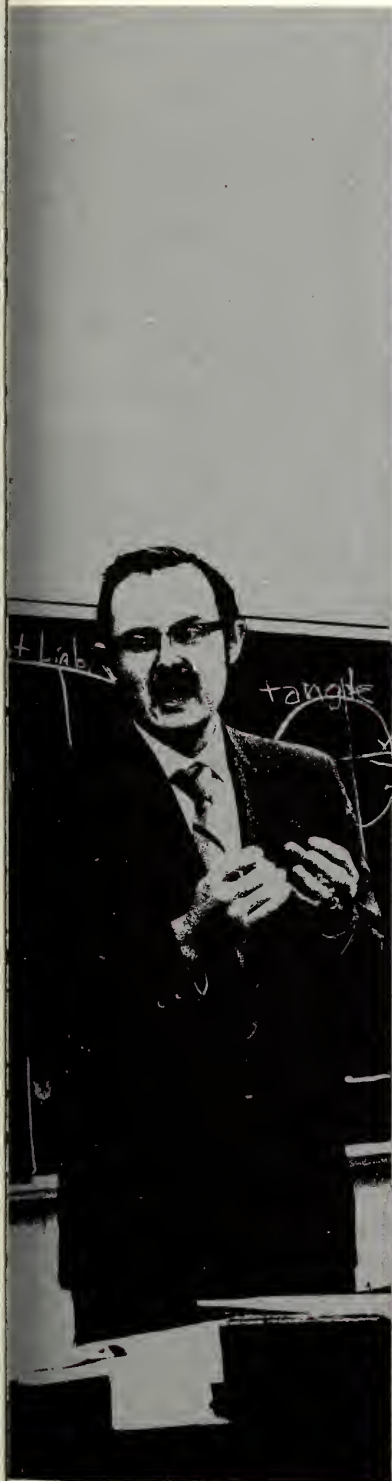
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1973 / 1974
Graduate
Catalog
Carbondale

Southern Illinois University Bulletin

SIU



OBJECTIVES OF SOUTHERN ILLINOIS UNIVERSITY

TO EXALT BEAUTY

*In God,
in nature, and
in art;
Teaching how to love the best
but to keep the human touch;*

TO ADVANCE LEARNING

*In all lines of truth
wherever they may lead,
Showing how to think
rather than what to think,
Assisting the powers
of the mind
In their self-development;*

TO FORWARD IDEAS AND IDEALS

*In our democracy,
Inspiring respect for others
as for ourselves,
Ever promoting freedom
with responsibility;*

TO BECOME A CENTER OF ORDER AND LIGHT

*That knowledge may lead
to understanding
And understanding
to wisdom.*

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Southern Illinois University Bulletin

Volume 15, Number 4

May 1973

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Published by Southern Illinois University at Carbondale,

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February, July, October, and December.

This Issue

of the *Southern Illinois University Bulletin* covers in detail questions concerning the Graduate School of Southern Illinois University at Carbondale. It supersedes Volume 14, Number 4.

THE FOLLOWING issues of the *Southern Illinois University Bulletin* may be obtained free from University Graphics and Publications, Southern Illinois University at Carbondale, Carbondale, Illinois 62901.

Graduate Catalog

Schedule of Classes. Please specify quarter (fall, winter, spring, or summer).

Undergraduate Catalog.

This publication provides information about Southern Illinois University at Carbondale. Primary attention is given to its academic programs, rules and regulations, and procedures. A student beginning graduate work during the period of time covered by this catalog (summer, 1973 through spring, 1974) is subject to the academic requirements of the Graduate School and of the degree programs as specified herein. If the requirements are subsequently changed, the student may elect either to meet the requirements in force in his particular degree program immediately prior to the change, or to meet the new requirements. If he elects the former option he shall be guaranteed a minimum period of time from the date that the program requirements were changed within which minimum period he will be permitted to complete the old degree requirements. This minimum period shall be determined by the department or other degree-program unit, subject to the following two constraints. First, the minimum period prescribed by the department may not exceed the standard Graduate School limitation that credit applied toward fulfillment of requirements for the master's degree must have been earned within a six-year period preceding the completion of the degree, and that a doctoral student must complete degree requirements within five years after admission to candidacy. Second, the minimum period shall encompass no less than two years for master's degree students and three years for doctoral students, with the exception that a student in the last stage of his degree work when requirements change (a master's student who has completed all requirements except the thesis or research report and the final examination or a doctoral student who has been admitted to Ph.D. candidacy) shall not be subject to the new requirements but may complete his degree within the standard Graduate School limitations stated above. A student who elects to follow old requirements, but does not complete his work within the minimum period prescribed by the department, shall, unless he was in the last stage of his degree work when requirements changed, be subject to requirements in force at the time he completes his degree, and shall be subject to the standard Graduate School limitations described above. The University reserves the right to change information contained herein on matters other than curricular requirements without notice when circumstances warrant such action.

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University Calendar

<i>SUMMER, 1973</i>	Quarter Begins	Monday, June 18 *
	Independence Day Holiday	Wednesday, July 4
	Quarter Ends	Friday, August 31
	Commencement	Friday, August 31
<i>FALL, 1973</i>	New Student Days	Sunday–Tuesday, September 23–25
	Quarter Begins	Tuesday, September 25 *
	Thanksgiving Vacation	Tuesday, 10 P.M.–Monday, 8 A.M., November 20–26
	Final Examinations	Wednesday–Tuesday, December 12–18
<i>WINTER, 1974</i>	Quarter Begins	Wednesday, January 2 *
	Washington's Day Holiday	Monday, February 18
	Final Examinations	Wednesday–Tuesday, March 13–19
<i>SPRING, 1974</i>	Quarter Begins	Wednesday, March 27 *
	Memorial Day Holiday	Monday, May 27
	Final Examinations	Wednesday–Tuesday, June 5–11
	Commencement (Carbondale)	Tuesday, June 11
<i>SUMMER, 1974</i>	Quarter Begins	Tuesday, June 18 *
	Independence Day Holiday	Thursday, July 4
	Commencement (Carbondale)	Friday, August 30

* Classes begin with the evening classes after 5:30 P.M.

Board of Trustees

Southern Illinois University

	<i>Term Expires</i>
Ivan A. Elliott, Jr., <i>Chairman</i> , Carmi	1973
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Southern Illinois University at Carbondale

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1 / The Graduate School

The Role of the Graduate School

The primary concern of the Graduate School is graduate instruction and research at Southern Illinois University at Carbondale. The Graduate School therefore plays an essential role in the development of instructional and research programs, in the acquisition of funds, and in the procurement of facilities necessary to encourage and support the research of the members of its scholarly community. In addition, the Graduate School is a major contributor to the public services provided by the University to the region, the state, the nation, and a number of other countries. In all of its programs of instruction and research, the Graduate School sets a high standard of achievement. It is in those students who have demonstrated this quality of excellence by completing advanced courses of study and by achieving significant results in their research that the Graduate School makes its contribution to the public welfare.

Research is of special concern because the faculty must engage in scholarly research activities to maintain its effectiveness and also because advanced instruction of graduate students consists mainly of guidance in research. For these reasons, University policies governing research are developed by the Graduate School and administered through it. The Graduate School assists in the continuing development of the research activities of the University. University support for individual research projects is available to faculty members through the special research projects program administered by the Graduate School. The Graduate School also supervises cooperative research projects and particularly assists applicants in the preparation and submission of research proposals that involve outside support from such sources as government, foundations, business, and industry.

Morris Library

Morris Library contains over 1,500,000 volumes and subscribes to more than 10,000 periodicals. Over 100,000 volumes have been added to the collection in each of the last three years. In addition to books and journals, the library has extensive collections of maps, manuscripts, and films. Morris Library is also a depository for federal, state, and U.N. documents. A major source for research in the behavioral sciences is the Human Relations Area files, consisting of copies of documents, books, articles, and manuscripts covering 170 world cultures.

Supplementing the resources of Morris Library is the Center for Research Libraries, in which the University holds membership. A printed book catalog of the center's some 2,000,000 volumes is available for con-

sultation. The extensive scientific journal collection of the Argonne National Laboratory is also available to graduate students in person or on interlibrary loan.

Information Processing

The Information Processing unit supports both the academic and the administrative needs of the University. A sizable instructional activity as well as the research activity of both faculty and students is supported. The center is presently equipped with an IBM System 370, Model 155 and an IBM 1130. A variety of sorting and tabulating equipment is also available.

Academic support activities of the center include maintenance of a research program library, consulting about computing problems, and non-credit instruction in computing. Arrangements can be made for both faculty and graduate students to use the services and facilities of the center at no personal cost.

Placement Services

The Placement Services assists students and alumni seeking career employment. Maximum benefit from its services is assured for students who file their resumes approximately three quarters prior to graduation. Alumni should periodically up date their resumes which are placed on permanent file. All inquiries concerning this free service should be made to the director of the Placement Services.

Housing

On-Campus Housing

On-campus housing is available in residence halls for single graduate students. If a sufficient number of graduate students apply they will be housed on the same floor rather than mixed in with undergraduate students. Single rooms are available for extra cost. All contracts will be for room and board.

University owned housing for married students includes 304 unfurnished two- or three-bedroom air-conditioned apartments; 272 furnished efficiency, one- or two-bedroom apartments; because the demand for university housing for married students exceeds the supply information should be requested early from University Housing, Building D, Washington Square.

Off-Campus Housing

The Housing Information Center, Building C, Washington Square, maintains current information on off-campus rooms, apartments, houses for rent or for sale, and trailer parks. Experience has shown that satisfactory arrangements cannot be made by mail. A personal visit is usually required. Prices vary widely, ranging from \$20 a month for trailer spaces to \$200 a month or more for houses and apartments. All arrangements for off-campus housing and all business transactions in the matter of this type of housing are the sole responsibility of the student and the owner of the house facility.

Health Services

The Health Service provides medical care to include 24-hour emergency service to graduate students who pay the student activity fee. The Health Service offers X-ray, laboratory, pharmacy, infirmary, and physician services. Those students that elect not to pay the student activity fee may utilize the medical services on a fee-for-service basis.

Financial Assistance

Fellowships, Preceptorships, Internships, and Assistantships

Inquiries may be addressed to department chairmen.

Graduate fellowships are available in all areas of graduate study upon application to the appropriate chairman, and are awarded by the graduate school on the basis of scholarship. The award is normally made for four consecutive quarters; for master's degree students the stipend is \$255 per month, or \$3,060 for the four quarters; for doctoral degree students the stipend is \$275 per month, or \$3,300 for four consecutive quarters. There is a remission of tuition but not other fees. There is no service requirement other than the duties required by a department of all students regardless of their source of support. While on a fellowship a student shall not hold another appointment in the University, nor shall he hold a job outside the University, since the purpose of the fellowships is to provide a student with a source of income which will enable him to work full time at his studies rather than work part time at a job and part time at his studies. All application materials should be submitted to the student's major department chairman before February 1 preceding the academic year for which the fellowship is desired.

Special doctoral assistantships are available for students who hold the master's degree, or its equivalent, from another institution, and who have been admitted to one of the doctoral programs. Application is made to the appropriate chairman, and the awards are made by the graduate school upon the basis of scholarship. The award is normally made for four consecutive quarters and carries a stipend of \$330 per month, or \$3,960 for four quarters. Extension to an additional four quarters is possible upon recommendation of the department chairman. There is a remission of tuition but not other fees. There is a service requirement, with the specific duties to be assigned by the chairman of the department. Application deadlines and procedures are the same as for graduate fellowships.

A number of preceptorships are offered by the University to students who are excellent teachers as well as superior scholars. These positions pay a stipend which ranges from \$300 to \$375 per month for the academic year, with the exact amount depending upon assignment, experience, and academic achievement. Remission of tuition is granted, but fees must be paid. Service of 20 hours per week, or corresponding load in teaching, is required. Preceptors must carry no more than 12 hours and no less than 6 hours of credit per quarter. Application should be made to the appropriate chairman before February 1 preceding the academic year for which the assignment is sought.

Teaching, research, and graduate assistantships, and graduate internships are available in a number of departments and from research agencies. These positions pay stipends which range from \$240 to \$350 per month, with the exact amount depending upon the assignment, experience, and academic achievement of the student. Rules applying to tuition, fees, and service loads are the same as those for preceptorships.

Special Fellowships

Several special fellowships are offered annually to students who show promise of success in graduate studies even though their previous academic achievements may have been hindered because they are members of a minority group, because of their socioeconomic status, or because of their sex. The awards are usually made to students who are well qualified by the usual indicators of promise for graduate work such as undergraduate grade-point averages and GRE or MAT scores, but whose status in one of the categories named above has meant that their records are not impressive enough for them to receive fellowships in the regular fellowship competition with the entire graduate student body of Southern Illinois University at Carbondale. Stipend rates are the same as for the regular graduate fellowships. There is a remission of tuition but not of other fees. There is no service requirement other than those activities which are required by departments of all students regardless of the source of their support. Application materials should be submitted to the chairman of the student's major department before February 1 preceding the academic year for which the special fellowship is desired.

Celia M. Howard Fellowship

The Illinois Federation of Business and Professional Women's Clubs, Inc. annually awards to a mature Illinois woman college graduate a Celia M. Howard fellowship toward a Master of Science degree in administration of justice. For information regarding this fellowship, write to Mrs. Rosemary Hardwick, Celia M. Howard Fellowship Fund Committee, 115 North Sixth Street, Carrollton, Illinois 62016.

External Support for Graduate Study

Fellowships, grants-in-aid, scholarships, and other similar awards for the support of graduate students are available from many sources outside the University. Students are encouraged to apply for such awards. Information concerning appropriate external sources of support may be obtained from department chairmen or directors of graduate studies of the student's major department.

Faculty Appointments

No student in a graduate degree program shall be appointed to any full-time faculty position in the department (or equivalent unit) in which he is a student, with the sole exception that a student who has already been admitted to candidacy for the Ph.D. degree may be granted a term appointment as an instructor in the unit in which he is a student. Such a term appointment shall not be renewable beyond a period of one year.

Student Work and Financial Assistance Office

The University maintains an Office of Student Work and Financial As-

sistance through which work on and off campus, cooperative work-study programs, summer employment, the federal work-study programs, and student loan funds and tuition scholarships are negotiated.

Additional information may be obtained from the director of Student Work and Financial Assistance program.

Tuition and Fees

The tuition and fees charged students are established by the Board of Trustees and are subject to change whenever conditions make changes necessary. Fees per quarter for graduate students are as follows:

	Not more than 5 hrs	More than 5, less than 11	11 or more
Tuition—Illinois Resident	\$ 48.00	\$ 95.00	\$143.00
Tuition—Out-of-State Resident	(143.00)	(286.00)	(429.00)
Student Welfare and Recreation			
Building Trust Fund Fee	5.00	10.00	15.00
Student Activity Fee	3.50	7.00	10.50
Student Center Fee	5.00	10.00	10.00
Athletic Fund Fee	3.00	6.50	10.00
<i>Total</i> —Illinois Resident	\$ 64.50	\$128.50	\$188.50
<i>Total</i> —Out-of-State Resident	(\$159.50)	(\$319.50)	(\$474.50)

The student activity fee includes the fees for limited hospitalization, entertainment, the student newspaper and yearbook, and such other privileges as may be provided.

Graduate fellows and teaching, research, and graduate assistants, and graduate interns on appointments of at least 25% of full time do not pay tuition and have an option on paying the student activity fee. They pay other fees. To receive a tuition waiver the graduate student must present his contract of appointment each time he registers for courses during the effective period of the appointment. A student who has been appointed to a position as an assistant or as an intern for three successive quarters will receive a remission of tuition for the quarter immediately following the final quarter of his appointment. Graduate fellows and special doctoral assistants do not receive an extra quarter's tuition waiver.

NDEA (Title IV) fellows and NSF trainees pay neither fees nor tuition.

In addition to the above fees, a student is subject to certain other charges under the conditions listed below:

1. A matriculation fee of \$5, which is assessed a graduate student the first time he registers if he is not a graduate of Southern Illinois University.
2. A late registration fee of \$5.00 when a student registers after the regular registration period has ended.
3. A graduation fee of \$9; and, for doctoral candidates, a dissertation microfilming fee of \$25–\$40, depending upon the service selected.
4. Other charges which a student may incur are those for field trips, library fines, and excess breakage. A student taking a course involving use of materials, as distinct from equipment, will ordinarily pay for such materials.

Regulations Governing the Determination of Residence Status for Admission and Assessment of Student Tuition

For the purpose of these regulations an adult is considered to be a student eighteen years of age or over; a minor student is a student under eighteen years of age. The words he or his also apply to a female unless otherwise stated or clearly indicated. The term the State means the State of Illinois. Except for those exceptions clearly indicated in these regulations, in all cases where records establish that the person does not meet the requirements for resident status as defined in these regulations the nonresident status shall be assigned.

Residency Determination

Evidence for determination of residence status of each applicant for admission to the University shall be submitted to the director of admissions at the time of application for admission. A student may be reclassified at any time by the University upon the basis of additional or changed information. However, if the student is classified in error as a resident student, the change in tuition shall be applicable beginning with the term following the reclassification; if the student is classified in error as a nonresident, the change in tuition shall be applicable to the term in which the reclassification occurs, provided the student has filed a written request for review in accordance with these regulations.

Adult Student

An adult, to be considered a resident, must have been a bona fide resident of the State for a period of at least twelve consecutive months immediately preceding the beginning of any term for which he registers at the University, and must continue to maintain a bona fide residency in the State, except that an adult student whose parents (or one of them if only one parent is living or the parents are separated or divorced) have established and are maintaining a bona fide residence in the State and who resides with them (or the one residing in the State) or elsewhere in the State will be regarded as a resident student.

Minor Student

The residence of a minor shall be considered to be, and to change with, and follow:

a. That of his parents, if they are living together, or the living parent if one is dead; or

b. If the parents are separated or divorced, that of the parent to whom the custody of the person has been awarded by court decree or order, or, in the absence of a court decree or order, that of the father unless the person has continuously resided with the mother for a period of at least twelve consecutive months immediately preceding his registration at the University, in which latter event his residence shall be considered to be that of his mother; or

c. That of the adoptive parents, if the person has been legally adopted and, in the event the adoptive parents become divorced or separated, that of the adoptive parent whose residence would govern under the foregoing rules if that parent has been a natural parent; or

d. That of the legally appointed guardian of the person; or

e. That of the natural guardian, such as a grandparent, adult brother or adult sister, adult uncle or aunt, or other adult with whom the person has resided and by whom he has been supported for a period of at least twelve consecutive months immediately preceding his registration at the University for any term if the person's parents are dead or have abandoned him and if no legal guardian of the person has been appointed and qualified.

Parent or Guardian

No parent or legal or natural guardian will be considered a resident of the State unless he (a) maintains a bona fide and permanent place of abode within the State, and (b) lives, except when temporarily absent from the State with no intention of changing his legal residence to some other State or country, within the State.

Emancipated Minor

If a minor has been emancipated, is completely self-supporting, and actually resides in the State, he shall be considered to be a resident even though his parents or guardian may reside outside the State. An emancipated minor who is completely self-supporting shall be considered to actually reside in the State of Illinois if he has maintained a dwelling place within the State uninterruptedly for a period of at least twelve consecutive months immediately preceding the beginning of any term for which he registers at the University. Marriage or active military service shall be regarded as effecting the emancipation of minors, whether male or female, for the purposes of this regulation. An emancipated minor whose parents (or one of them if only one parent is living or the parents are separated or divorced) have established and are maintaining a bona fide residence in the State and who resides with them (or the one residing in the State) or elsewhere in the State will be regarded as a resident student.

Married Student

A nonresident student, whether male or female, or a minor or adult, or a citizen or noncitizen of the United States, who is married to a resident of the State, may be classified as a resident so long as he continues to reside in the State.

Persons Without United States Citizenship

A person who is not a citizen of the United States of America, to be considered a resident, must have permanent resident status with the United States Immigration and Naturalization Service and must also meet and comply with all of the other applicable requirements of these regulations to establish resident status.

Armed Forces Personnel

A person who is actively serving in one of the armed forces of the United States and who is stationed and present in the State in connection with that service and submits evidence of such service and station, shall be treated as a resident as long as the person remains stationed and present in Illinois. If the spouse or dependent children of such member of the armed forces also live in the State, similar treatment shall be granted to them.

Minor Children of Parents Transferred Outside the United States

The minor children of persons who have resided in the State for at least twelve consecutive months immediately prior to a transfer by their employers to some location outside the United States shall be considered residents. However, this shall apply only when the minor children of such parents enroll in the University within five years from the time their parents are transferred by their employer to some location outside the United States.

Definition of Terminology

To the extent that the terms bona fide residence, independent, dependent, and emancipation are not defined in these regulations, definitions shall be determined by according due consideration to all of the facts pertinent and material to the question and to the applicable laws and court decisions of the State of Illinois.

Voter registration, filing of taxes, proper license and registration for the driving or ownership of a vehicle, and other such transactions may verify intent of residency in a state. Neither length of University attendance nor continued presence in the University community during vacation period shall be construed to be proof of Illinois residence.

Procedure for Review of Residency Status or Tuition Assessment

A student who takes exception to the residency status assigned or tuition assessed shall pay the tuition assessed but may file a claim in writing to the appropriate official for a reconsideration of residency status and an adjustment of the tuition assessed. The written claim must be filed within 10 school days from the date of assessment of tuition or the date designated in the official University calendar as that upon which instruction begins for the academic period for which the tuition is payable, whichever is later, or the student loses all rights to a change of status and adjustment of the tuition assessed for the term in question. If the student is dissatisfied with the ruling in response to the written claim made within said period, he may appeal the ruling to the legal counsel by filing with the appropriate official within twenty days of the notice of the ruling a written request.

These regulations shall become effective for the winter quarter, 1972, and shall remain in full force and effect unless and until subsequently amended or repealed by action of the Board of Trustees.

Graduate Degrees Offered

Master's degrees are available in the fields listed below.

Abbreviations: Master of Arts, MA; Master of Business Administration, MBA; Master of Fine Arts, MFA; Master of Music, MM; Master of Music Education, MME; Master of Science, MS; Master of Science in Education, MS in Ed.

Administration of Justice	MS	Botany	MA, MS
Agricultural Industries	MS	Business Administration	MBA
Animal Industries	MS	Chemistry and Biochemistry	MS
Anthropology	MA	Community Development	MS
Art	MFA	Computer Science	MS
Biological Sciences	MS	Design	MS

Early Childhood Education	MS in Ed	Music	MM, MMed
Economics	MA, MS	Occupational Education	MS, MS in Ed
Educational Administration and Foundations	MS in Ed	Philosophy	MA
Elementary Education	MS in Ed	Physical Education	MS in Ed
Engineering	MS	Physics	MA, MS
English	MA	Physiology	MA
English as a Foreign Language	MA	Plant Industries	MS
Foreign Languages	MA	Psychology	MA, MS
Forestry	MS	Recreation and Outdoor Education	MS in Ed
Geography	MA, MS	Rehabilitation Institute	
Geology	MS	Behavior Modification	MA, MS
Government	MA	Rehabilitation Administration	MA, MS
Guidance and Educational Psychology	MS in Ed	Rehabilitation Counseling	MA, MS
Health Education	MS in Ed	Secondary Education	MS in Ed
Higher Education	MS in Ed	Secretarial and Business Education	MS in Ed
History	MA	Sociology	MA, MS
Home Economics	MS	Special Education	MS in Ed
Home Economics Education	MS, MS in Ed	Speech	MA, MS
Inter-American Studies	MA	Speech Pathology and Audiology	MS
Instructional Materials	MS in Ed	Theater	MA, MFA
Journalism	MA, MS	Zoology	MA, MS
Linguistics	MA		
Mathematics	MA, MS		
Microbiology	MA		

Certificate of Specialist programs are available in the fields listed below.

Educational Administration and Foundations	Guidance and Educational Psychology
Elementary Education	Secondary Education
	Special Education

Doctor of Philosophy programs are available in the fields listed below.

Anthropology	Government	Psychology
Botany	Historical Studies	Sociology
Chemistry and Biochemistry	Journalism	Speech/Theater
Economics	Mathematics	Speech Pathology and Audiology
Education	Microbiology	Zoology
English	Molecular Science	
Geography	Philosophy	
	Physiology	

Admission to Graduate Study

A student should obtain application forms from the Graduate School and submit application, with other supporting material, directly to the Graduate School where it will be evaluated for compliance with Graduate School admission requirements. The student must have the registrar of

each college previously attended (except Southern Illinois University at Carbondale) send three official transcripts of his record to the Graduate School. Copies sent to a department are not acceptable. Unofficial or personal transcripts are not acceptable. The recording of one or more college's grades upon the transcript of another college does not meet the requirement. No transcripts or other admission credentials will be returned or forwarded to other institutions. Only if these steps are taken and if the student seeks a degree will the application be forwarded to the department * in which the student indicates his desired major. The admission requirements of the Graduate School and the department must both be met before the student is admitted either conditionally or unconditionally, and both the Graduate School and the department may specify conditions. Several departments require additional materials such as test scores or letters of recommendation. The student will be informed of his admission status after this process has been completed. Admission to the Graduate School is determined almost entirely by the caliber of the applicant's previous college work.

An applicant should see to it that all required admissions materials are submitted to the Graduate School no later than 30 days prior to the beginning of the quarter for which he is seeking admission. An applicant to a degree program whose materials are received too late for processing may be granted unclassified (late entry) admission status for the quarter for which admission was originally sought. The application papers will continue to be processed for admission to a degree program for the quarter following the one originally applied for. Whether work taken by a student who is unclassified because of late application will later count toward a degree will be decided by the Graduate School and the department concerned.

An applicant to master's-level study may be admitted to the Graduate School if: (1) in order to complete all requirements for the bachelor's degree he needs no more than 48 quarter hours (if his school is on a quarter system) or 32 semester hours (if his school is on a semester system) beyond the credits shown on his transcript at the time of application; and (2) he has an overall grade point average of at least 3.5 (where A=5.0) in the work shown on his transcript at the time of application.

An applicant for admission to Ph.D.-level study may be admitted to the Graduate School if: (1) in order to complete all requirements for the master's degree he needs no more than 24 additional quarter hours (if his school is on the quarter system) or 16 additional semester hours (if his school is on the semester system) beyond the credits shown on his transcript at the time of application; and (2) he has an overall grade point average in graduate work of at least 4.25.

In all cases, admission to the Graduate School is final only when an official transcript which certifies that the applicant has been awarded a bachelor's degree is received in the Graduate School office.

A student who is applying to a department for an assistantship or fellowship and who submits a transcript in support of that application must also submit an application for admission and transcripts directly to the Graduate School for admission processing.

Admission of Faculty Members

No one who holds a faculty appointment at any of the academic ranks—

* The word "department" is used here to designate any academic or administrative unit offering work leading to one or more graduate degrees.

lecturer, instructor, assistant professor, associate professor, and professor—shall be admitted to a graduate degree program at any level, or be eligible to register for courses to be taken for graduate credit, in the graduate degree program in which he holds his appointment. If a faculty member has been admitted to a graduate degree program in some unit other than the one in which he holds his appointment, no member of the faculty of the unit in which the appointment is held may be a member of his thesis committee, graduate program committee, dissertation committee, or any other examining committee.

Admission to Graduate Study on an Unclassified Basis

A person may apply for admission to the Graduate School as an unclassified student when he does not seek a graduate degree or certificate, or when he has applied too late to be admitted to a degree program for the quarter for which he seeks admission. A person who seeks admission as an unclassified graduate student must present evidence that he holds a bachelor's degree and that his overall undergraduate grade point average is 3.40 or higher ($A = 5.00$).

Admission of International Students

A student from abroad is subject to all requirements for admission established by the Graduate School. In addition, he must complete special forms pertaining to the admission of international students. For these admission forms and for other information concerning international students, inquiries should be sent to the Assistant Director of Admissions, International Student Division, Office of Admissions and Records, Southern Illinois University, Carbondale, Illinois 62901.

All foreign-born applicants must apply through the foreign admissions office unless they are certified as residents by the Office of Admissions and Records.

To allow ample time for visa and other departure procedures, the applicant should have his application and all supporting documents on file with the University no less than four months prior to his proposed entry date.

An international student must be enrolled in a program leading to a graduate degree. He cannot be admitted as an unclassified student.

If the above requirements are satisfactorily met and the student is admitted to a degree program, he will be required to certify that he has adequate financial resources available to him to undertake and continue in a program of study.

Test of English as a Foreign Language (TOEFL)

All foreign-born applicants not admitted under paragraph one under *Academic Requirements* listed below whose primary spoken language is not English must achieve a TOEFL score of 550. This test must have been taken no more than 12 months prior to the quarter for which the applicant is seeking admission.

Academic Requirements

If a foreign-born applicant has completed a four-year bachelor's degree program at an accredited institution in the United States of America, the applicant may be given the same consideration for admission to a graduate degree program as a United States citizen, in regard to both academic requirements and the use of English as a foreign language.

If a foreign-born applicant has completed the equivalent of a four-year baccalaureate degree in any other country, or at an unaccredited institution, the applicant must have an academic record equivalent to a 3.70 grade average ($A = 5.00$) for admission to a graduate degree program.

The determination of the applicant's grade point average shall be the responsibility of the Office of Admissions and Records, International Student Division.

Retention

A student admitted conditionally because of low grades is on academic probation from the time of admission. A student who was admitted without any condition because of low grades (that is, a master's-level student whose overall undergraduate GPA was 3.70 or above, or a specialist- or Ph.D.-level student whose GPA in all previous graduate work was at least 4.25), and who has earned 16 or more quarter hours of credit in 400- or 500-level courses, will be placed on academic probation when his cumulative GPA for all graduate course work falls below 4.00. All 400- and 500-level courses taken by a graduate student count in his overall graduate GPA, even though some courses may not be a part of his degree program.

A student who is currently on academic probation and has been on academic probation for at least one quarter, and who has earned at least 24 quarter hours of credit in graduate courses, will be dropped from the Graduate School if he has received eight or more hours of *C* in graduate courses which are not balanced by hours of *A* in graduate courses, or in any case in which it would take at least eight additional hours of *A* work to bring his graduate grade point average up to 4.00. Four examples of cases where a student would be dropped: eight hours of *C* and no hours of *A*; ten hours of *C* and two hours of *A*; four hours of *C*, two hours of *D*, no hours of *A*; five hours of *C*, one hour of *E*, and no hours of *A*. A student who is dropped from the Graduate School under these conditions will not again be eligible for admission to the Graduate School unless a special exception is granted by the graduate dean.

Undergraduate Student Registration in Graduate Courses for Graduate Credit

An undergraduate student who wishes to register for a graduate course (any 400- or 500-level course) for graduate credit must file the standard application for admission to the Graduate School. If he is admitted to the Graduate School, he will not be allowed to register for graduate courses for graduate credit until he is within 16 quarter hours of receipt of the bachelor's degree. At that time his registration will be permitted, subject to all of the approval procedures in effect for graduate students who have already received the bachelor's degree, together with final approval by the Graduate School. After having received such approvals an undergraduate student will be allowed to take graduate courses for graduate credit for two quarters. If, at the end of two quarters, he has not received the bachelor's degree, his permission to enroll in graduate courses for graduate credit will be withdrawn until after he has received the bachelor's degree.

Undergraduate Credit for 500-Level Courses

Undergraduate students are permitted to register for 500-level course for undergraduate credit only by special permission of the graduate dean.

Such permission will be granted only to properly qualified students. The procedure for obtaining such permission is as follows: The chairman of the department offering the course, in collaboration with the instructor who is teaching the section of the course in which the student desires to enroll, and in consultation also with other appropriate persons such as the director of graduate studies for the department, should write a letter to the graduate dean indicating the special reasons why the particular student should be allowed to take a particular 500-level course for undergraduate credit. Such a request should be made only for a truly superior student, and there should be a clear expectation that the student would perform above the median of graduate students in the course. The letter should therefore include some information on the student's academic work with particular attention to advanced and relevant courses in the major area. There should also be an explanation of why the student's needs cannot be adequately satisfied by undergraduate courses. Any information that explains the unique features of this particular student's case and justifies special approval will be helpful. Appropriate grade point averages should be included. If the petition is granted, a letter will be sent from the graduate dean to the registrar, asking that the specified credit be accepted in the student's undergraduate program.

Master's Degree Programs

Admission

In order to receive unconditional admission to the Graduate School for study at the master's level, the applicant must hold a bachelor's degree and have an overall undergraduate grade point average of 3.70 or higher ($A = 5.00$).

A student with a grade point average between 3.40 and 3.70 may be granted conditional admission and will remain on conditional status until he earns 24 quarter hours of credit in graduate-level courses. The faculty of a degree program unit may add its own grade point average requirements and other conditions for admission to that particular program. Students who are denied admission to a degree program may enroll as unclassified students. If, at a later date, they are admitted to a degree program, none of the credit hours they acquired as unclassified students may be counted towards their degree.

A student whose overall undergraduate grade point average is below 3.40 may be admitted to the Graduate School only by special permission of the graduate dean. A student who wishes to request such permission must write a letter formally requesting that an exception to the grade point average rule be made in his case, stating his reasons for believing that special consideration is warranted in his case, and particularly stating whether there is some reason to believe that his previous academic record is not a valid indicator of his success in Graduate School because of his membership in a minority group, his low socioeconomic status, or his sex. In addition, this letter should indicate when he expects the following information to have been received in the Graduate School office: (1) scores on the aptitude test of the Graduate Record Examination (GRE) or on other standard tests such as the Miller Analogies Test; (2) at least three letters of recommendation on his behalf from persons who are professionally qualified to judge his promise as a graduate student in his proposed specialty; (3) a very strong letter of support from the

degree program to which he wishes to apply. If a student has requested special permission for an exception to the grade point average rule, the Graduate School office will calculate his grade point average for his last two years of undergraduate work and for his undergraduate major; at least one of these grade point averages should be above 3.70. If the graduate dean approves admission to the Graduate School for a student whose grade point average is less than 3.40, the student must still obtain admission to a graduate degree program, since he will not be permitted to register as an unclassified student.

General Requirements

Graduate credit earned in graduate courses for which the student has received grades of A, B, C, or S, and only such credit, is acceptable for master's degree programs. An overall grade point average of at least 4.00 in all graduate work included in the master's degree program is required before that degree can be awarded. If a graduate student repeats a course with the permission of the graduate dean, both grades will be counted in his grade point average. Forty-eight hours of acceptable graduate credit are required for a master's degree, except in fine arts and college student personnel work, where 60 hours are necessary, and in behavior modification, psychology, and rehabilitation counseling, where 72 hours are required. At least 24 hours must be earned in courses numbered 500 or above. No more than 16 hours earned for work done on campus at another university (for this purpose Southern Illinois University at Edwardsville is considered to be another university) or in extension from Southern Illinois University at Carbondale, or any combination of the two, may be counted toward the degree. An evaluation of transfer credit is made in every case and may result in a reduction of the credit offered. No transfer credit will be given for work bearing a grade below B. No credit toward the degree may be earned by correspondence.

Only credit earned within a six-year period preceding the completion of requirements for the degree, whether at Southern Illinois University at Carbondale or elsewhere, will be counted toward the degree.

Each candidate for a master's degree shall write a thesis except where a graduate program has been approved by the Graduate Council to provide for some other arrangement, such as a research paper. The thesis may be counted for not more than nine nor less than five quarter hours of credit. Two copies of the approved thesis must be presented to the Graduate School at least three weeks prior to the date of graduation, to be bound and shelved in the library. At the time that the department submits a clearance for the student to graduate, the director of the thesis must submit grade change cards to change the grade in the thesis course from Deferred to Satisfactory or Unsatisfactory. For nonthesis programs, a research paper should show evidence of the student's knowledge of research techniques and should be based on a special project or specific courses as may be recommended by the advisory committee.

Each candidate for a master's degree is required to pass a comprehensive examination covering all of his graduate work, including the thesis. This examination may be written or oral, or both, as determined by the student's advisory committee.

Application forms for graduation, which are to be secured from the Office of Admissions and Records should be completed and returned to that office after payment of the graduation fee at the Bursar's Office, at least five weeks prior to the graduation date.

Double Major for Master's Degree

A student may earn a double major in a master's degree under the following conditions: (1) The student must have been admitted to one master's degree program. (2) Each unit in which the student wishes to earn a major must have an approved master's degree program. (3) The chairman of each unit must endorse the proposed program. (4) The proposed program must specify the title of the degree which is awarded. (5) The proposed program must be approved by the graduate dean. (6) At least 30 quarter hours must be earned for each major, and one-half of the course work for each major must be in courses numbered 500 or above. (7) The minimum number of hours required for the double major is as follows:

- 60 quarter hours—if each major individually requires a minimum of 48 hours;
- 68 quarter hours—if one major requires 48 and the other requires 60;
- 75 quarter hours—if one major requires 48 and the other requires 72;
- 82 quarter hours—if one major requires 60 and the other requires 72 or more;
- 87 quarter hours—if both majors require 60;
- 90 quarter hours—if both programs require 72.

Second Master's Degree

A student may earn a second master's degree if the second degree is offered by an academic unit different from that of his first master's degree. None of the hours used towards any previous degree will be allowed to count as a part of the total number of hours toward a second master's, and all regulations concerning the total number of hours and the number of hours at the 500 level shall apply to the second master's degree exactly as they would if this were a first master's degree.

Sixth-Year Specialist Certificate Program

The sixth year specialist certificate program is for a qualified student with a master's degree or its equivalent, as determined by the specific department, who wishes to pursue a specialization in an educational field. Sixth year courses of study are offered in the professional education areas of educational administration, elementary education, guidance, secondary education, and special education.

Students seeking admission to the sixth year specialist certificate program follow the same procedures that apply for admission to other graduate programs. Admission to the sixth year specialist certificate program requires a grade point average of 4.25 ($A = 5.00$) for all previous graduate work. Departments may establish a higher scholastic requirement for admission and may use other selective criteria appropriate to the field of specialization. The student's previous work shall have provided a proper base of general and special preparation for the sixth year studies; if this is lacking, additional work must be taken to establish this base. Two years of experience relevant to the specialized field are required.

An advisory committee of three members for each candidate shall be appointed by the dean of the Graduate School upon the recommendation of the chairman of the respective department.

A minimum of 45 quarter hours of work beyond the master's degree or its equivalent is required. This work must be planned early by the student and his advisory committee, must clearly lead the student toward

the specialization he seeks, and must conform to the sixth year specialist program approved by the Graduate Council. A minimum grade point average of 4.25 for all work in the sixth year specialist certificate is required for completion of the program. No more than nine hours earned for work done on campus at another university (for this purpose Southern Illinois University at Edwardsville is considered to be another University) or in extension from Southern Illinois University at Carbondale, or any combination of the two, may be counted toward the degree. All such work must be approved by the student's advisory committee and must carry a grade of *B* or better. No credit earned through correspondence or used in obtaining another degree or certificate may be counted.

A field study is required of each candidate for the specialist certificate. A written report of the field study is to be submitted to the student's advisory committee before a final oral examination. After the advisory committee approves the field study report, one copy will be forwarded to the Graduate School to be placed in Morris Library.

All credit must have been earned within seven years prior to the completion of the program.

The residency requirement is fulfilled by the enrollment of at least 12 quarter hours in a single quarter or of at least eight quarter hours in each of two quarters.

Doctor of Philosophy Degree Program

Admission

Admission to a Ph.D. program in the Graduate School requires a master's degree or its equivalent, a grade point average in graduate work of at least 4.25, and acceptance by the academic unit offering the Ph.D. program. The graduate dean informs each student of any conditions for admission imposed by the Graduate School or by the academic unit.

General Requirements

The Ph.D. degree is awarded for high accomplishment in a particular discipline or a recognized interdisciplinary area, as measured by the student's ability to pass the preliminary examination for admission to candidacy, meet the research tool requirement of the program, perform a piece of original research, present the results in proper form in a dissertation, and defend the dissertation before a faculty committee. There is no graduate school requirement that a certain number of quarter hours be taken for the Ph.D. Some degree programs do have requirements for the student of a certain number of quarter hours. Therefore, the acceptability of work done at other institutions as a part of a Ph.D. program is at the discretion of the department.

Preliminary Examination

The student will generally prepare himself for this examination through independent study and course work, as advised by the faculty of his Ph.D. program. The examination is given to determine the breadth and depth of the student's knowledge within his discipline. The particular form and content of the examination are determined by the faculty of each of the doctoral programs. The student will be permitted to take the preliminary examination at the discretion of the department, after he has completed two years of full-time study or its equivalent beyond the baccalaureate.

Research Tool Requirement

The Ph.D. at Southern Illinois University at Carbondale is a research-oriented degree. The research tool requirement is intended to be an integral part of the student's program. Since research materials, problems, and techniques vary from discipline to discipline, the details of the research tool requirement are determined by the faculty of each of the doctoral programs.

Admission to Candidacy

Admission to candidacy is granted by the dean of the Graduate School upon recommendation of the faculty responsible for the student's program, after the student has passed his preliminary examination and met the research tool requirement of the program. The Ph.D. degree may not be conferred less than six months, nor more than five years, after admission to candidacy, except upon approval of the dean of the Graduate School. If completion of requirements is delayed beyond five years, a student may be required to take another preliminary examination and be admitted to candidacy a second time.

Dissertation

After being admitted to candidacy, the student must complete a dissertation showing that he is capable of independent research or other creative effort. The dissertation shall be supervised by a faculty committee which has been approved by the dean of the Graduate School. Unless the graduate dean has approved an exception requested by the student's academic unit this committee shall consist of five faculty members, at least one of whom shall be from a graduate program outside the student's academic unit.

While the student is working on his dissertation he must register for the course numbered 600. The student is to devote at least one academic year of full-time work to complete the dissertation; he will register for 36 quarter hours of dissertation credit, for example, 12 hours for each of three terms. At the time that the department submits a statement of approval for the student to receive his degree, the chairman of the student's dissertation committee must submit grade change cards to record the final grade which the student has received for his dissertation credits.

The student must submit two copies of the dissertation acceptable to the Graduate School, along with an abstract of 600 words or less. All dissertations will be microfilmed. There is a fee of \$25.00 to cover the cost of publication of the abstract and microfilming of the dissertation. If copyright is desired, an additional fee of \$15.00 will be required.

Final Examination

There will be a final oral examination administered by the student's doctoral dissertation committee. The examination will cover the subject of the dissertation and other matters related to the discipline. Any member of the graduate faculty may attend the final oral examination and may participate in questioning and discussion, subject to reasonable limitations imposed by the chairman of the committee. Only the members of the committee may vote or make recommendations concerning acceptance of the dissertation and final examination. A student will be recommended for receipt of the degree only if the members of the committee, with at most

one exception, judge both his dissertation and his performance at the final oral examination to be satisfactory.

Residency

In order to earn the Ph.D. one must be a full-time student on campus for a minimum of three consecutive quarters. This means in particular that during this period of three consecutive quarters the student should not be on more than half-time University appointment. Typical of such appointments are teaching and research assistantships. Exceptions may be made to the residency rule in cases which involve: (1) long-time involvement in the degree program, (2) a close relationship between assigned duties and the specialized area of study, and either (3) two consecutive quarters of study without assigned duties, or (4) at least three nonconsecutive quarters as a full-time student.

Interdisciplinary Doctor of Philosophy Programs

These guidelines provide for interdisciplinary Ph.D. programs for a limited number of students whose educational requirements can be met by existing resources but not exclusively by any one of the University's constituent units. Interdisciplinary Ph.D. programs will be instituted in response to the particular academic interest of individual students, not as programs of a permanent nature. The procedures and criteria given below govern the authorization and control of interdisciplinary Ph.D. programs.

1. After admission to an established doctoral program at Southern Illinois University at Carbondale and upon the recommendation of the chairman or adviser of that program, a student may apply for an interdisciplinary Ph.D. program to the dean of the Graduate School.

2. The dean of the Graduate School will apply the following criteria in deciding whether a program committee should be established to consider the proposed interdisciplinary Ph.D. program.

- a. The requisite staff must be available.
- b. The library holdings must be adequate without unreasonable additions.
- c. The program must lie within the recognized disciplines or fields of study, at least one of which offers the Ph.D. program.

3. If the dean of the Graduate School is satisfied that the proposed program satisfies these criteria, he shall form a special program committee of five members, three of whom shall be from units offering the Ph.D.

4. If the committee approves the proposed program, a plan of study shall be developed that includes the following elements:

- a. Fields or areas of study
- b. Required courses
- c. Languages or other research tool requirements
- d. Dissertation subject

5. The program as approved by the committee and accepted for principal sponsorship by a unit with an approved Ph.D. program shall be submitted to the dean of the Graduate School. Upon his final approval the student's program shall have the same binding effect upon the Graduate School as programs printed in the graduate catalog. The degree earned shall carry the title of the doctoral unit that has assumed principal sponsorship. The commencement program shall give specific indication that the degree is interdisciplinary and include a listing of those units

that are substantively involved in addition to the principal sponsoring unit, as determined by the graduate dean.

6. When the committee has certified all the required performances, including the results of examinations, the committee shall be dissolved.

Advisement

Each student admitted to the Graduate School is expected to consult a graduate adviser in the department or faculty of his major for assistance in planning his total program and in choosing courses each quarter. As soon as the student gains approval for a thesis topic and a thesis director, the latter is designated as chairman of the advisory committee. This committee advises the student in the preparation of the thesis or dissertation, evaluates it quality when completed, and supervises the final examination, written or oral, when one is required.

A graduate student is expected to plan his work carefully. Program changes after registration must be approved by the student's adviser and the dean of the Graduate School. They may involve payment of a program-change fee. Program-change forms may be obtained from the Graduate School office.

The graduate student must assume responsibility for his progress by keeping an up-to-date record of the courses he has taken and by consulting periodically with his adviser. Responsibility for errors in program or in interpretation of regulations of the Graduate School and the University rests entirely upon the student. It is the student's responsibility to see that his records in the Graduate School office, Office of Admissions and Records, and with his major adviser are brought together well in advance of the time of graduation. The student cannot be approved for graduation unless these records are available at least six weeks in advance of the time of graduation. Advice is always available on request.

Registration

Registration takes place in the Graduate School office. Only those students who have been officially admitted by the Graduate School will be permitted to register. Students should register in person. There is no registration by mail. A student who has been admitted to a degree program begins the registration process by consulting a graduate adviser in his major department before coming to the Graduate School office. Unclassified nondegree students begin registration immediately at the Graduate School office. Information concerning registration dates and deadlines for the first quarter a student attends the University will be sent to him at the time he is admitted to the Graduate School. Continuing students should consult the schedule of classes for each quarter to find deadlines and dates for their registration.

Student Course Loads

Maximum course work for graduate students is 18 hours each quarter; 12 hours is considered a normal load. The maximum load for teaching, research, and graduate assistants who are employed half-time is 12 hours and the minimum is 6 hours; for assistants who are employed more than half-time the maximum is 8 hours. For persons attending the eight-weeks

summer session the maximum is 12 hours. Graduate Fellows must take a minimum of 10 hours per quarter; NDEA (Title IV) fellows and NSF trainees are required to register for 11 to 18 hours per quarter. Exceptions to these maxima and minima are possible only with the written permission of the graduate dean.

Graduate Advisers

Following is a list of chief academic advisers to students pursuing a graduate degree.

Administration of Justice—Jesse Woodard	Government—Joann Paine
Agricultural Industries—Eugene Wood	Guidance and Educational Psychology—John J. Cody
Animal Industries—G. B. Marion	Health Education—Donald Boydston, Charles E. Richardson
Anthropology—Edwin A. Cook	Higher Education—John E. King, Donald Tolle
Art—Milton Sullivan	History—James Murphy
Art Education—Roy Abrahamson	Home Economics Education—Anna Carol Fults
Behavior Modification—Robert Campbell	Instructional Materials—Gordon Butts
Biological Sciences—Edwin Galbreath	Inter-American Studies—Albert W. Bork
Botany—William Ashby	Journalism—George C. Brown
Business Administration—Gola E. Waters	Linguistics—James Redden
Chemistry and Biochemistry—Richard Arnold, James Cox	Mathematics—Carl E. Langenhop
Child and Family—Michael Zunich	Microbiology—Maurice Ogur, Hassan Rouhandeh
Clothing and Textiles—Rose Padgett	Molecular Science—John Zimmerman
College Student Personnel—Jack W. Graham	Music—Roderick Gordon
Community Development—Richard Thomas	Occupational Education—Larry Bailey
Computer Science—A. M. Mark	Philosophy—Lewis E. Hahn
Design—Jane Merchant	Physical Education (Men)—Edward J. Shea
Early Childhood Education—Nancy Quisenberry	Physical Education (Women)—JoAnne Thorpe
Economics—Robert Ellis	Physics—Richard Schlecht
Education (Ph.D. Program)—Dean L. Stuck	Physiology—Ralph Stacy
Educational Administration and Foundations—Edward Sasse	Plant Industries—Irvin Hillyer
Elementary Education—Luther Bradfield	Psychology—David Ehrenfreund, Janet Rafferty
Engineering	Recreation and Outdoor Education—Loren Taylor
Electrical and Systems Engineering—J. G. Smith	Rehabilitation Administration—Robert E. Lee
Engineering Mechanics and Materials—P. K. Davis	Rehabilitation Counseling—Brockman Shumacher
Thermal and Environmental Engineering—Juh-wah Chen	Russian—Joseph Kupcek
English—Howard Schultz	Secondary Education—R. J. Fligor
English as a Foreign Language—James Redden	Secretarial and Business Education—Harves Rahe
Family Economics and Management—Karen E. Craig	Sociology—Peter Munch
Food and Nutrition—Frank Konishi	Spanish—Lincoln Canfield
Forestry—Ali A. Moslemi	Special Education—James Crouner
French—Maxine Vogely	Speech—Thomas Pace
Geography—Douglas Carter	Speech Pathology and Audiology—John Moncur
Geology—Russell Dutcher	Theater—Archibald McLeod
German—Howard French	Zoology—George Garoian

Grading System

Grades are recorded by the letters *A*, *B*, *C*, *D*, and *E* (*A* = 5.00). *A* is for outstanding work, *B* for good or average performance, *C* for conditional or not fully satisfactory work, *D* and *E* for failure. Only courses for which the grades of *A*, *B*, *C*, or *S* have been received are acceptable in fulfillment of graduate degree requirements. Other grades may be:

W—Authorized withdrawal made through a program change where no basis for evaluation has been established. Work may not be completed. This grade is not included in grade point computation for retention purposes.

WP—Authorized withdrawal made after first four weeks through a program change with a passing grade. Work may not be completed.

WE—Authorized withdrawal made through a program change after the first four weeks with failing grade. Work may not be completed, but grade is included in calculation of average.

INC—Incomplete. Has permission of instructor to be completed within a time period designated by instructor, but not to exceed one year from the close of quarter in which course was taken. If *Inc.* remains, it is not included in grade point computation. To complete the work, a student should not register for the course again but should complete the work from the original registration.

DEF—Deferred. Used only for graduate courses of an individual, continuing nature such as thesis or research. When the work is completed, grade is changed to a letter grade.

ABS—Unauthorized withdrawal. Used when student fails to continue in attendance, but does not withdraw through a program change. Counted as an *E* in calculating grade point average.

S—Satisfactory. Used for noncredit courses, thesis and dissertation hours, and certain specially designated and approved 500-level research, internship, or practicum courses. Is not counted in calculating grade point average.

U—Unsatisfactory. Used for noncredit courses, thesis and dissertation hours, and certain specially designated and approved 500-level research, internship, or practicum courses. Is not counted in calculating grade point average.

AU—Audit. A student registering for a course on an audit basis receives no letter grade and no credit hours. An auditor's registration card must be marked accordingly and he pays the same fees as though he were registering for credit. A student registering for a course for audit may change to a credit status or vice versa through the official program change method during the first four weeks of a quarter. Thereafter the change may not be made.

Note: Letter grades *A*, *B*, *C*, *D*, and *E* as well as the grades *WE* and *ABS* are included in grade point averages for academic retention. Authorized withdrawals made through a program change during the first four weeks of the quarter do not carry a grade. After four weeks it is at the discretion of the instructor whether or not a letter grade will be given for an authorized withdrawal.

2 / Instructional Units

Administration of Justice

The Center for the Study of Crime, Delinquency, and Corrections offers the Master of Science degree in administration of justice. This curriculum is a multidisciplinary study of crime, criminals, and societal responses to their behavior. Through merger of theoretical orientations and practical experience, students are prepared for careers in law enforcement, court administration and auxiliary services, correctional institutions, community-based programs, teaching in criminal justice curriculums, and criminal justice planning agencies. The projects and research activities of the center expose students to issues and settings of their subsequent careers.

Unconditional admission requires a 3.7 overall undergraduate average and acceptance by the center's faculty. Scores from the Graduate Record Examination (aptitude portion only) are also required by the center. Graduation requires writing of a thesis and completion of supervised field work. The sixty quarter hours of instruction include required core courses: AJ 501a,b,c, AJ 580 and AJ 583; supervised field work; and related courses. Students with undergraduate backgrounds particularly applicable to this curriculum may have the number of hours reduced to 52 quarter hours. Students with their advisory committees plan individualized multidisciplinary programs relevant to their academic and career objectives.

Application forms for both the Graduate School and the administration of justice must be separately submitted. Upon request to the center application forms from the Graduate School and center will be sent. Acceptance in the program is contingent on the final approval of the administration of justice admissions committee after processing by the Graduate School.

The center also supports joint graduate programs for students oriented primarily into the Departments of Government, Psychology, and Sociology. Inquiries may be addressed to the chairman of the center, Academic Affairs.

Agricultural Industries

The Department of Agricultural Industries offers graduate work leading to the Master of Science in agricultural industries with concentrations in agricultural economics, agricultural education and agricultural services. Students interested in the Doctor of Philosophy degree in economics with a concentration in agricultural economics should consult with the Department of Economics. Students interested in advanced degrees in education beyond the masters with a concentration in agricultural education should consult with the College of Education.

Agricultural Economics

The concentration in agricultural economics is designed for the professional agricultural economist. Specialization may be attained in farm management, agricultural marketing, agricultural prices, agricultural policy, resource economics, and agri-business management.

Application forms for admission to the Graduate School may be obtained from the Graduate School.

For entering graduate students to be accepted on an unconditional basis in the agricultural economics concentration of the Master of Science program, a minimal GPA of 3.7 is required and an undergraduate competence in economics and agricultural economics must be demonstrated. Students may be accepted on a conditional basis if the GPA is below 3.7. Students with an insufficient background in economics or agricultural economics may be admitted if remedial courses are taken.

A minimum of 48 hours of graduate credit, including thesis or research hours, is required for the Master of Science in agricultural industries with a concentration in agricultural economics. At least 24 hours must be at the 500 level. Twelve hours must be agricultural economics courses, 8 hours economics courses, and 8 hours statistics or accounting courses. M.S. students usually take 6–9 hours of research or thesis and complete the additional hours by taking courses in agricultural economics or in their major area of concentration in the School of Business. A thesis or research paper is required. In some cases, particularly for students holding assistantships, four academic quarters may not be sufficient time in which to complete degree requirements.

Inquiries for financial assistance and additional information should be directed to the chairman of the Department of Agricultural Industries, Southern Illinois University at Carbondale, Carbondale, Illinois, 62901.

Agricultural Education

The concentration in agricultural education is designed for instructors in secondary schools, for students preparing for employment at junior colleges and for those desiring to continue their education by obtaining a Ph.D.

Application forms for admission to the Graduate School may be obtained from the Graduate School. For entering graduate students to be accepted on an unconditional basis in the agricultural education concentration of the M.S. program a minimal GPA of 3.7 is required. Students may be accepted on a conditional basis if the GPA is below 3.7.

A minimum of 48 hours of graduate credit, including thesis or research hours, is required for the M.S. in agricultural industries with a concentration in agricultural education. At least 24 hours must be at the 500 level. A minimum of 18 hours is required in agriculture (including agricultural education), 8 hours of research methods or statistics, and 8 hours in education or community development. M.S. students usually take 6–9 hours of research or thesis, and complete the additional hours by taking courses in education or agriculture. A thesis or research paper is required. In some cases, particularly for students holding assistantships, four academic quarters may not be sufficient time in which to complete degree requirements.

Inquiries for financial assistance and additional information should be directed to the chairman of the Department of Agricultural Industries,

Southern Illinois University at Carbondale, Carbondale, Illinois, 62901.

Agricultural Services

The agricultural services concentration is designed to permit students who are engaged in agriculture as extension workers, soil conservation employees, etc., to expand their educational experiences in light of current and prospective employment goals and opportunities.

Application forms for admission to the Graduate School may be obtained from the Graduate School. For entering graduate students to be accepted on an unconditional basis in the agricultural services concentration of the M.S. program, a minimal GPA of 3.7 is required. Students may be accepted on a conditional basis if the GPA is below 3.7.

A minimum of 48 hours of graduate credit, including thesis or research hours, are required for the M.S. in agricultural industries with a concentration in agricultural services. At least 24 hours must be at the 500 level. Eighteen hours must be agricultural courses. Students usually take 6–9 hours of research or thesis and complete the additional hours by taking courses in their major area of concentration. A thesis or research paper is required. In some cases, particularly for students holding assistantships, four academic quarters may not be sufficient time in which to complete degree requirements.

Inquiries for financial assistance and additional information should be directed to the chairman of the Department of Agricultural Industries, Southern Illinois University at Carbondale, Carbondale, Illinois, 62901.

Animal Industries

The Department of Animal Industries offers programs of study leading to the Master of Science degree. Programs may be designed to meet the requirements of candidates in the various disciplines of animal behavior, breeding, nutrition, and physiology. Minimum requirements for the master's degree may be fulfilled by satisfactory completion of 48 quarter hours of graduate credit. If the student writes a thesis, 24 of these quarter hours must be in animal industries courses; if the student submits a research paper, 30 of these quarter hours must be in animal industries courses. Minimal requirements for students entering the master's degree program involving a thesis are a) meet animal industries undergraduate requirements, b) minimal GPA of 3.7 ($A = 5.0$). Students who do not meet the undergraduate requirements may correct these deficiencies while an unclassified student or select the non-thesis option and complete at least 10 quarter hours of undergraduate course work in animal industries in addition to the 30 hours of departmental graduate credit. Students entering the animal industries graduate program with a GPA below 3.70 are accepted on a conditional basis and must enroll in 12 hours of structured courses at the 400–500 level during his first quarter, and make a 4.0 GPA or he is dropped from the program.

Each student, whether in the thesis or non-thesis option, will have an advisory committee of at least three members including the departmental chairman and at least one other member of the department. Each master's degree candidate must pass a comprehensive oral examination covering his graduate work including the thesis or research paper.

Research leading to a thesis can be conducted with beef cattle, dairy

cattle, horses, poultry, sheep or swine. Supporting courses may be selected in applied science, chemistry, mathematics, microbiology, physiology, zoology, behavioral sciences, etc.

Students who wish to emphasize the study of animal production in a program leading to the Master of Science degree might select a majority of their supporting courses from the Departments of Agricultural Industries or Plant Industries.

Admission to programs administered by the Department of Animal Industries must be approved by the department. Application for admission to graduate study in animal industries should be directed to the Graduate School. The applicant must have the registrar of each college previously attended send three official transcripts of his record directly to the Graduate School. Supporting materials for the application should be sent to the Department of Animal Industries and include two letters of recommendation from individuals who can evaluate the candidate's academic ability and a letter in which the applicant expresses his professional and personal objectives.

Students interested in animal science at the doctoral level can be admitted to a program of study leading to the Ph.D. degree in physiology. The program, which is administered by the Graduate School through the Department of Physiology, is adequately flexible to allow candidates to emphasize such areas as behavioral science, endocrinology, meat science, metabolism, microbiology, physiological genetics, or reproductive physiology.

Minimum requirements have been established for students entering the Ph.D. program. These include undergraduate training in biology, inorganic and organic chemistry, and one year of both mathematics and physics. Deficiencies in these areas must be resolved prior to entry into the program.

Information concerning admission policies, requisites for graduation and availability of financial assistance for graduate study in any specific program can be obtained from the Department of Animal Industries, Southern Illinois University at Carbondale, Carbondale, Illinois 62901.

Anthropology

General Requirements

Acceptance for graduate study in anthropology and subsequent continuation in the graduate program are at the discretion of the Department of Anthropology, provided that the student has been admitted into the Graduate School and meets the retention requirements of the Graduate School.

Application forms for admission to the Graduate School may be obtained from the Graduate School. In addition to the materials required by the Graduate School, the student must send three letters of recommendation and a personal statement of aims and interests addressed to the chairman of the department.

Although Graduate Record Examination scores are no longer required by the department, the student is invited to include these scores with other data supplementing his application papers. The student is advised, however, that inclusion of such scores may be required as a part of a future application for non-university grants or fellowships.

No special program of previous work is required. Applicants with academic degrees in fields other than anthropology are accepted. However,

in consultation with the department, a plan for remedying undergraduate deficiencies in anthropology will be arranged.

In some cases the department may petition the graduate dean for permission for the student to be admitted to Ph.D. level study without formal receipt of the master's degree on the basis that his graduate work is equivalent to a master's degree.

The student coming to Southern Illinois University at Carbondale for either the M.A. degree or the Ph.D. degree will be given a choice between alternatives A or B noted below. Inasmuch as these involve anthropology, they will include the traditional major sub-fields which, as staff is available, will be archaeology, cultural anthropology, social anthropology, linguistics, and physical anthropology.

(A) Concentration in a major sub-field of anthropology with sufficient work in the other sub-fields to allow the student a general understanding of their coverage, method, and theory.

Students in program A will be expected and encouraged to go outside the discipline of anthropology as it is formally structured today. A student taking the social anthropology concentration, for example, might do work in one or more sub-fields of sociology, psychology or social psychology, or in applied fields such as community development. A culture historian might be involved in geology, cultural or physical geography, botany, zoology, history, or paleontology. A linguist might have a similar range of outside fields depending on the needs of the individual student.

(B) A degree in which two or even three basic anthropological sub-fields can be merged.

For example, a student might wish to combine social anthropology and linguistics or archaeology and social anthropology. In such a case an internalized program could be worked out. Outside fields may be included in this alternative, though they will be less heavily stressed than the anthropological ones.

In all cases the student in either category A or B will be expected to have at least two subject fields, one of which must be within Anthropology. All students in either the M.A. or Ph.D. programs will be required to have a reading knowledge of a major literary language foreign to the student. In addition, all graduate students in anthropology are required to have formal experience in teaching.

The Program

A student coming into the Department of Anthropology is expected to take a well-rounded curriculum in anthropology during his first year, the actual coursework being determined by his background in anthropology, TA and RA duties, etc. All students will take Anthropology 415 (Philosophy of Social Science) or such substitute as the department may deem desirable. A student must have a minimum of eight graduate level courses over a 3-quarter period, including at least one graduate credit course or seminar in each of the major sub-fields of anthropology for which staff is available.

Midway in the third quarter of his/her first year in graduate school, the student will take a written diagnostic examination. The first part of this examination will consist of six hours; one and a half hours for each of the subjects of linguistics, social and cultural anthropology, archaeology, and physical anthropology. In the second part of the examination, the student will be given a selection of data (for example, a journal article) to take

home for a period of 72 hours. He/She will be asked to turn in a concise analysis and comment on these data. The purpose of the examination is not to test knowledge of anthropological data but rather to test a student's ability to manipulate abstract concepts and to express concepts clearly in writing. All members of the faculty in residence will read the two parts of the examination which will be considered as a unit and voted on as a whole. Grades will be pass or fail. A simple majority vote will pass or fail, and students who fail will be dropped from the program. Under no circumstances shall any student repeat the diagnostic examination.

At the end of the academic year students who successfully pass the diagnostic examination will have their academic record evaluated by the Executive Committee of the department. The executive committee, after consultation with other members of the department, will direct the student to make up any subject deficiencies by recommending specific course work. The executive committee, after consultation with the faculty, will also decide at this time whether the student is to go into an M.A. or a Ph.D. program.

Masters Degree Program

Students accepted for the masters program will request a committee chairman who shall be a continuing member of the Department of Anthropology. A second faculty member, who may be from outside the department, will be chosen by the student and his chairman in consultation with the departmental chairman or director of graduate studies.

In order to meet the requirements for the M.A. degree, the student must have a total of 48 hours of graduate course work of which at least half of the hours must be 500 level. The student will take, in addition to the 48 hours, 5-9 hours of thesis credit and will present a thesis or professional paper published (or one accepted for publication) in a professional journal. A copy of the thesis or published paper must be deposited with the department, and two aproved copies must be deposited with the Graduate School. Decisions on thesis topic, area, tool requirements, definition of professional journal, etc., will be the prerogative of the Committee. From time to time special M.A. programs may be offered within the departmental graduate structure.

Doctor of Philosophy Degree Program

Immediately after being advanced to the doctoral program, the student, in consultation with the chairman of the department or the director of graduate studies, will choose a committee chairman. The committee chairman and student together will then select four additional committee members. One member of the committee must be from outside the department and a second member may also be from outside the department. This committee shall normally direct the student in all subsequent graduate work and, after approval by the graduate dean, shall direct the dissertation. Any changes in the membership of the committee shall be with the concurrence of the student and the committee chairman and notice shall be given to the executive committee.

The requirements for the doctoral program are noted below:

(1) Additional course work. This involves not only work in anthropology but, as discussed above, work in other fields where necessary. The committee is expected to outline a definite course of studies that will usually involve, minimally, an additional academic year of full-time course work.

(2) Tool requirements. These vary from student to student and shall be at the discretion of the committee. The student will in all cases be expected to have a good working knowledge of a major literary language foreign to the student. Other requirements might include such skills as computer science, statistics, econometrics, biometrics, a second language, or any combination of such skills deemed necessary.

(3) After completing the equivalent of the Masters degree as defined by the Graduate School, the student must apply to the Graduate School for admission as a doctoral student.

(4) Within such time as deemed advisable by the student and his committee, but not to exceed three years of full-time graduate work, the student will be given a three-hour oral examination covering those areas of anthropology in which he/she is to concentrate. Unless the graduate dean has granted an exception requested by the committee, the student cannot take the examination until two years of full-time graduate work have been completed. As a result of this examination the committee may, by majority vote, decide the following:

- (a) The student, having passed the examination, is recommended to the Graduate School for formal candidacy.
- (b) The student, having failed the examination, is allowed to retake it after an additional period of study, which is determined by the committee.
- (c) The student, having failed the examination, is eliminated from the program.

Students who are allowed to retake the oral examination will usually maintain the same committee for the second examination. At this stage the student may, in consultation with his/her committee chairman and the chairman of the department or the director of graduate studies, still elect to take a masters degree, in which case he/she enters the M.A. program as outlined above.

Ph.D. Candidacy

A student will be advanced to candidacy when (1), (2), (3) and (4-a) above have been completed. At this point the candidate will normally undertake a period of problem-oriented fieldwork.

Dissertation

Under normal circumstances, the chairman and other members of the oral examination committee will serve as the student's dissertation committee. However, changes in the composition of the committee may be made with the approval of the department. Candidates for the Doctor of Philosophy degree must register for 36 hours of dissertation credit under Anthropology 600.

For the dissertation to be accepted, all five committee members, ideally, should concur; at the least, concurrence of the committee chairman and three of the four other members shall be required.

Following the successful completion of the dissertation, a defense of dissertation shall be held in which members of the Department of Anthropology and of other departments who may be concerned will be invited. All guests may direct questions to the candidate. To pass the dissertation defense, the candidate may have no more than one dissenting vote of his dissertation committee. The student is required to file a copy of his/her dissertation with the department, as well as filing two acceptable copies with the Graduate School.

Art

The School of Art offers graduate studies leading to the Master of Fine Arts degree in studio, and in addition offers studies constituting a concentration in art education for the Master of Science in Education degree in secondary education. The student is expected to select an area of specialization (studio or art education), and in accordance with specialization, a program will be planned in consultation with the major professor in that area.

Credit hour requirements for the Master of Fine Arts degree in studio (painting, printmaking, drawing, sculpture, ceramics, metalsmithing, and weaving), are a minimum of 60 quarter hours, and all hours that are to count towards graduation must have the approval of the student's major adviser in his studio specialty. The length of time required to complete a 60-hour program is usually 6 academic quarters or 2 academic years. Most graduate students are in residence for 6 academic quarters, but the minimum residency requirement is 3 academic quarters. Programs of residency must have the approval of the student's major adviser.

Required hours are distributed as follows: 30 hours in major field (studio specialty), 12 hours in art history or related subjects, 5 to 9 hours in thesis or terminal project work, and the remainder in electives. Elective hours may be completed within any discipline in the School of Art, or in the University at large.

In addition to the completion of course work, all candidates for the M.F.A. degree, must during the last quarter of academic work, present a graduate exhibition, present a terminal project or a written thesis, and participate in an oral examination. The terminal project is a creative activity presented in lieu of the written thesis, and in practice, the graduate exhibition is considered to satisfy the terminal project requirement.

The cost of graduate education in studio specialties is expensive, and because of the individual nature of creative work, it is virtually impossible to predict the exact cost for each student. The School of Art provides the faculty, and the studio and shop facilities that are necessary to the programs offered, but all other costs, especially materials, that are considered necessary to the successful completion of a graduate program are borne by the student.

The concentration in art education of the Master of Science in Education degree in secondary education requires a minimum of 48 quarter hours of graduate credit. These hours are distributed as follows: 24 hours in education (including 4 hours of Art 566, Research in Art Education, 4 hours of Art 560, Seminar in Art Education and either (1) 5 to 9 hours of thesis work or (2) enrollment in S.Ed. 575, Independent Research plus preparation of a research paper); and 24 hours in the areas of art education, art history, studio or crafts (including 4 hours of Art 466, Studio in Art Education and 20 hours of electives.) All hours that are counted toward graduation and election of either a thesis project or a research paper must have the approval of the major adviser in art education.

An undergraduate degree in art or art education, or the equivalent in course work or experience if the undergraduate degree is in another discipline, is required for admission into the Master of Fine Arts degree program. The student must also submit transcripts of all previous undergraduate work, present slides or a portfolio of his creative work, and may

submit letters of recommendation. An undergraduate degree in art education is required for admission into the program constituting a concentration in art education for the Master of Science in Education degree in secondary education. Any exception to these requirements must be approved by the faculty in the studio or art education specialties and by the director of the School of Art.

Asian Studies

A graduate minor is offered in Asian Studies which may be made up by selecting from the following courses which are listed by departments: Agricultural Industries 417; Anthropology 401, 483, 585, Art 451a,b,c, 571, 572; Economics 460, 461, 462; Geography 466, 522; Government 457, 458a,b,c, 480, 521, 595; History 448, 449, 455, 510, 514; Philosophy 490, 591. Thesis and dissertations on Asian topics may also be written by students in any of several majors.

Interested graduate students may write to or consult with the chairman of the Committee on Asian Studies.

Biological Sciences

Requirements for Admission

1. Bachelor's degree with a major in a natural science department.
2. Admission to the Graduate School.
3. Approval of the chairman of the Biological Sciences Committee or his designated representative.

Requirements for the Master of Science Degree in Biological Sciences

Complete 60 hours of graduate courses in the biological sciences. The specific courses required of any student are to be determined by consultation between the student and the program committee, with the following provisions:

1. No more than 35 hours of credit in any one department may be used for the degree.
2. No minor area is required.
3. Have at least 24 hours of credit in 500-level courses. These may not include more than 4 hours for "special problems," 4 hours for "seminars," and 4 hours for "readings."
4. Complete at least one 400- or 500-level laboratory course in three of the departments of the biological sciences. (No special credit, such as indicated in 3 above, will satisfy this requirement.)
5. Submit a research paper.
6. Attend, for credit, at least one quarter of seminar in three of the departments of the biological sciences.

Advisement

Guidance of students shall be by a program committee of three members, one from each of the biological science departments involved, or other departments at the discretion of the program committee. The program director will serve as an *ex-officio* member.

Graduate work may be taken in the Departments of Botany, Microbiology, Physiology, and Zoology to obtain a Master of Science degree in biological science in the College of Liberal Arts and Sciences.

Additional information may be obtained from the director of the graduate biological program, Department of Zoology, Southern Illinois University, Carbondale, Illinois 62901.

Botany

Graduate work may be taken in the Department of Botany as a major or minor leading to the Master of Arts, Master of Science, and Doctor of Philosophy degrees and as a part of the program in biological sciences leading to the Master of Science or the Master of Science in Education degree.

Applicants for the advanced degrees must be approved by the department. Queries concerning graduate work in botany should be made to the graduate adviser in botany. To be eligible for graduate work in botany, the student must have an equivalent to an undergraduate minor in botany. Certain deficiencies may be made up concurrently with graduate work.

In accordance with the general requirements of the Graduate School a candidate for the Master of Arts or Master of Science degree must complete 48 hours of graduate credit and a thesis. The Master of Arts candidate must demonstrate a competence in a foreign language.

The Doctor of Philosophy degree requires, in addition to a dissertation, a reading knowledge of two foreign languages or one foreign language and statistics or computer programming, if recommended by the candidate's committee.

Business Administration

The graduate faculty in business administration, consisting of members of the Departments of Accountancy, Administrative Sciences, Finance and Marketing of the School of Business at Carbondale, offers the Master of Business Administration degree. The M.B.A. program has as its objective the development of professional managers and executives to serve the needs of business and government and to prepare interested graduates for doctoral study. The program has been structured with flexibility so as to serve holders of baccalaureate degrees in business administration as well as those who hold degrees in other disciplines.

M.B.A. Admission Requirements

1. Complete all admission requirements set forth by the Graduate School.

2. Complete the Admission Test for Graduate Study in Business (Princeton Test) and have the results of the test mailed directly to the assistant dean, graduate studies in business administration. Information regarding this test is available by writing to: Admission Test for Graduate Study in Business, Educational Testing Service, Box 966, Princeton, New Jersey 08540.

3. Complete an interview with the director of graduate programs in business administration. This interview may be delayed in individual cases where a special trip to the campus would require travel in excess of one hundred miles to reach the Carbondale campus.

4. An undergraduate cumulative grade point average of 4.00 is preferred, and no less than 3.5 grade point average is permitted for admission. These averages are calculated on a 5.0 scale.

M.B.A. Degree Requirements

A minimum of 48 quarter hours of course work plus a terminal examination (oral, written, or both) are required. Candidates who receive permission to write a thesis must complete a minimum of 44 quarter hours of course work plus an acceptable thesis for which 8 quarter hours of credit are assigned.

Candidates who lack the necessary prerequisites may be required to complete as much as 36 additional quarter hours of acceptable course work. Those who enter the Master of Business Administration program with deficiencies in any of the basic areas in the common body of knowledge in business and administration as specified by the American Association of Collegiate Schools of Business must eliminate the deficiencies in a satisfactory manner prior to starting the program course work.

The Master of Business Administration program course work to be taken beyond that needed to eliminate deficiencies is determined on an individual basis in conference with the director of graduate programs in business administration. Candidates must satisfy requirements in the following areas: quantitative methods, accountancy, administrative sciences, economics, behavioral sciences, legal environment of business, finance, marketing, communications, and business policy.

The candidate may select a concentration, not to exceed 24 quarter hours of credit in accountancy, or 16 quarter hours of credit in administrative sciences (personnel or production), or finance, or marketing. The candidate may also choose courses in a wide variety of areas of graduate study throughout Southern Illinois University at Carbondale.

Chemistry and Biochemistry

Graduate courses of study leading to the Doctor of Philosophy and Master of Science degrees are offered by the Department of Chemistry and Biochemistry. Interested students should consult the chairman of the department for a complete statement of the requirements for each degree. The following is a summary of these requirements.

Master of Science Degree

In addition to meeting the general requirements of the Graduate School, a candidate for the Master of Science degree in chemistry is required to:

1. Pass field examinations in 3 of the 5 fields (analytical, inorganic, organic, physical, and biochemistry) of chemistry or complete their equivalent in course work with a grade of *B* within the first six quarters of residence.

2. Earn 9 credit hours at the 500 level in one of the five basic fields of chemistry (Chemistry 451a,b,c may be taken in place of two 500 level biochemistry courses) and earn credit in one chemistry course at the 500 level in each of two other fields.

3. Earn 40 hours credit in chemistry courses, or 30 hours in chemistry if an outside minor is elected. A total of 48 quarter hours is needed for graduation of which 24 hours must be at the 500-level.

4. Maintain a 4.00 grade-point average.

5. Attend weekly seminars and earn one hour credit (Chemistry 595) by presentation of a seminar.
6. Earn a minimum of 12 hours in research and thesis (Chemistry 598 and 599).
7. Demonstrate reading competence in one of the following languages: German, Russian, or French.
8. Prepare and present a thesis on the research carried out.
9. Pass a final oral examination.

Doctor of Philosophy Degree

Students entering the Ph.D. program either must have a master's degree in chemistry or must meet all of the requirements of the Graduate School and of the Department of Chemistry and Biochemistry for the master's degree except for the thesis and oral examination requirements which may be omitted. In addition, all students in the Ph.D. program must:

1. Fulfill proficiency requirements in physical chemistry and three of the other four fields (analytical, inorganic, organic and biochemistry) of chemistry or complete their equivalent in course work with a minimum grade of *B* within six quarters of residence, exclusive of summer quarters.

Students fulfilling the proficiency requirements in only 3 fields within the specified period may continue toward the M.S. degree. On successful completion of all the requirements for the latter degree, including thesis and final oral examination, they may petition the department requesting permission and conditions for continuing work toward the Ph.D. The department, acting as a committee of the whole, will rule on such petitions on due consideration of the recommendation of the candidate's graduate committee and all other pertinent information.

2. Complete a course of study as determined by his graduate committee.
3. Earn one hour credit in seminar (Chemistry 595) beyond the Master of Science degree requirement and attend weekly seminars.
4. Earn a minimum of 48 hours in research and dissertation (Chemistry 598 and 600).
5. Pass cumulative examinations.

- a. After having fulfilled all the proficiency requirements, a candidate may begin taking cumulative examinations. A graduate student holding a master's degree in chemistry may proceed with the cumulative examinations in those areas in which he has fulfilled the field examination requirements.

- b. A student may elect to take cumulative examinations in his major area only, or he may elect to take cumulative examinations in different areas. If the student elects the latter course of action, he must so inform the chemistry department graduate advisers at the time that he selects director of his intention to pursue a cross-area curriculum. It is the responsibility of the student's graduate committee to determine how the cumulative examinations are to be divided among the several areas. However, in no case can the total cumulative examination requirement be less than stipulated below.

- c. Ten examinations are to be given each calendar year with two examinations respectively in the fall and summer quarters and three examinations respectively winter and spring quarters. Cumulative examinations may be written examinations not to exceed two hours in length. Take-home examination, laboratory examinations, or oral examinations may be substituted for a written examination. All areas

will give their examination simultaneously. The time and place for the examination will be posted at least ten days before an examination. The subject of an examination may be announced in advance of the examination. A student must register to take the examination at least one week before it is scheduled.

d. A student must pass 5 examinations in no more than 14 trials in order to continue for the Ph.D. degree. *A student must take consecutive examinations.* He is urged to begin as soon as he is eligible. He is not liable for examinations during any time he is not enrolled in school.

6. Pass preliminary oral examination following completion of the cumulative examination requirement and the research tool requirement.

7. Maintain a 4.25 grade-point average.

8. Demonstrate competence in one of the following languages if this requirement was not fulfilled during previous graduate studies: German, French, or Russian. This requirement must be fulfilled prior to scheduling the preliminary oral examination.

9. Complete his dissertation following the specifications set forth by the Graduate School.

10. Schedule and pass a final oral examination (defense of dissertation). Copies of the dissertation must be distributed to the members of the graduate committee at least one week prior to the examination.

Community Development

The Community Development Institute offers an inter-disciplinary Master of Science degree in community development consisting of 48 credit hours, a field internship, and the completion of one of four terminal options. Within this degree program, and depending upon professional plans, the master's candidate is able to minor in one discipline; such as, agriculture, anthropology, economics, education, geography, government, history, psychology, or sociology; or to pursue a multi-disciplinary minor in such areas of concentration as urban studies, planning, group work, or international development. To be admitted, a student must meet the requirements of the Graduate School, submit to the Director of the Institute a statement of background and career interest in the field of community development and three letters of recommendation, and also complete the following courses or their equivalent at either the graduate or undergraduate level:

CD 401, Introduction to Community Development	4 hours
Social Statistics	3-4 hours
An introductory and one other course in sociology	6-8 hours

In certain circumstances, the above prerequisites may be completed after admission to the major.

The specific requirements of the community development Master of Science degree program include the following:

1. Courses designed or approved by the Community Development Institute, including one of four alternative terminal options (master's thesis, terminal research paper, extended minor, or master's project), totaling 28 hours: CD 501, 502, 503, 511, 598, and 596 or 599.

2. Work in one or more allied fields, such as those mentioned as minors above, totalling 20 hours.

3. Up to one year of supervised part-time field work in community de-

velopment (approximately 400 clock hours.) There is no additional fee for the internship, but students should be prepared to budget sufficient time to meet the requirement. This totals approximately one academic quarter, but may be distributed in a variety of ways.

4. Satisfactory completion of a terminal oral examination at which the master's candidate defends work done in his terminal option as well as his knowledge of the field of community development.

Computer Science

The Department of Computer Science offers a graduate program leading to the Master of Science degree.

Application forms for admission to the computer science program should be obtained from the Graduate School. Decisions concerning the admission of students to and their retention in the graduate program will be made by the department faculty subject to the requirements of the Graduate School. The department does not have any specific grade point average requirement for admission but the student's academic record will be examined for evidence that he can meet the standards required of graduate students. An undergraduate major in computer science is not required for admission and students with majors in other fields are accepted.

The student applying for admission will be expected to have completed a standard sequence in calculus. No other formal course requirements are stated for admission, but it should be understood that a student with minimal background may be expected to take additional work on a deficiency basis.

Requirements

The requirements for the M.S. degree include a minimum of 48 hours of graduate credit. However, the actual number of hours which the student must take is dictated by the degree of preparation of the student at the time he enters the program. The extent of this preparation is generally defined by the number of core courses (or equivalents) which the student has taken prior to admission and hence need not repeat as a graduate student in the program.

(1) Core Requirements

- (a) Computer Science 403, 411, and 414
- (b) Computer Science 442, 445, 451, and 464a,b
- (c) Computer Science 470 or 472
- (d) Mathematics 421a,b
- (e) Mathematics 480a,b or 483a,b

(2) Group Requirements

With respect to the following three groups of courses, the student is required to take at least six hours from one group and at least three hours from each of the remaining groups:

Group a: Computer Science 551, 554, 557

Group b: Computer Science 514, 516a,b, 518

Group c: Computer Science 531, 536, 564a,b

(3) Other Requirements

- (a) The student will be required to write a thesis carrying 5 to 8 hours credit under Computer Science 599. The thesis adviser will be assigned by the department after consultation with the student.
- (b) Additional courses to complement and supplement prior work

so that the total program involves at least 48 hours of graduate credit with at least 24 hours at the 500 level. Pertinent graduate level courses from other departments may be counted for credit but approval must be given before such courses are taken.

(c) At the completion of his work, the student will be given a final oral examination over his thesis and other topics.

Design

The Department of Design attempts a generalized rather than a specialized design education. Through his undergraduate years the student is led to treat man and his environmental transactions in terms of whole systems rather than of isolated aspects or component parts. Emphasis is placed on the overall solutions to human problems which may be encompassed through design procedures.

The graduate program of the department continues this broad integrative approach but assumes that, at this level, the student should concentrate his studies in a more closely defined area within which he should work in depth.

It is recognized, however, within the present massive accelerations in the design possibilities of man's control over his environment, that the format of such graduate study should offer the utmost flexibility and capacity for change. The entire graduate program should be viewed as experimental in nature and one whose content and approach will be adjusted according to experience and field developments.

Students with an undergraduate background in various areas of design specialization may qualify for the master's degree program. In addition, on the premise that the association of diverse disciplines participating in the design process may often yield productive and enriching interactions, students with an undergraduate background in fields other than design will be accommodated. Special arrangements should be developed in consultation with the chairman of the department.

Students applying to the department must submit a letter explaining their background, their reasons for selecting this program, and their major goals; and examples of work that they have produced to the head of the graduate program. A faculty committee will review the letter and work and when possible have a personal interview with the applicant to evaluate his acceptance into the department.

The two-year program leading to a Master of Science degree requires at least 34 hours of graduate study in the Department of Design; at least 18 hours of study outside the department; and 9 hours of thesis. Within the structure of this program, the students will work as an operational research organization and through individual studies. There will also be the opportunity to participate in seminars and lectures given by distinguished visiting professors. The faculty are interdisciplinary representing the fields of design, systems analysis, social psychology, and computer science.

Economics

General Information

Graduate courses in economics may be taken as a major or minor leading to the Master of Arts, Master of Science, or Doctor of Philosophy degrees.

In addition to Graduate School admission standards, the Department of Economics requires completion of the verbal, quantitative, and advanced economics portions of the Graduate Record Examination except where it may create a hardship for international students.

Master's Degrees

Either the M.A. or M.S. degree requires successful completion of 48 hours of graduate work, of which at least 33 hours must be in economics courses and of which at least 24 hours must be at the 500 level. There are required courses in statistics, mathematical economics, macro and micro-economic theory. In addition to these stipulations, the master's degree can be completed in one of three ways. A thesis may be written for which the student may receive up to 9 hours credit, counted as part of the 48 hours total. A second option is to include among the 48 hours, Economics 510, Research in Economics. A third option is to take and pass the qualifying exam for the Ph.D. degree. Each of the latter two options also requires the submission of a research paper. Candidates for the M.A. degree must also demonstrate proficiency in one of the foreign languages required for the Ph.D. degree at the level prescribed for that degree. If the student intends to enter the doctoral program, he should also take the remaining courses for the qualifying exam which includes monetary theory and policy and advanced work in micro and macroeconomic theory. Before undertaking work in mathematical economics and economic theory, the student should have completed at least 10 quarter hours in calculus or linear algebra.

Doctor of Philosophy Degree

The Ph.D. prepares the student for teaching and research positions in the academic world, for positions as economist in private industry, for positions with private research or consulting organizations, or for government positions requiring advanced economic training.

The degree is awarded for high accomplishment as evidenced by these steps:

1. Demonstrating proficiency in statistics as a research tool through successful completion (minimum grade of B) of Math 410a,b, and 411 or 412, or Math 480a,b, and 481 or Math 483a,b, and 486, 487 or 488. Econ. 567a, Econometrics I may be substituted for Math 411, 412, 481, 486, 487 or 488.

2. Demonstrating proficiency in a second research tool chosen, with the prior consent of the director of graduate studies, from one of the following:

- a. A foreign language. Proficiency is demonstrated by successful completion of the Educational Testing Service Examination or by passing Foreign Languages 288a,b,c with a grade of A or B in each course.

- b. Mathematics. Completion of the second year calculus sequence, plus one additional course at the 400 level or one 300 level course selected from Mathematics 301, 305a, 321, 352, 319. Each course must be passed with a grade of B or better.

- c. Any three courses at the 400 or 500 level in an area other than mathematics that is closely related to economics and each passed with a grade of B or better.

- d. Computer programming. The student should consult the director of graduate studies for the method of demonstrating proficiency.

3. Completing required courses in history of economic thought, mathematical economics, and micro and macro economic theory.

4. Passing a written qualifying examination in economic theory and mathematical economics.

5. Passing written and oral preliminary examinations in three specialized areas chosen, with the prior consent of the director of graduate studies, from comparative economic systems, economic development, economic history, economic theory (two fields are available), econometrics, human resources, international economics, money and banking, political economy, public finance, or any graduate area outside economics but having a reasonable connection with economics.

The student is admitted to candidacy for the degree after he passes the preliminary examination.

6. Completion of a dissertation based on original research and successful defense of the dissertation before a faculty committee.

More detailed descriptions of the graduate programs, as well as information on teaching and research assistantships and fellowships may be obtained from the director of graduate studies, Department of Economics.

Education

One may pursue a program of study leading to the Doctor of Philosophy degree in Education through any one of 12 approved concentrations: counseling and guidance, cultural foundations, educational administration, educational psychology, elementary education, health education, higher education, instructional materials, measurement and statistics, physical education, secondary education, and special education. Students must satisfy the requirements of the Graduate School in addition to the College of Education requirements for the Doctor of Philosophy degree in Education. General policies pertaining to the Doctor of Philosophy degree in Education are enumerated in this section; policies specific to each concentration are stated under each departmental heading.

Application

Applicants must submit the standard application materials to the Graduate School. Any data required in addition to the standard Graduate School application materials are described under the appropriate departmental headings below.

Admission and Retention

The application materials of those who meet Graduate School requirements for admission to the Ph.D. program are forwarded to the College of Education. The department concerned reviews all documents relative to the student and makes recommendation to the admission and retention committee of the College of Education; this committee makes the final admission decision. Retention standards beyond minimum Graduate School standards are established by each department or concentration.

Advisement

For each student a doctoral committee consisting of a minimum of five members is constituted and approved according to the *Ph.D. Policies and Procedures Manual of the College of Education*. His program, planned to include all of his graduate study beyond the master's degree, should be

approved at a meeting of the student with his committee. The program is then forwarded to the assistant dean for graduate studies in the College of Education for final approval and filing.

Program Requirements

Each doctoral student in education must successfully complete a prescribed core of 12 credits in psychological foundations of education and in social and philosophical foundations of education combined. These courses include Ed. Af. 591, Ed. Af. 592, Guid. 590, and Guid. 545m. For each concentration there are also basic courses, listed below under the departmental headings, which are required beyond this core. The study and his doctoral committee agree upon his final program, which lists other courses and experiences.

Research Requirements

Each concentration in the Ph.D. in Education has its own research requirement.

Preliminary Examination

All students in the Ph.D. program in Education must take the preliminary examination over areas determined by the department or concentration. The examination is offered four times a year: during Wednesday, Thursday, and Friday of the fifth week of each quarter.

A student may take the preliminary examination when he has: successfully completed his research requirement, successfully completed all or most of his course work, successfully completed the professional seminar sequence, and petitioned his doctoral committee to take the preliminary examination and received an affirmative response. A student who fails the examination on the initial attempt may take the exam two additional times. If at that time the student has not passed the examination, he is dropped from the program.

Dissertation

The dissertation committee, which in the College of Education is the doctoral committee, consists of a chairman who is authorized to direct doctoral dissertations and at least four others who are authorized to serve on dissertation committees. The committee is appointed by the Dean of the Graduate School upon the recommendation of the assistant dean for graduate studies of the College of Education. At least one member of the committee must be from a department other than that of the student and at least one member from a unit outside the College of Education.

Satisfactory completion of the dissertation requirement includes the passing of an oral examination covering the dissertation and related areas.

Department of Educational Administration and Foundations

The Department of Educational Administration and Foundations participates in the doctoral program in education with approved concentrations in both educational administration and cultural foundations.

Educational Administration

APPLICATION

Inquiries regarding application should be directed to the chairman of the Department of Educational Administration and Foundations.

ADMISSION AND RETENTION

The following are criteria for admission to and retention in the program: 1) A graduate background, at the level of a master's degree major or its equivalent, in educational administration; 2) objective measures rated on a point scale developed by the department: undergraduate grade point average, graduate grade point average, and the Miller Analogies Test Profile Rank. A test of the writing ability of the applicant may also be required; 3) subjective measures: recommendations from three or more persons knowledgeable of the candidate's ability to do advanced graduate work; and data gained through personal interview, if possible.

A minimum grade point average of 4.25 on a 5.0 scale is required for retention in the program. A student whose grade point average falls below 4.25 may take an additional twelve quarter hours of work on his program if such work will correct the deficiency. If after the twelve hours his GPA remains below 4.25, he shall be dropped from the program.

PROGRAM REQUIREMENTS

The doctoral program in educational administration normally includes a minimum of 96 quarter hours of work as follows. The student is required to complete: (a) a core of 12 quarter hours common to all doctoral students in Education; (b) a major concentration of 24–32 quarter hours including a required 12-hour, 3-course seminar in educational administration; (c) a cognate or interdisciplinary block of 16 quarter hours; (d) a dissertation of from 36 to 48 quarter hours and; (e) electives as needed which may be drawn from social and behavioral science fields as anthropology, economics, government, sociology, psychology. This work seeks to provide the student with an orientation to fields that are integrally related to educational administration.

RESEARCH REQUIREMENTS

The multiplicity of academic programs demands varying competencies in research. Therefore, no common research competency is required of all students although a minimum of one research competency is required of each student. Specific research competencies and procedures for evaluation are determined by the doctoral committee of each student congruent with his professional preparation and goal expectations. Research requirements might include a statistics sequence, computer programming, foreign languages, or other related and research oriented subjects and procedures.

PRELIMINARY EXAMINATION

The student prepares himself for the examination through course work and independent study as advised by his doctoral committee. The examination covers specialized areas of research, curriculum, supervision, and administration. The student's doctoral committee chairman initially solicits and compiles test questions in these areas, then meets with the department chairman to determine the completeness of the examination. If certain areas are judged to be inadequately covered, additional questions in those areas are solicited from appropriate staff members. Individuals submitting questions are responsible for evaluating the student's responses to such questions, although the entire examination is available to the total examining committee. After the evaluations, the entire examining committee meets to determine whether the student has passed part or all of the examination. If certain specialty responses are judged in-

adequate, the examining committee may require the student to re-write in the deficient area or to submit to an oral examination in the specialty.

Cultural Foundations

APPLICATION

Inquiries regarding application should be directed to the chairman of the Department of Educational Administration and Foundations.

ADMISSION AND RETENTION

The admissions criteria include grade point averages, Miller Analogies Test scores, letters of recommendation, and work experience. Students shall ordinarily have completed at least two years of successful teaching experience in the public schools, or its equivalent as determined by the foundations committee. If this requirement has not been fulfilled, the committee may make arrangements for a special internship program.

A GPA of at least 4.25 on the first 30 quarter hours of course work is required for retention. This minimum average must be maintained for the remainder of the program.

PROGRAM REQUIREMENTS

The student is required to complete a program of at least 100 quarter hours beyond the baccalaureate degree, not including 36 hours used in dissertation research. The program must meet the following minimal pattern: 1) twenty hours of professional education courses; 2) thirty-six hours in a major area of concentration: philosophy of education, history of education, comparative and international education, and educational sociology; 3) twelve hours each in two minor areas selected from: philosophy of education, history of education, comparative and international education, and educational sociology; and 4) twenty hours of elective courses as determined by the sponsoring committee with the cooperation of the student.

RESEARCH REQUIREMENTS

Each student must demonstrate research competence in one or two areas determined by the student and his committee. This might consist of the course sequence in statistics (Guidance 505, 506, and 507), foreign languages, historiography, etc.

PRELIMINARY EXAMINATION

After the student has completed the pro-seminar sequence, the research competencies, and made up any deficiencies indicated by his doctoral committee, the preliminary examination may be taken during the final term of course work or upon successful completion of 60 quarter hours. Materials to assist the student studying for the preliminary examinations may be secured from the faculty member asking the questions for the examination. These materials might include a bibliography or some suggestion of those areas the faculty member would hold to be essential to an understanding of that area of the Cultural Foundations of Education.

The examination consists of six hours of written examination administered over two days, and two hours of oral examination. The written examination consists of two three-hour parts. Part one is from the student's principal area of concentration within Cultural Foundations of Education and part two consists equally of questions from the student's two minor

areas. The foundations committee determines who shall write the questions. Faculty members designing questions shall evaluate the responses and state the reasons for their acceptability or unacceptability. The oral examination committee consists of the faculty members writing questions and may also include members of the student's doctoral committee.

The oral examination is administered by the examination committee within two weeks after the written examination; the exact time is determined by the doctoral chairman with the consent of the oral examination committee. The oral examination has the following purposes: 1) To provide the members of the committee the opportunity to seek further evidence of the student's competence in three areas of foundations and in any other area deemed important by the members of the examination committee; 2) To clarify issues or responses raised by the written examination.

A student receiving an evaluation of unacceptable on any one part of the written examination may confer with his committee chairman and the evaluator of the question to determine further action, which might include a re-examination of the area judged unacceptable or the design of a special program to correct the student's deficiencies. Failure of the committee chairman and the evaluators to agree will be resolved by the foundations committee.

Failure to pass two or more parts of the written examination or the oral examination constitutes an overall rating of unacceptable. The foundations committee then decides what action shall be taken in regard to the student.

Department of Elementary Education

The Department of Elementary Education offers a concentration that develops competencies for college and university teaching and research in various specializations. The program is balanced and flexible, and utilizes work in appropriate disciplines outside the College of Education, and each student's committee plans his program to meet his particular needs and interests.

APPLICATION

Inquiries regarding application should be directed to the chairman of the Department of Elementary Education.

ADMISSION AND RETENTION

A minimum of two years' teaching experience in elementary school, or equivalent experience as determined by the departmental screening committee, is required. Four recommendations are required from persons who are qualified to judge the applicant's academic and professional competence. The department chairman or his representative secures these recommendations from names supplied by the applicant. At least one recommendation must concern teaching ability. The applicant must take the Miller Analogies Test; a score at the fiftieth percentile or above is usually required for admission. Additional examinations may be required. As a part of the total evaluation of the student some evidence of scholarly writing should be submitted to the department screening committee. The applicant will have a personal interview with the department screening committee unless the screening committee judges that the applicant's situation precludes such an interview. The committee may admit the student even if he shows some deficiency from department standards, if in their

opinion the student shows professional promise. The screening committee recommends admission of the student only if the department is willing to sponsor the candidate and has identified as prospective chairman of the student's doctoral committee a faculty member who holds status I.

Prior to the completion of 30 hours of course work, the student meets with his doctoral committee to determine whether or not he will continue as a doctoral student. Such matters as grade point average, progress in the program, and steadfastness of desire to attain original goals are considered. A report of this meeting is sent to the department chairman, to the assistant dean for graduate studies, and to the student. If the committee chooses not to retain the student the reasons are specified in the report. Any student who for a period of eight consecutive quarters has not taken course work leading to the completion of his program will be dropped from the program.

PROGRAM REQUIREMENTS

A minimum of 96 hours beyond the master's degree and 144 hours beyond the bachelor's degree are required. In addition to the 12 hour pro-seminar core requirement, each doctoral student will be required to complete successfully EL.Ed. 570 before taking the preliminary examination. He must complete a minimum of 20 quarter hours of work in the field of specialization within the Department of Elementary Education, and at least 12 quarter hours of course work in cognate areas, which may be outside the College of Education. A minimum of 36 hours of dissertation credit must be taken. The balance of the student's program will be in electives that have been selected to support the goals of his program.

RESEARCH REQUIREMENTS

A minimum of one research requirement is selected by the doctoral committee from the following list: 1) a reading knowledge of one or more modern foreign languages; 2) a demonstration of competency in educational statistics or successful completion of Guidance 505, 506, and 507; 3) a demonstration of competency in computer programming; 4) another research competency at the discretion of the doctoral committee. Statistics is strongly recommended.

PRELIMINARY EXAMINATION

The preparation and direction of the preliminary examination is the responsibility of the department and the student's doctoral committee. Eight hours of testing are required, four hours of which must be in general elementary education as prepared by the department, and four hours of which may be in the student's area of concentration as prepared by his doctoral committee. Additional oral and written examinations may be required by the student's doctoral committee.

Department of Guidance and Educational Psychology

The Department of Guidance and Educational Psychology offers approved concentrations in counseling and guidance, educational psychology, and measurement and statistics.

APPLICATION

Inquiries regarding admission to any of the three concentrations should

be directed to the chairman of the Department of Guidance and Educational Psychology.

ADMISSION AND RETENTION

The applicant must complete the department form and select one of the three specialties within the department. A selection and review committee of that specialty will screen the applicant on the basis of prior graduate work, grade point average, standardized test scores (usually the Miller Analogies Test or the Graduate Record Examination), and letters of recommendation. A student accepted by one specialty who wishes to change to another must re-submit his papers to the new specialty for consideration.

A student will not be permitted to take the preliminary examination unless he maintains a 4.25 grade point average in courses taken as a part of the doctoral program. Any student who has a grade point average below a 4.25 after 30 quarter hours of doctoral level work, and before passing the preliminary examination, will not be allowed to continue in the program, nor will he be considered for readmission at some later date. All students will be required to participate in teaching and/or research experiences as a part of their program without credit.

PROGRAM REQUIREMENTS

Each doctoral student in the department must demonstrate his competency in each of three core areas: (a) measurement and statistics; (b) educational psychology; and (c) personality theory and human dynamics. The competencies are defined as successful completion of the following courses: Measurement and Statistics 506, 531; Educational Psychology 515; Personality Theory and Human Dynamics 481.

Students may request proficiency credit for the competencies from the department chairman. The awarding of such credit will be determined by: (a) examination; (b) consideration of previous courses taken; (c) interview; (d) some other appropriate method; or (e) any combination of the above. The final decision is at the discretion of the department chairman.

RESEARCH REQUIREMENTS

A research degree in the Department of Guidance and Educational Psychology requires competencies of all students in measurement and statistics, educational psychology, personality and human dynamics. The research competencies are attested by course work in the three core areas, as described above, under program requirements, with such additions as deemed appropriate by the student's doctoral committee.

PRELIMINARY EXAMINATION

In addition to the core and pro-seminar requirement, each student must demonstrate competency in his chosen concentration. Expectations and specific requirements of the preliminary exam are developed by the student and his doctoral committee.

Guidance and Counseling

PROGRAM REQUIREMENTS

Student programs of studies in guidance and counseling are individually designed. Consequently, the requirements include only:

1. Completion of the core requirements (Guidance 481, 506, 515, and 531).
2. The required dissertation credits, of which 36 hours will be the maximum. However, to encourage a broad academic base in the specialty, students typically complete the following courses:
 - a. those courses required in the guidance and counseling master's program or their equivalent if they have not already been completed;
 - b. 8 to 12 hours of electives outside of the department but related to the specialty;
 - c. hours in Guidance 568, Topical Seminar in Guidance and Counseling;
 - d. hours in Guidance 581, Internship (advanced practicum) in guidance and counseling.

PRELIMINARY EXAMINATION

The guidance and counseling concentration faculty will prepare and evaluate a comprehensive exam not to exceed eight hours in length. If the student's doctoral committee feels that additional evaluation is necessary at the time of the comprehensive examination, the nature of the additional evaluation will be determined by the student's doctoral committee.

Educational Psychology

PROGRAM REQUIREMENTS

Students in the specialty of educational psychology will be expected to demonstrate competencies in the following areas:

<i>Competency</i>	<i>Suggested Activity</i>
Statistics/Measurement	Guidance 507/531
Research Methodology	Guidance 567—Research Design
Learning and Instruction	Selected Courses
Development and Human Dynamics	Selected Courses
Concentration Area	Self-Study/Selected Courses Practicum Experiences/Dissertation (36 hrs)

The doctoral committee, in consultation with the student, will determine the means for demonstrating competence and the criteria for successful mastery.

PRELIMINARY EXAMINATION

The preliminary examination will be prepared by the doctoral committee of the student. The exam will be composed of questions regarding findings, theory, research methodology and application in the following areas: learning and instruction, development and human dynamics; comprehensive examination in the student's concentration. The nature of the examination (e.g., timed paper and pencil test, qualifying paper, project, oral examination, experimental or theoretical paper) is to be determined by the student and his committee with the stipulation that some product must be generated, evaluated, and placed in the student's permanent records.

Upon successful completion of the preceding, the student's doctoral committee will make a recommendation regarding admission to candidacy. The recommendation must be filed with the assistant dean for graduate studies within two weeks following the written examination.

Measurement and Statistics
PROGRAM REQUIREMENTS

All programs in measurement and statistics must include: (1) a minimum of 16 hours in Guidance and Educational Psychology 580 Topical Seminar in Statistics and Measurement; (2) a minimum of four hours of electives outside of the department but related to the specialty; (3) a maximum of 36 hours of dissertation credit.

PRELIMINARY EXAMINATION

Expectations and specific requirements of the preliminary examination are developed by the student and his doctoral committee. The preliminary examination will be prepared by the doctoral committee of the student. The examination will be composed as follows: advanced statistics—four hours; advanced measurement—four hours; special exam in student’s area of interest—four hours. The student’s doctoral committee will grade the exam. An oral examination over the preliminary exam will be conducted within two weeks of the written examination.

Department of Health Education

The Department of Health Education participates in the doctoral program in education with a concentration in health education.

APPLICATION

Inquiries regarding application should be directed to the chairman of the Department of Health Education.

ADMISSION AND RETENTION

An applicant must be sponsored by a member of the graduate faculty from health education. His application is evaluated by a committee of at least three graduate faculty members appointed by the department chairman. The committee examines all available evidence relevant to the student’s objectives, background, and academic history, including: 1) distribution of undergraduate and graduate course work indicating broad cultural foundations; 2) experience appropriate to the student’s professional goals; 3) evidence of ability to do superior graduate work. The evidence may be based on: (a) Miller Analogies Test scores or Graduate Record Examination results, (b) a master’s thesis or other evidence of an ability to present data in a scholarly manner, or (c) ability to pass a written or oral examination.

PROGRAM REQUIREMENTS

The student’s program must include the following distribution of graduate course work beyond the baccalaureate degree and master’s degree:

- | | |
|--|-------------|
| 1. Pro-seminar sequence | 12 hours |
| 2. Health Education, Professional Education, and Electives | 48–96 hours |
| A. Health Education | 24–48 hours |
| B. Professional Education | 8–24 hours |

OPTION 1—Educational Administration
and Foundations

OR

OPTION 2—Curriculum Theory and Practice

- C. Other disciplines within the total University Graduate School 16-24 hours
3. A demonstration of competency in educational statistics or completion of the 12 hour statistics course sequence, Guidance 505, 506, and 507 with a *B* average or above to fulfill the department's research requirement.
4. Dissertation 36 hours

PRELIMINARY EXAMINATION

Each student must take a four-hour written preliminary examination, which is prepared by his doctoral committee. The examination includes those areas established as appropriate to the student's specialty.

Department of Higher Education

The Department of Higher Education participates in the doctoral program in education with a concentration in higher education.

Pre-service and in-service preparation is offered for persons who expect to teach in two-year and four-year colleges or serve in administrative positions in colleges and universities in: academic affairs (e.g., provost, dean); business affairs (e.g., bursar, controller); student personnel services (e.g., vice president for student affairs, dean of students, registrar); community and junior college affairs (e.g., president, vice president, dean of instruction); or other administrative and teaching areas in higher education, (e.g., executive and staff officers of coordinating agencies, vice president for development, director of institutional research).

APPLICATION

Inquiries regarding application should be directed to the chairman of the Department of Higher Education.

Admission and Retention

Applicants must submit the departmental application form, an autobiographical statement, five letters of reference, and, when required, scores on the Miller Analogies Test or the Graduate Record Examination.

PROGRAM REQUIREMENTS

In addition to the College of Education requirements, 24 quarter hours' credit in six common courses in higher education are required:

- Hi.Ed. 510 (4), Higher Education in the United States
- Hi.Ed. 513 (4), Organization and Administration of Higher Education
- Hi.Ed. 516 (4), College Student and College Culture
- Hi.Ed. 518 (4), College Teacher and College Teaching
- Hi.Ed. 555 (4), Philosophy of Education
- Hi.Ed. 578 (4), Economic Aspects of Higher Education.

A student's doctoral committee may require additional credit in other departments, or in an internship if the applicant has not had previous professional experience in higher education.

RESEARCH REQUIREMENTS

The student must demonstrate competency in one or more research areas selected in collaboration with and approval of his doctoral committee.

PRELIMINARY EXAMINATION

The preliminary examination in Higher Education is a comprehensive

written examination. The study may petition his doctoral committee to take the examination when he has successfully completed his research competency requirement, the professional seminars, and all or most of the course work listed on his approved program.

Department of Instructional Materials

The doctoral concentration in instructional materials is designed for those individuals who wish to become directors of instructional materials in a large school system, a college, a university, or industry where the scope of the program will require, under the director, separate specialists in the audiovisual and library fields.

APPLICATION

Inquiries regarding application should be directed to the chairman of the Department of Instructional Materials.

ADMISSION AND RETENTION

The departmental selection and review committee screens applicants on the basis of prior graduate work, graduate grade point average, and scores on standard tests.

Prior graduate work must provide an adequate background for doctoral study in the field of instructional materials.

A student who has maintained a 4.50 grade point average or higher will be accepted unconditionally, if other criteria are met. Students with grade point averages of 4.25 to 4.50 will be accepted conditionally assuming other evidence of potential to succeed in doctoral study, with the condition being that at least a 4.50 average must be maintained in the first 24 successive hours of work after conditional admission. Students with grade point averages less than 4.25 will not be considered for the doctoral program.

Applicants must present scores from the Graduate Record Examination (aptitude) and Miller Analogies Test as a part of the admission procedure. Acceptance is usually dependent upon the student's achieving at least the fiftieth percentile on national norms for graduate students in education on at least one of these examinations.

Other data from the application for admission to graduate study, other test performance, reference letters, and prior experience will be gathered as a part of the admission procedure and will be used as means of determining acceptance.

PROGRAM REQUIREMENTS

- | | |
|--|-------------|
| 1. Curriculum Theory and Instructional Practice | 4-12 hours |
| 2. Field of Specialization. Each student must identify with an area of specialization and must complete from 24 to 48 hours in support of his specialty. | 24-48 hours |
| 3. Cognate Study. To support the field of concentration, 16 to 24 hours of work may be required in a cognate field or fields. | 16-24 hours |
| 4. Dissertation | 36-48 hours |
| 5. Electives. To complete minimum requirements and to support the goals of the program. | |

RESEARCH REQUIREMENTS

Research requirements are chosen by the student's doctoral committee,

from the approved research requirements: foreign languages, statistics, and computer programming.

PRELIMINARY EXAMINATION

The preliminary examination can be taken only after the student has completed the professional seminars, all or most of his course work, and has satisfied the research requirements. The purpose of the preliminary examination is to examine the professional preparation of the student on all of his previous graduate work. The department is responsible for preparation and evaluation of the preliminary examination, consistent with the College of Education policies and procedures.

Physical Education

The Departments of Physical Education for Men and Physical Education for Women participate in the Doctor of Philosophy in education with an approved concentration in physical education.

APPLICATION

Inquiries regarding application should be directed to either the chairman of the Department of Physical Education for Men or the chairman of the Department of Physical Education for Women.

ADMISSION AND RETENTION

The applicant must possess a background of knowledge of, and experience with, physical education which will provide a basis for advanced work in this field. The student's experience and interests as well as formal education are considered before deciding his deficiencies and the manner of satisfying them. Credit for work done to satisfy deficiencies will not count toward the Ph.D.

A grade point average of 4.50 is required in courses taken as part of the doctoral program. If at any time the grade point average is less than 4.50, the student will confer with the chairman of his doctoral committee concerning the probability of future success in the program.

A minimum of one year of teaching experience will be required. The adequacy of the experience will be judged by the student's doctoral committee.

PROGRAM REQUIREMENTS

A minimum of 144 credits is required, as follows: (1) 56 quarter hours in physical education courses beyond the bachelor's degree composed of: (a) 32 credits in physical education for the master's degree major. The common requirements listed below make up 24 of the 32 credits. The remaining 8 credits are physical education courses beyond the bachelor's degree. They must be approved by the student's doctoral committee; (b) 24 credits in approved physical education beyond the master's degree; (2) 52 quarter hours in any subject area including course work required of all students by the College of Education; (3) 36 quarter hours of dissertation.

RESEARCH REQUIREMENTS

At least one research competency, determined by the student's doctoral committee and approved by the assistant dean for graduate studies, is required. Research competencies embody skills needed to understand research in the student's field, to carry out his dissertation, and to contribute to his specialization.

PRELIMINARY EXAMINATION

The student must meet the following conditions satisfactorily before applying to the student's doctoral committee to take the preliminary examination: (1) Completion of a minimum of 96 hours of course work beyond the bachelor's degree; (2) completion of the courses required of all students by the College of Education; (3) completion of courses required of all Ph.D. students by the Departments of Physical Education for Men and for Women; and (4) completion of the research competency.

These examinations will pertain to: the objectives of course work required of all students in the College of Education and to the special concentration of physical education.

Department of Secondary Education

The Department of Secondary Education participates in the doctoral program in education with a concentration in Secondary Education.

APPLICATION

Inquiries should be directed to the coordinator of doctoral studies in the Department of Secondary Education.

ADMISSION AND RETENTION

Admission is determined by a screening committee composed of a minimum of three members of the graduate faculty of the department. The candidate is usually requested to have a personal interview with the committee. The criteria considered in this decision are: (1) the nature and quality of previous graduate work; (2) the undergraduate grade point average; (3) performance on the Miller Analogies Test (recommended minimum of fiftieth percentile) and other tests of academic potential recommended by the screening committee; (4) the employability of the applicant at a level commensurate with the degree upon the completion of the doctoral program; (5) the quality of samples of the applicant's written work; (6) evidence of a minimum of two years of successful teaching experience in secondary schools; (7) letters of recommendation relative to professional and academic competence; and, (8) a willingness on the part of a member of the department to sponsor the applicant in the process of completing the Ph.D. degree.

The chairman of the student's doctoral committee will meet with the student upon the completion of one-third of his doctoral course work to evaluate the student's progress toward the Ph.D. degree. If, in the opinion of the chairman, satisfactory progress is not being made toward completion of the degree, the chairman will convene the total doctoral committee to determine whether the student should continue in the doctoral program. The chairman must notify the student, the coordinator of doctoral studies of the Department, and the assistant dean for graduate studies of the college of the action of the student's doctoral committee.

PROGRAM REQUIREMENTS

Areas of specialization with the concentration in secondary education include: (1) college or university teaching and research in the general area of secondary education; (2) college or university teaching and research in the subjects typically taught in secondary schools (example: English education, art education, social studies education, mathematics education, technical education); (3) curriculum direction at the local school, school

district, intermediate educational unit, state, or national levels; (4) supervision of secondary education programs and subjects at the levels listed above; and (5) teaching in the secondary schools.

The typical program of studies consists of 96 quarter hours above the master's degree, arranged as follows: (1) professional seminars (12 hours); (2) the departmental core in curriculum theory and instructional practices which is required of all secondary education students (S.Ed. 508 [4], Current Developments in Selected Subjects in Secondary Schools, S.Ed. 562 [4], Secondary School Curriculum, S.Ed. 566 [4], Seminar in Instruction, S.Ed. 571 [4], Seminar in Curriculum, S.Ed. [3], Seminar: Research and Evaluation in the Secondary School Curriculum, [28 hours]); Departmental Electives (8), Courses to be selected from graduate level courses currently offered in the Department of Secondary Education; (3) field of specialization and cognate study: at least 20 hours, elected with the approval of the doctoral committee. The student interested in a subject field such as English education should concentrate in the subject area. The student pursuing a program in curriculum, supervision, or secondary education in general might elect courses to meet certification requirements and courses that provide field experiences; and (4) dissertation (36 hours).

RESEARCH REQUIREMENTS

A minimum of one research competency selected from those listed below is required. Although it is the prerogative of the student's doctoral committee to determine the appropriate research requirement, statistics is strongly recommended. (1) demonstrated competency in one or more modern foreign language; (2) demonstrated competency in educational statistics; and (3) demonstrated competency in computer programming.

The student's doctoral committee, the coordinator of doctoral studies, and the assistant dean for graduate studies of the college must approve an unusual research competency necessary for specialized research (example: historiography).

PRELIMINARY EXAMINATION

Prior to taking the preliminary examination a student must have met the research requirement, fulfilled the pro-seminar requirements of the College, completed two years of full-time study (or the equivalent thereof) beyond the baccalaureate degree, and be certified as prepared for the examination by his doctoral committee.

Upon completion of these prerequisites and with the approval of his doctoral committee, the student applies to the Coordinator of Doctoral Studies for permission to take the examination. The preliminary examination is in three parts: (1) a written examination of approximately four hours focusing on the departmental core work prepared and evaluated by the Department of Secondary Education; (2) a written examination of approximately four hours in length directed toward the student's specialization, prepared and evaluated by his doctoral committee; and (3) an oral examination approximately one hour in length administered and evaluated by the student's doctoral committee.

Department of Special Education

The Department of Special Education participates in the doctoral program in education with a concentration in special education.

APPLICATION

Inquiries regarding application should be directed to the chairman of the Department of Special Education.

ADMISSION AND RETENTION

The criteria for admittance are:

1. Fulfill all requirements of the Graduate School,
2. Minimum grade point average of 4.25,
3. Acceptance by the College of Education admission and retention committee,
4. Personal interview by the faculty of the Department of Special Education,
5. Minimum of two years' teaching or comparable acceptable experience,
6. Biographical data,
7. Three letters of recommendation,
8. Miller Analogies Test,
9. At the discretion of the department faculty, evidence of writing ability may be required.

A student will not be allowed to take the preliminary examination unless he maintains a 4.25 grade point average in courses taken as a part of the doctoral program. Any student who has a grade point average below a 4.25 after 30 quarter hours of doctoral level work, and before passing the preliminary examination, will not be allowed to continue in the program, nor will he be considered for readmission at some later date. It will be the responsibility of the doctoral committee chairman to make this determination.

PROGRAM REQUIREMENTS

All students will take the pro-seminar requirements plus the following 12 hours: Spec.Ed. 590 (4), Seminar: Ed. of Children with Mental Deviations; Spec.Ed. 591 (4), Seminar: Ed. of Physically Handicapped Children; and Spec.Ed. 592 (4), Seminar: Ed. of Children with Learning and Behavior Disorders.

Students must also complete a minimum of 40 quarter hours, approved by their committee, from specific courses in the Departments of Educational Administration and Foundations; Guidance and Educational Psychology; Elementary Education; Instructional Materials; Psychology; Rehabilitation; Sociology; and Special Education.

RESEARCH REQUIREMENTS

No single research competency is required for every student. The doctoral committee aids the student in selecting a research requirement(s) which facilitates the specific research skills he needs.

PRELIMINARY EXAMINATION

The procedure described in the *College of Education Policies and Procedures Manual* regarding doctoral programs will be followed. The content of the special education preliminary examination will include: (1) historical facts in the development of educational program for the handicapped; (2) theoretical issues related to education of the handicapped; (3) the design and conduct of experiments related to the education of the

handicapped; and (4) the planning of educational programs for the handicapped.

Educational Administration and Foundations

This department carries extensive graduate offerings in educational administration, instructional supervision, and educational foundations in support of the Master of Science in Education degree, the Specialist's degree, and the Doctor of Philosophy in Education degree. Programs at all levels are NCATE approved.

The department administers its programs leading to the master's degree and Specialist's degree, and provides programs and personnel for doctoral students who wish to specialize in educational administration, general instructional supervision, and educational foundations. Interested applicants should direct inquiries to the chairman of the department.

Master of Science in Education

At the master's level, majors are offered in educational administration and in instructional supervision. Within the administration major, specializations may be selected for such positions as elementary principal, secondary principal, curriculum coordinator, school business manager, vocational-technical director, etc. A minimum of 48 quarter hours of work is required.

Admission to master's degree work in the department is approved by the department admission committee. Admission considerations include undergraduate grade point average, work experience, letters of reference from persons knowledgeable of the candidate's ability to do graduate level work, and data gained through personal interview with the candidate.

The program for the Master of Science in Education degree, with a major in educational administration includes a basic core, an educational foundations sequence, research and tool subjects, and selected specialized courses. A research report and comprehensive oral examination are also required. The department stresses the advantage of an academic field teaching major for all educational administration students. An applicant with aspirations for public school practice is expected to have two years of successful teaching experience prior to or concurrent with the program.

The regulations for the master's degree with a major in instructional supervision parallel those for the major in educational administration. Students in this area normally select specialized courses in supervision and curriculum appropriate to their goals as supervisors, (i.e., elementary, secondary or both). The department encourages a cross-departmental approach in the selection of appropriate courses for individual programs.

Specialist's Degree

The Specialist's degree program is structured around a 45 quarter-hour sequence of experiences as follows: 8 quarter hours in an interdisciplinary seminar in educational administration; at least 16 quarter hours in the area of administrative specialization; 8 quarter hours either in an internship or practicum; 5 quarter hours in a field study; and electives as needed.

The program is designed by the candidate and his adviser, subject to the approval of the student's advisory committee. A comprehensive written examination is the final step in the program.

Admissions criteria include a minimum graduate grade point average of 4.25 on a master's degree or its equivalent, appropriate work experience, letters of reference from persons knowledgeable of the candidate's ability to do advanced graduate level work, and data gained through personal interview with the candidate.

This program is based on the supposition that the applicant has a master's degree or its equivalent in educational administration. Students entering the program without this previous administrative training will be required to complete prerequisite work as determined by the student's committee.

The Master's Degree

A graduate major in elementary education or in early childhood education for the Master of Science in Education degree consists of a minimum of 48 quarter hours of which at least 24 must be on the 500 level. Guid. 422 and EDAF 500, or their equivalent, are required for both majors.

The early childhood education program also requires the following courses or their equivalent: El. Ed. 433 or 560, El. Ed. 505 or 537, EDAF 554 or 555, Guid. 412 and Guid. 562a.

The elementary education program consists of a general program and the following specialty programs: language arts, mathematics, reading, science, social studies, and supervision. The general program requires the following courses or their equivalents: El. Ed. 441 or 442, 415 or 515, 542, 543, 557 and 561. A student selecting a specialty program is required, in addition to Guid. 422 and EDAF 500, to have his program approved by an adviser from the specialty area.

If a thesis is not written, students are required to write a research paper under the guidance of a department faculty member and take the departmental master's examination. A total of 8–12 quarter hours should be selected from departments outside the College of Education. Students seeking certification in elementary school administration may major in the Department of Educational Administration and Foundations or the Department of Elementary Education. The assistant dean for graduate studies in the College of Education will be the recommending officer for administrative or supervisory certification.

Uncertified students who desire certification for K-9 are required to complete, without graduate credit, after admission to the teacher education program, a minimum of the following education courses: education psychology (Guid. 305), elementary school methods (314 or 316), elementary school reading (337), and at least two courses from the following: Mathematics (310), Language Arts (423), Science (441) and Social Studies (424). In addition, uncertified students must complete at least 8 quarter hours of student teaching. The teaching must be done in residence at a university or college approved by the National Council for Accreditation of Teacher Education.

Unconditional admission to the master's program requires that the applicant hold a teaching certificate appropriate for one or more grade levels (K-9), and have an overall undergraduate grade point average of 3.7 or higher on a 5-point scale. A student with a grade point average between 3.4 and 3.7 may be granted conditional admission and will remain on conditional status until he earns 24 quarter hours of credit in graduate level courses. Students who are denied admission to a degree program may enroll through the Graduate School as an unclassified grad-

uate student; then, upon meeting admission requirements may transfer to a degree program.

Specialist Degree

The Specialist's degree constitutes a minimum one-year program beyond the Master's degree, necessitating from 48–50 quarter hours depending on the area of specialization chosen. The purposes of this degree are two-fold: (1) to prepare specialists and supervisors for preschools, elementary, and middle schools, and (2) to retrain or upgrade the training of self-contained classroom teachers or those working within departmentalized situations.

Areas of specialization include supervision and curriculum, language arts, reading, science education, mathematics education, social studies education, and early childhood education.

Admission to the Specialist program requires a minimum grade point average of 4.25 on a five-point scale for all previous graduate work. A minimum grade point average of 4.25 for all work in the program is required for completion of the program. No credit earned through correspondence or used in obtaining another degree may be counted. No more than nine quarter hours earned at another college or university may be accepted toward meeting requirements for the Specialist's degree.

Each student entering this program will be directed by a three-member specialist committee. At least one member of this committee will be from the student's area of specialization. The student's program will be planned cooperatively with this committee and course work will be chosen from four areas: (1) foundations, (2) specialization, (3) supporting disciplines, and (4) internship or practicum. No program will exceed twenty hours of work at the 400 level and no more than twelve hours of 400 level courses can be taken within the College of Education. The selection of 400 level courses is permitted outside the College of Education when approved by the specialist committee.

Each student will be required to successfully complete a written and/or oral examination upon the completion of twenty-four hours of graduate study in this program. Prior to graduation, the specialist committee may require a written report of field study, internship, or practicum experiences. A final oral examination will be conducted by each student's committee.

Engineering

Graduate programs leading to a Master of Science degree with a major in engineering are available in three engineering departments. Course offerings and research activities within the departments include:

Department of Electrical Sciences and Systems Engineering:

circuits, electronics, electromagnetics, energy conversion, bioengineering, systems analysis and design, controls, instrumentation, and operations research.

Department of Engineering Mechanics and Materials:

viscous and inviscous flow, compressible flow, turbulence, wave motion, numerical fluid dynamics and solid mechanics, continuum mechanics, experimental stress analysis, stability, photoelasticity, structural analysis and design.

Department of Thermal and Environmental Engineering:

air-pollution control, water-quality control, thermal pollution, mass and heat transfer, thermodynamics, chemical processes.

Students who are interested in graduate studies in engineering must be admitted to the Graduate School and accepted in the degree-program by one of the three engineering departments. An applicant must have a bachelor's degree with a major in engineering, mathematics, physical science, or life science with competence in mathematics.

Degree requirements are consistent with the general requirements of the Graduate School with a minimum of forty-eight hours in graduate credits, including thesis credit. Students whose undergraduate training is deficient may be required by the department to take coursework without graduate credit.

A program of study will be developed by a graduate adviser and the student. Each student is required to concentrate in one of the branches of engineering, but with the approval of his graduate committee, may also take courses in other branches of engineering or areas of science and business such as physics, geology, chemistry, mathematics, life science, or administrative sciences.

Teaching or research assistantships and fellowships are available for qualified applicants. Additional information about programs, courses, assistantships, and fellowships may be obtained from the School of Engineering and Technology or any one of the three engineering departments.

Engineering Biophysics

Graduate work in engineering biophysics may be taken as a major leading to the Master of Science degree. The graduate work builds upon an interdisciplinary undergraduate program at SIU having a core in the areas of chemistry, engineering, mathematics, physics, physiology, psychology, and speech pathology and audiology. The graduate program provides the student with the unique opportunity to work with the faculty and facilities in increasingly integrated areas throughout the University and to specialize in solving problems of biomedical physics that involve several academic and professional disciplines.

The engineering biophysics committee, appointed by the dean of the Graduate School, is the agency that evaluates the program and recommends policy for its development. The committee appoints an administrator who is responsible to it and to the students for the daily as well as long-run activities of the program. The committee has a chairman and it sees that the program is administered in accordance with the policies established by that committee and with the policies of the Graduate Council and the dean of the Graduate School.

Admission to the Program

1. A bachelor's degree from any area of the behavioral, life or physical sciences, engineering, or mathematics serves as a minimum requirement for admission. A very favorable route is by following the prescribed interdisciplinary curriculum of the four-year undergraduate program in engineering biophysics at Southern Illinois University at Carbondale, or its equivalent elsewhere. A copy of the undergraduate and graduate curricula may be obtained from the program administrator.

2. No demonstration of language competency is required for the

master's degree. The student is urged, however, to acquire a reading knowledge of French, German, or Russian in his undergraduate experience.

Internship

The fifth year of the master's program emphasizes courses in physiology, psychology, and speech pathology and audiology. Those studies provide a basis for the internships in selected hospitals and in laboratories in industry and government. The internship is a requirement for completing the graduate program, and it allows nine quarter-hours of credit. The internship might well be accomplished in the summer quarter of the graduate year.

English

Graduate courses in English may be taken for major or minor in the Master of Arts program and for the Doctor of Philosophy degree. In addition, graduate courses in English may be taken for the subject-matter major in the Master of Science in Education degree in secondary education. A student enrolled in a program leading to the Ph.D. in education, with a concentration in secondary education, may select the elective portion of his program from the graduate courses offered in the Department of English. In addition to Graduate School requirements for admission to the Doctor of Philosophy program, the Department of English requires a score of the 70th percentile or above in the advanced section of the Graduate Record Examination. Inquiries about admission to graduate study in English should be sent to the director of graduate studies in English, Department of English, Southern Illinois University at Carbondale, Carbondale, Illinois 62901.

For the Master of Arts degree in English, the student must satisfy the following requirements:

1. Complete at least 48 hours of satisfactory graduate work.
2. Take at least one course in each of the following fields: English literature to 1500, 1500–1660, 1660–1800, 1790–1900, 1885 to date, and American literature.
3. Take English 500 in the first term it is available to him.
4. Take a course in the English language or in linguistics.
5. Take English 585 (required only of teaching assistants).
6. Demonstrate competence in one foreign language, normally French or German. This requirement will be regarded as satisfied if the student has taken two years of college-level foreign language, or its equivalent, with not less than a *B* average for the two years of work. Otherwise, the requirement must be satisfied by examination, which must be arranged through the director of graduate studies.
7. Submit to the director a clean copy of that research paper which best represents his abilities and accomplishments.
8. Pass the master's comprehensive examination.

The Master of Science in Education degree with an emphasis in English is administered by the Department of Secondary Education. An English education specialist in the Department of English advises the students concerning their course work in English. Twenty-four of the 48 hours' credit must be in education courses; up to 8 hours of English 581 may apply toward this education elective requirement.

For the Doctor of Philosophy degree in English, the student must satisfy the following requirements:

1. If he has not already taken such courses on the graduate level, take at least one course in each of the following fields: English literature to 1500, 1500–1660, 1660–1800, 1790–1900, 1885 to date, and American literature.

2. If he has never had courses, graduate or undergraduate, in Chaucer, Shakespeare, and Milton, remedy this deficiency.

3. Present evidence of competence in English language and linguistics, normally by completing the appropriate courses with a grade not lower than *B*.

4. Satisfy two research-tool requirements. (See below.)

5. Pass preliminary examinations in English and American literature, the preparation for which is prescribed by his advisory committee.

6. Submit a satisfactory dissertation.

7. Pass a final oral examination.

Research-tool options

A student may satisfy the research-tool requirements by fulfilling one of the three options listed below. The choice of option and languages selected must be approved by the student's advisory committee.

1. A reading knowledge, demonstrated by examination, of two languages in addition to English, selected from any languages in which there is substantial literature for research and which are germane to the student's field. Foreign students may specify their native language as one of the foreign languages, provided it is one which meets the above requirements.

2. A command of one foreign language and its literature demonstrated by examination or by at least three courses numbered 400 or above, with an average grade not lower than 4.0. Satisfaction of the requirement normally would require the equivalent of three years of study at the college level with grades of *B* or better. Foreign students may use their native language, provided it is one which is germane to the particular field of major concentration.

3. A student may elect to offer a single foreign language, and a special research technique or collateral field of knowledge. A special research technique should represent the acquisition of any special skill that will effectively contribute to the research proficiency of the student (provided that such a skill is not an assumed or traditional part of the major). The collateral field of knowledge is expected to broaden the student's scholarly background by permitting exploration of knowledge in a field related to the major.

To satisfy the research technique or collateral-field requirement, the student may complete a total of three courses numbered 400 or above, with an average grade not lower than 4.0.

Foreign Languages

The Department of Foreign Languages offers graduate studies in several languages and literatures. Such studies lead to the Master of Arts degree with major concentrations in French, German, or Spanish and minor concentrations in these same languages as well as Russian. For the Master of Science in Education degree in either secondary education or higher

education a concentration is available in French, German, Russian, or Spanish.

Students seeking the Master of Arts degree will be governed by the policies of the Graduate School, as stated in the Graduate Catalog, with respect to admission, scholastic attainment, residence, and time limitation for completion of the program.

In addition to the general requirements of the Graduate School, candidates for admission to the graduate program of the department normally present a Bachelor's degree with a major or at least 27 quarter hours of courses in French, German, or Spanish on the junior-senior level. Students who do not meet these requirements may be admitted under conditions prescribed for students on unclassified or probationary status. These students may register for specific graduate courses only with the consent of the instructor and the authorization of the head of the particular language section.

The student who has been admitted to graduate study will plan his course of study in periodic consultation with the graduate adviser in his language section. Together with his adviser, the student will also decide whether he will submit a research paper or a thesis. This decision should be made by the beginning of the third quarter of full-time study. In the event that he decides to submit a research paper, he must take bibliography and research techniques in foreign language areas (FL 560) from the appropriate language section and research problems (FL 543), two quarter hours of which will apply to the satisfaction of the research paper requirement. In the event that the student chooses to write a thesis, he should register for the thesis course (599) for which he will receive from five to nine quarter hours of credit. Whether a candidate writes a thesis or a research paper, he must pass a comprehensive written examination and a final oral examination at a time specified by the language section. For the student writing a thesis this final oral examination is primarily a defense of his thesis.

French

The program of study leading to a Master of Arts degree with a major concentration in French is planned to afford a comprehensive overview of French Literature and the structure of the French Language. The candidate is expected to pursue a course of study which will provide some knowledge of all the historically important movements and figures in the literature as well as a special competence in an area of concentration to be selected by the student.

Each candidate must include in his program the following courses:

1. Romance Philology 410
2. Old French 515

The candidate must demonstrate proficiency in a second foreign language, normally Spanish or German, by passing an examination in that language.

German

The candidate for the Master of Arts degree with a major concentration in German may elect a major specialization in either German Language and Linguistics or German Literature; a minor will be completed in the other of these two fields. Regardless of the specialization (language or literature) chosen, there are specific courses that must be taken by every student whether or not the student plans to write a thesis. These are:

1. FL 560A Bibliography and Research Techniques in German (to be

taken the first time it is offered after the student's first quarter of graduate study)

2. German 413 History of the German Language
3. One course in an older period of a Germanic Language; German 411AB Middle High German is recommended, but alternative courses are: German 509AB, German 533, English 501-2, English 506; in addition, German 412, Contrastive Phonetics: English and German is strongly recommended for prospective teachers of German.

Each candidate will be required to demonstrate, by examination, an acceptable reading knowledge of a second foreign language approved by the German section.

Spanish

Graduate study in Spanish is organized by areas and fields of study. The areas are: Peninsular Spanish Literature, Spanish American Literature, and Hispanic Linguistics.

All candidates will select one of these areas for specialization. Each candidate must include the following courses in his program of study:

1. Romance Philology 410
2. Old Spanish 515
3. Spanish Syntax 520
4. FL 560C Bibliography & Research Techniques in Spanish

Candidates must also demonstrate proficiency in another Modern Foreign Language.

The Master of Science in Education degree in secondary education with a concentration in French, German, Russian, or Spanish requires at least 24 credit hours in the subject area and 24 credit hours in secondary education. The Master of Science in Education degree in the Department of Higher Education with a concentration in French, German, Russian, or Spanish requires at least 29 credit hours in the subject area and 19 credit hours in higher education. In either of the above cases if the concentration is to be in Russian then Russian 520 is required.

Forestry

The Department of Forestry offers advanced courses for the Master of Science degree. In addition, cooperative curricula are available which permit graduate forestry students to enroll in Doctor of Philosophy programs with other departments.

Admission Requirements

In addition to the requirements set forth by the Graduate School, the Department of Forestry requires the following:

1. A minimum grade point average of 3.7 is required for admission (A = 5.0). The department will permit conditional entry between the 3.5 and 3.7 grade point average level. Grade point average of 3.7 or higher is required for stipend eligibility when available.
2. The student is required to provide proof of his proficiency in technical writing. Normally an expository essay is required to evaluate whether the student should have remedial grammar or writing courses.
3. Three letters of recommendation from former professors, employers or other responsible individuals are required.
4. The aptitude test of the Graduate Record Examination is required of all applicants.

5. Each applicant should fill out the statement of interest form. This form indicates the student's area of interest in forestry and the faculty member under whom he desires to study. All correspondence should be directed to the Chairman of the Department of Forestry.

Retention and Completion Requirements

Once on campus and during the second quarter of residence, an advisory committee of 3-5 members of the graduate faculty will be formed to guide the student's work. The same committee will be responsible for preparation and administration of thesis exams and also for the reading of the thesis. The advisory committee chairman and one other member of the committee shall be members of the Forestry Department. The other member(s) may be selected from any academic unit including forestry.

Summary of Events

1. The deadline for receipt of applications and official transcripts in the office of the Graduate School:
 - (a) The second Saturday in July for admission to the fall quarter.
 - (b) The last Saturday in October for winter quarter.
 - (c) The last Saturday in January for spring quarter.
 - (d) The last Saturday in March for summer quarter.
2. Three letters of recommendation from the applicant's former professors or employers should reach the forestry department chairman by the same dates as above.
3. Acceptance by department and Graduate School will be announced one month or earlier than the desired matriculation date. A thorough review will be made by a screening committee of three forestry department graduate faculty and the departmental adviser.
4. Registration for first quarter work after student's acceptance by the department.
5. Appointment of committee chairman, written plan for course work, and selection of tentative thesis areas all within first two months of residence.
6. Preparation of formal written thesis outline and preparation of research proposal.
7. Completion of final, typed or reproduced review copies of thesis and submission to advisory committee at least one week in advance of oral defense of thesis. Handwritten or incomplete work will not be acceptable.
8. Oral exam to be followed by completion of required approval forms. If thesis requires modifications, this should be accomplished immediately to reach the graduate dean's office in due time set by the Graduate School. One copy of the thesis will be provided for the department, one for the chairman of the advisory committee in addition to copies required for the Graduate School and a copy for the individual himself. Additional copies may be required for projects sponsored by outside agencies.

Master of Science Programs

The forestry department offers four areas of concentration with specializations within each. Combinations of specializations are possible.

1. Forest Resource Management
 - (a) Forest ecology (including silviculture, forest soils, forest influences and watershed management)

- (b) Forest management
- (c) Forest biometry
- (d) Forest economics
- (e) Forest-tree improvement
- 2. Park and Wildlands Management
 - (a) Forest and outdoor recreation
 - (b) Park management
 - (c) Outdoor recreation planning
 - (d) Urban (municipal) forestry
- 3. Wood Science and Technology
 - (a) Physical, mechanical, and biological properties of wood
 - (b) Production of forest products
 - (c) Forest products marketing
- 4. Outdoor Recreation Resource Management
 - (a) Social science concentration
 - (b) Biological science concentration
 - (c) Managerial science concentration
 - (d) Natural science concentration

All candidates for the Master of Science degree are expected to complete original research. For those engaged in the first three areas mentioned above, this research shall lead to the completion of a thesis governed by the rules of the Graduate School. Students in the outdoor recreation resource management option may elect either a thesis or a research paper.

Assistantships and Fellowships

Eight to ten research assistantships are sponsored each year by the McIntire-Stennis Cooperative Forestry Research Act. Several assistantships financed by the experimental farms and teaching assistantships funded by the School of Agriculture are also available. Outstanding students have the opportunity to apply for a graduate school fellowship and for stipends awarded by the SIU-C Outdoor Laboratories. If qualified, foreign students are eligible for tuition scholarships through the dean of international students. A variety of stipends for research studies is available through the auspices of the Federal Forest Service, the U.S. Department of Interior, other federal and state agencies and private corporations.

Since the normal minimum requirement for graduation is 48 quarter hours, the completion of degree work for students holding assistantships should be accomplished within five academic quarters which is also the maximum span for financial aid.

Facilities

Southern Illinois University at Carbondale is well endowed with a number of different forest types which are available to the forestry department for teaching and research purposes. In particular, we are conducting or planning research and demonstration programs on forest plots and experimental fields of the Carbondale campus and its experimental farms. We also have access to wooded lands of the SIU-C Little Grassy Outdoor Laboratory at Pine Hills Field Research Station and other forests.

Through various memoranda of understanding and special use permits we have use of forested lands and plots on the Crab Orchard wildlife refuge, the Shawnee National Forest and the Union State Forest, all of which are within an hour's drive of Carbondale. In addition, we can conduct basic research on the famous Beall Forest near Mt. Carmel, Illinois.

The forests on this land represent one of the last central hardwoods remnants of original bottomland and slope vegetation and are under jurisdiction of the Illinois Nature Preserves Commission.

We also have access to a variety of private corporation lands, including strip mines, timber management, and pulp operations.

A new research greenhouse operated in cooperation with the U.S. Forest Service at the tree improvement center on the western side of campus is now in operation. Greenhouse and growth chamber facilities in the agriculture greenhouses in conjunction with the Department of Plant Industries are also available.

A variety of laboratories for all phases of forestry research as well as access, through cooperative agreements, to laboratory facilities with other agencies including Forestry Sciences Laboratory on the campus are available. In addition, a modern wood testing laboratory and a large wood products pilot plant is accessible at our Vocational-Technical Institute.

Geography

The Department of Geography offers three fields of specialization: physical environmental systems, resource management systems, and systems of cultural adaptation. Programs lead to the degrees of Master of Arts, Master of Science, and Doctor of Philosophy. Also offered is a concentration in geography as a part of the Master of Science in Education program in secondary education.

Master's Degree

The graduate program for each student will be structured from a student-inquiry viewpoint. The student should take the initiative with the guidance of his adviser and the departmental faculty during all phases of his program.

Selection of a Tentative Adviser

Students admitted to the master's degree program should expect to qualify for the M.A., M.S., or M.S. in Education degree, normally within a 24-month period. Incoming students should choose a tentative adviser no later than two weeks after the beginning of their first quarter of residence. The choice will be made in consultation with the chairman of the department and with the consent of the prospective adviser taking into consideration such matters as faculty expertise and faculty and advisee loads.

Course of Study

A proposed course of study, identifying deficiencies to be rectified, and language, statistics, or other technique requirements, will be initiated by the student in consultation with his adviser during the student's first quarter in residence. The proposal will be presented to the graduate research program and professional activities committee of the department for its comment, and subsequent approval. The proposed course of study shall include the following courses: Geography 450, 451, 452, and 550. Each student will also include 3 seminars in his program.

Proficiency Option

Each student will enroll in Geography 450, 451, 452, and 550 during the first quarter of its offering after his matriculation. A proficiency examination for each of the three core courses will be offered upon request to

each student before the end of the first week of the quarter of its offering. Notification of the student's passing or failing of the proficiency examination will be given to the student within one week after the examination.

Review and Evaluation of Student Progress

Each student's progress will be assessed quarterly by the faculty in a meeting within 10 days after the beginning of the ensuing quarter. For that meeting, a written statement, based on faculty reports of his performance will be generated by the adviser for submission to the student, the chairman of the department and the graduate research program, and professional activities committee. Each student is expected to show continued progress and in particular, to develop habits of critical analysis and dialogue. Unsatisfactory progress will be brought to the attention of the graduate research program and professional activities committee for recommended action by the faculty.

Master's Advisory Committee

Students have two options for the master's degree: a thesis or a research paper. This option must be decided before the end of the third quarter of residence.

Before the end of the third quarter of the student's program, an adviser and committee must be arranged and approved by the faculty; the committee must implement the following at that time:

1. Circulate the student's preliminary research paper or thesis proposal to the faculty for comment and recommendation to the master's advisory committee where approval must be obtained prior to the student's registration for thesis hour credit.

2. Arrange for the student's accomplishment of an assigned field problem which must be completed in a prescribed length of time. Successful completion includes an oral defense of the faculty of the student's methodology and findings.

3. Provide for a faculty evaluation of the student's performance in the areas described above and decide whether the student is to be encouraged to continue with second year of graduate study. Tentative course enrollment projections for the second year should be approved at this time.

Completion of Requirements

The finished thesis or research paper will be submitted to the master's advisory committee for approval. The judgment of the committee will be expressed to the student and forwarded to the chairman for recommendation to the Graduate School for the conferring of the master's degree.

Doctor of Philosophy Degree

The Ph.D. degree is a specialized research degree. Although it assumes a broad background comparable to that provided by the M.A. program the Ph.D. program is designed to develop a comprehensive yet a critically analytic knowledge of theory, literature, research, design, and application within one of the three fields of specialization. In addition the Ph.D. candidate will concentrate in two subfields in which he proposes creative research.

Program

The student and his tentative adviser will formulate a program which will include the following courses: Geography 450, 451, 452, and 550. The

student, adviser, and committee will ascertain the tools and cognate courses appropriate and will certify proficiency. Each student will include four research seminars in his program.

Before the end of the second quarter of doctoral work, the student will select an adviser and they jointly will recommend doctoral committee members to the graduate faculty for certification.

Review and Evaluation of Student Progress

Each student's progress will be assessed quarterly by the faculty in a meeting within 10 days after the beginning of the ensuing quarter. For that meeting, a written statement, based on faculty reports of his performance will be generated by the adviser for submission to the student, the chairman of the department and the graduate research, program, and professional activities committee. Each student is expected to show continued progress and, in particular, to develop habits of critical analysis and dialogue. Unsatisfactory progress will be brought to the attention of the graduate research, program and professional activities committee for recommended action by the faculty.

Upon completion of the program, and with the approval of a majority of the graduate faculty, the Ph.D. student will offer for a comprehensive written and oral examination two subfields within the following three fields of specialization: Physical Environmental Systems; Resource Management Systems; and Systems of Cultural Adaptation.

The written portion of the comprehensive examination will be prepared by the student's doctoral committee which will evaluate the performance and judge the student's success or failure. The examination then will be circulated to the graduate faculty.

The graduate faculty will be invited to the oral examination which takes place in not less than one week nor more than two weeks from the time of the written examination. The oral examination will be conducted by the student's doctoral committee with appropriate opportunity for all graduate faculty to ask questions. The student's success or failure of the oral examination will be judged by the student's doctoral committee.

The doctoral student will present his dissertation proposal at an open meeting of the Department of Geography, having passed the comprehensive examination. The written and oral examination and presentation of the dissertation proposal are prerequisite to admission to candidacy.

The Dissertation

The student's written dissertation will be circulated to members of his doctoral committee two weeks in advance of the proposed defense. The doctoral committee will announce a public invitation a week in advance and will hear the student's defense at the place and time approved by the Graduate School. The finished dissertation will be sent to the student's doctoral committee for approval. The judgement of the official committee will be expressed to the student and forwarded to the chairman of the department for recommendation of the Graduate School for conferring of the Ph.D. degree.

Geology

The Department of Geology offers a program leading to the Master of Science degree.

Master of Science Degree

Entering students are required to take a placement examination which is administered at the beginning of the Fall and Spring terms each year. All students are expected to be familiar with the Department of Geology policies and requirements. All students are expected to give evidence of competence in the basic sciences. A total of forty-eight hours of graduate work with an average grade of *B* or better constitute the minimum credit requirements. A final oral examination, primarily concerned with defense of the thesis, is administered as the last step before graduation.

The objective of the master's program is to develop the student's competence in the basic fields of geology and to provide for specialization dependent on student and faculty interest. Facilities and staff are available for studies involving surface and subsurface mapping, structural geology, petrology, paleontology, micropaleontology, palynology, paleoecology, coal petrology, coal geology, stratigraphy, sedimentation, sedimentary environments, crystallography, mineralogy, low temperature geochemistry, ore deposits, petroleum geology, environmental geology, hydrogeology, and exploration geophysics. Many of the faculty are actively conducting research in which statistical and computer techniques are applied to problem solving in the earth sciences. Interdisciplinary research with other departments is encouraged. Preparation for teaching earth science at the high school and junior college level may also be undertaken in cooperation with the College of Education and other science departments.

Southern Illinois and adjacent areas offer a wide variety of geological conditions ideal for individual study and research. Experienced staff members work closely with students and provide individual assistance when necessary. Graduate teaching, research and field assistantships are available to qualified students. The Illinois State Geological Survey and several major companies in the petroleum industry actively support geological work in this area.

Government

Graduate courses in government may be taken as a major or cognate leading to the Master of Arts degree, as a part of a social studies major leading to the Master of Science in Education degree, and as a major leading to the Doctor of Philosophy degree.

Application Procedures

Application for admission to graduate study in government should be directed to the Graduate School. The applicant must have the registrar of each college previously attended send three official transcripts of his record to the Graduate School. Supporting materials for the application should be sent to the director of graduate studies in the government department. These materials consist of (1) the personal and professional data form, (2) three letters of recommendation from former teachers, (3) a letter of professional intent, (4) a copy of all transcripts, and (5) scores on the Graduate Record Examination (GRE) verbal and quantitative test. The personal and professional data form and forms for applying for assistantships and fellowships may be obtained from the director of graduate studies. In the event that the GRE cannot be taken at the time of application, this requirement may be temporarily waived until the first

time the examination is offered after the student arrives on campus. Applications and supporting materials should be submitted at least eight weeks before the quarter the student intends to register.

Departmental processing of applications for acceptance as a graduate student in government is the joint responsibility of the director of graduate studies and the graduate studies committee. The director of graduate studies serves as adviser to each new graduate student until an advisory committee can be named, normally no later than the end of the student's first quarter in residence. All elements of the student's program must receive the approval of this committee.

Areas and Fields of Study

Area A—Political Theory and Methodology

- (1) History of political theory
- (2) Normative political theory and analysis
- (3) Empirical political theory and theory-building
- (4) Research methods and techniques
- (5) Polimetrics
- (6) Didactics

Area B—American Government

- (1) Concepts, theory and methods
- (2) The legislative-executive process
- (3) Administrative decision-making and organizational behavior
- (4) Political behavior and the electoral process
- (5) Public policy (including foreign policy)
- (6) Psychology and politics
- (7) State, local, community and urban behavior and structures
- (8) Public law and the judicial process

Area C—Comparative Government

- (1) Concepts, theory and methods
- (2) The political systems of foreign countries or areas
- (3) Processes and institutions, e.g., comparative political development, comparative political socialization, comparative administration, comparative political parties, comparative foreign policies, or other approved topic

Area D—International Relations

- (1) Concepts, theory and methods
- (2) International politics
- (3) International law
- (4) International organization
- (5) Linkages between foreign policy and international relations

Area E—Cognate and Interdisciplinary fields

- (1) An approved field, e.g., history, economics, mathematics or sociology
- (2) An approved set of related interdisciplinary courses, e.g., courses in organizational and group behavior

Master of Arts Degree

Requirements for admission imposed by the department are in addition to those of the Graduate School. The department will ordinarily accept as candidates for the Master's degree only those applicants who (1) have graduated from an accredited four year college or university; (2) have completed a minimum of 24 quarter or 16 semester hours in government or political science; (3) have a 3.7 (5-point scale) over-all grade point

average or, alternatively, have a 3.9 overall for the last two years of undergraduate work, and (4) have a 4.0 average in government or political science.

Applicants who meet the minimum standards of the Graduate School but do not meet these minimal requirements can be considered for acceptance only on petition to the department's graduate studies committee. If granted, acceptance may be accompanied by a statement specifying special conditions of admission.

The student must earn a minimum of 48 quarter hours of acceptable graduate credit to meet the requirements for the Master's degree. At least 24 hours of this credit must be in 500-level courses and at least 15 quarter hours of the 500-level work must be in courses other than internship or thesis.

A student who completes only the minimum of 48 hours of course work may devote no more than 8 of those hours to courses outside the department unless the work is in an approved cognate field or topic. In the latter case, a maximum of 16 hours in the cognate area may be counted toward fulfillment of the 48 hour requirement.

Each candidate for a Master of Arts degree is required to take government 500a and 500b, Research Methods. Proficiency in one tool—a modern language, statistics or computer science is also required. The selection of a tool must be justified to the student's advisory committee as being relevant to his or her proposed course of study and research and professional interests. The method of demonstrating proficiency is the same as that required of Ph.D. students.

A student must have an overall GPA of at least 4.0 ($A = 5.0$) to be eligible to write a master's thesis or internship report.

A thesis or internship report of thesis quality is required for the Master of Arts degree. The topic must be approved by the members of the student's thesis committee. A final oral examination will cover the thesis, the major area in which it is written and the student's general competence in government.

Doctor of Philosophy

The rules in force at the time of the student's admission to the Ph.D. program will apply while he or she is in the program unless (1) the student voluntarily selects a newer set of rules in total or (2) the time between admission to the Ph.D. program and passing the preliminary examinations exceeds five years. In the latter case, the student will automatically come under the rules in force at the beginning of the sixth year and every fifth year thereafter until the preliminary examinations are passed. At least one year (three academic quarters) in residence is required before taking preliminary examinations. The Ph.D. student must offer six fields of study selected from at least four areas. Four fields from not less than three areas of study will be satisfied by passing the written preliminary examinations. Two fields will be satisfied by the completion of eight hours of graduate course work (either 400 or 500 level courses) with at least a grade of *B*. Courses taken in the M.A. program may be used to satisfy this requirement. Excluding dissertation hours, one-half of the remaining work must be 500 level courses. Successful completion of Government 500a and b and the tool requirements and an overall GPA of at least 4.5 are also required before taking preliminary examinations.

Each Ph.D. student must satisfy two tool requirements, consisting of two foreign languages or any combination of two of the following: One

foreign language, statistics, or computer science. The two tools selected must be justified to the members of the student's advisory committee as being relevant to a program of study and research and professional interests. Language proficiency may be demonstrated by course work or examination. Passing the Educational Testing Service foreign language examination with a minimum score of 465 may be used to fulfill the requirement in the common languages (Spanish, German, French or Russian). A special examination locally administered is used for the uncommon languages (Arabic, Chinese, Vietnamese, etc.). Alternatively, the language requirement may be satisfied through the successful completion of 288a,b, and c in the foreign languages department with a minimum grade of *B* in 288c. Where the foreign languages department recommends that the student start with 288b or c, the completion of the recommended course with a grade of *B* in 288c will satisfy the requirement.

Proficiency in computer science may be demonstrated by course work or examination. The student may take Computer Science 202, Advanced Fortran, and a third course approved by the advisory committee members. A grade of *B* is required in the second and third courses. A special problem assigned by a committee of faculty designated by the director of graduate studies in the government department can be substituted for the third course. As an alternative to the course work or problem, the student may take an examination prescribed by a committee of government faculty designated by the director of graduate studies.

Statistics tool requirements can be fulfilled by taking Mathematics 410a and b and a third mathematics course approved by the student's advisory committee or by taking Guidance 505, 506, and 507. A grade of *B* must be earned in the last two courses. Proficiency in one, two, or all three statistics courses can alternatively be demonstrated by passing examinations administered by the mathematics department.

The dissertation topic must be approved by the members of the student's dissertation committee. The student must register for 36 hours of dissertation credit. The dissertation must be completed within five years of finishing the preliminary examinations. If the dissertation is not finished, the student will have to take preliminary examinations again. Upon completion of a dissertation of acceptable quality, the successful passing of a final oral examination devoted primarily to a defense of the dissertation will complete the degree requirements for the Doctor of Philosophy degree.

Guidance and Educational Psychology

The Department of Guidance and Educational Psychology offers three programs in addition to actively participating in the Ph.D. in Education program. The three programs are: M.S. in Education in guidance, M.S. in Education in educational psychology and Specialist degree in guidance.

Guidance

The Guidance and Educational Psychology Department at Southern Illinois University at Carbondale offers the *Master of Science in Education* degree in guidance with emphasis at either the elementary or secondary school level.

PROGRAM OBJECTIVES

The basic objective for the guidance program is to prepare a specialist in guidance to work in the school setting. While at times the individual may

choose to work in another setting, the program is designed primarily to meet the needs of school personnel. This being the case, the school counselor is viewed primarily as an educator. A person interested in clinical psychology, counseling psychology, rehabilitation counseling, college student personnel work, etc., should seek a program different from that presently offered. This in no way implies a disregard or lack of understanding for either counseling or therapy, but states clearly the expectation that the guidance major graduating from our master's program will have specific skills enabling him to work effectively in an instructional context. Some objectives for all programs would include an expectation of the development of attitudes and skills in the following areas:

1. An appreciation of the dignity and worth of man.
2. An understanding of human behavior, particularly as it relates to the school setting.
3. A philosophy of education and the role of guidance services within this philosophy.
4. Those specific skills attributed to a person filling the role of a school counselor.

ADMISSION REQUIREMENTS

A. Master of Science in Education degree with majors in elementary guidance or secondary guidance.

Admission to study for a graduate degree in the guidance and educational psychology department is based upon an analysis of the academic and personal potential of the individual. Prerequisites include:

1. Applicants must be eligible to hold a teaching certificate. Special cases examined by the selection and review committee may arise. In such instances each situation will be reviewed carefully on appeal from the individual concerned.
2. Applicants for the master's degree who have earned a 3.70 grade point average (based on 5.0 as A) in the undergraduate degree will be admitted to graduate study. Those students whose averages are below 3.70 but above 3.40 may, with good reason, petition that the selection committee of the guidance and educational psychology department accept them conditionally in accordance with the regulations of the Graduate School.
3. Applicants must have one year of full time employment subsequent to receipt of their bachelor's degree or be 24 years of age at the time of application to the program. Special cases examined by the selection and review committee may arise. In such instances each situation will be reviewed carefully on appeal from the individual concerned.

PROCEDURES FOR ADMISSION TO STUDY

Permission to enter a program of study in the Department of Guidance and Educational Psychology is by application and review of performance. Procedures are listed below:

1. Completion of the application for admission to graduate study. These forms may be obtained from the Graduate School. Completed forms are to be returned to the Graduate School admissions office.
2. Submission of three official transcripts of all previous college course work to the Graduate School admissions office.
3. Submission of four reference letters, preferably from a college academic adviser, a fellow teacher, and most recent employer. The

referent should be asked to comment upon the applicant's personal qualities—ideals, honesty, and leadership—ability to work in his chosen career field (relationship with peers and organization ability), academic achievement, work experience, sense of job responsibility. Reference letters should be mailed directly from the referent to the Department of Guidance and Educational Psychology.

4. Submission by an appropriate university or other agency of scores received on the Miller Analogies Test. This test can be taken on campus at the student's convenience.
5. Completion of an autobiographical sketch. The Department of Guidance and Educational Psychology selection and review committee is interested in each application as an individual. The autobiographical sketch should comment upon the following:
 - 5.1 Early life experience which may have influenced your development, e.g., significant incidents in your home with parents, siblings, friends; work and responsibilities as an employee or member of a group; experience in school and elsewhere.
 - 5.2 College experience including a listing of organizational memberships, offices held, and other activity participation which influenced a decision to apply for the chosen program of study in the Department of Guidance and Educational Psychology.
 - 5.3 Work and other experiences, e.g., teaching summer camping, church work, work in industry, which support your chosen program of study in the Department of Guidance and Educational Psychology.
 - 5.4 Interpersonal relationships with your peers and other educators which influenced your decision to enter education which may affect your success as a professional educator.
 - 5.5 The role you perceive to be that of the educator-counselor as he relates to the students, the faculty, and the administrative staff.
 - 5.6 The social issues which you believe to be most important to mankind today.
 - 5.7 Summarize, briefly, why you feel that you will succeed in your chosen field of work.
6. If the applicant is accepted to a program of study in the Department of Guidance and Educational Psychology, the approval will be forwarded to appropriate University offices.

ACADEMIC REQUIREMENTS

1. 4.0 average is required in a prescribed sequence of graduate courses in order to be eligible to receive the Master of Science in Education degree.
2. Minimum of 48 hours of course work is required.
3. All candidates will be required to pass two written or oral comprehensive examinations during the quarter in which he completes requirements for the master's degree. A written request from the student, signed by his advisor, must be submitted one month prior to the examination date. Should the candidate fail to pass comprehensive exams, he can expect to complete additional work as determined by the examining committee.

The Master of Science in Education degree in guidance for secondary school guidance personnel is designed as the first year of graduate prepara-

tion of the public school guidance worker. While it is possible that a person completing the program might be employed under almost any title in the public school, this person is academically prepared to do those things we feel are best described as guidance functions in the public school. It is no longer fair or reasonable to either the public schools or the student in the program to imply that in one year of graduate work a preparation program can be sufficiently comprehensive to allow the graduate to do all those things which might be expected of him in the area of guidance and counseling. At this level we hope to prepare a person to have the following school related competencies:

- 1. Proficiency in educational and vocational counseling. The student will take three practicums: one in counseling, two in guidance services at the appropriate level. At this level our emphasis will be in developing a needed competence, that of helping students and parents develop vocational and educational plans. While it is true that the student will be given an opportunity to deal with other aspects of counseling as they appear, no claim is made that he can be prepared to the degree necessary in all areas. Two additional theory courses and two practicums are devoted specifically to counseling above the master level. All counselors are encouraged to complete these courses.
- 2. Proficiency in other guidance services. These skills include:
 - 1. The appropriate use of evaluation methods for school evaluation.
 - 2. Appraisal procedures appropriate in the secondary school.
 - 3. Group procedures appropriate in the secondary school.
 - 4. Use of informational materials and services.
 - 5. Ability to conduct in-service programs.
 - 6. Ability to make effective referrals.
 - 7. Ability to organize and administer a guidance program.
 - 8. Ability to employ basic statistics and educational measurement concepts.
- 3. Other general competencies:
 - 1. A basic understanding of human behavior, adolescent psychology, educational psychology, and their application in the school setting.
 - 2. The ability to serve as a consultant to the classroom teacher in matters relating to psychological needs of students if the teacher so desires.
 - 3. The ability to assist in formulation of programs of education designed to meet students' needs.

The following courses are generally required. It is strongly recommended that students take Guidance 442 (Basic Principles of Guidance) or its equivalent before entering the program. Guidance 442 cannot be counted as an elective.

	412	Mental Hygiene—Pre. 305	4
	or		
Psych.	440	Theories of Personalities	4
	505	Introduction to Statistical Methods	4
	530	Standardized Testing: Theory, Use & Interpretation—Pre. 305	4
	537a	Counseling Theory and Practice—Pre. Consent of Instructor	4
	541	Occupational Information and Guidance—Pre. 442	4
	543	Guidance Through Groups—Pre. 442	4

548a	Practicum in Secondary Guidance	8
548c	Practicum in Counseling—Pre. Consent of Instructor	4–8
553	Organization and Administration of Guidance and Pupil Personnel Services—Pre. 537a	4
562b	Human Development in Education (Adolescent)—Pre. Advanced Standing	4

In addition to this basic core, a student is required to take 4 hours to complete a minimal program of 48 hours.

In an effort to provide more realistic relevant experiences for master level students in guidance and counseling, the 548 series was devised. In this series students are placed in an on-the-job setting for three quarters. This gives the student more experience and according to school administrators provides a greater continuous service to the schools. This new program in guidance and counseling calls for a greater commitment and involvement from both students and from the school, but will produce a guidance counselor who should be more adequately prepared to meet the needs of the school.

548a Practicum in Secondary Guidance

548b Practicum in Elementary Guidance

In the Fall and Winter quarter, each master student in counseling and guidance will be placed in an appropriate setting for a minimum of one day a week. Laboratory experiences and a seminar will be included in this course that is appropriate to the on-the-job experiences. Prerequisites: permission of instructor.

548c Practicum in Counseling

In the Spring quarter each master level student will be expected to be in an appropriate educational setting for a minimum of three days a week. Laboratory experiences and a seminar will be included in this course that is appropriate to the experiences. In the case of job conflict, alternatives are listed and individual cases will be handled by committee. Prerequisite: permission of instructor.

ALTERNATIVES FOR 548 SERIES

Students who can not or will not be able to spend the required time in the on-the-job setting will have the following alternatives:

1. Arrange to spend one full quarter five full days a week in an appropriate setting.
2. Arrange to spend the required amount of time in the appropriate setting in another sequence as approved by the departmental committee.
3. Full time commuter teachers may take 548c in two hour blocks for two quarters to meet the time commitment.
4. Special cases may be petitioned to the departmental faculty committee in guidance and counseling.

The Master of Science in Education degree in guidance with the emphasis on the elementary level is designed to develop a specialist who works with children in a school setting and helps parents and teachers.

PROGRAM OBJECTIVES

That the elementary guidance person develop skills:

1. To work with children whose minor personal or academic problems interfere with school life using selected types of individual or group activities, and to make referral of children needing intensive diagnosis to community agencies or other professional personnel.

- 2. To provide counseling and group guidance services for teachers.
- 3. To consult with and assist parents and teachers in working with children.
- 4. To provide in-service training in areas of mental health, group guidance, interpretation and selection of tests, maintenance and use of cumulative records, child behavior and development, and techniques of counseling and interviewing.
- 5. To assimilate and interpret the technical information supplied by other specialists.
- 6. To interpret the guidance program to community organizations and parents.

The following basic core of courses is required for the major in elementary guidance.

Guid. 412	Mental Hygiene	4
or		
Psych. 440	Theories of Personalities	4
Guid. 505	Introduction to Statistical Methods	4
Guid. 521a	Analysis of Classroom Behavior	4
* Guid. 530	Standardized Testing: Theory, Use and Interpretation	4
* Guid. 537a	Counseling Theory and Practice	4
* Guid. 541	Occupational Information and Guidance	4
* Guid. 543	Guidance Through Groups	4
Guid. 548b	Practicum in Elementary Guidance	8
* Guid. 548c	Practicum in Counseling	4-8
Guid. 562a	Human Development in Education—Child	4

Whenever enrollments allow, those courses asterisked will have special sections for elementary guidance majors. It is strongly recommended that students take Guidance 442 (Basic Principles of Guidance) or its equivalent before entering the program. Guidance 442 cannot be counted as an elective.

In addition to this basic core, a student is required to take 4 hours to complete a minimal program of 48 hours. Additional courses felt to be needed by the student and his adviser will be added to the total.

SPECIALIST IN GUIDANCE

The guidance and educational psychology department, College of Education, Southern Illinois University at Carbondale offers a program of training that leads to a Specialist degree in guidance. This certificate is awarded to students who complete successfully the equivalent of a year of sequenced training beyond the Masters Degree. Students who complete the program of study qualify for positions as pupil personnel administrators or counseling with special populations or admission to an internship in school psychology.

The specialist program is designed to train service oriented personnel who have interests in children and young adults who have learning and social problems related to their schooling. Sensitivity to the school as a social system and understanding the interrelationships among professional personnel as well as between school staff members and students are emphasized. Course work is offered during the summer as well as during the regular academic year.

PROGRAM OBJECTIVES

This specialist program is designed to meet the needs of school personnel through an interaction model of training involving local school districts,

the State Department of Public Instruction, the College of Education, and other appropriate resources. All students who complete the specialist program will be expected to have skills and knowledges in the area of: (1.) consultive roles of school specialists (2.) counseling theory and practice (3.) individual appraisal and diagnosis (4.) evaluation of school programs (5.) management of classroom behavior

Students in conjunction with their advisers will select one or more of these areas for special emphasis. Laboratory practice and experiences in the schools will be employed to relate knowledge gained through formal course work to the skills required on the job.

PROGRAM ADMINISTRATION

Faculty members of the Department of Guidance and Educational Psychology who have responsibilities in the specialist program hold doctorates and are experienced practitioners. The content and quality of the specialist program including curriculum review, selection of students, and program relevancy are the responsibility of an admissions committee.

Admission Procedures. Admission into the program of study is established by the approval of an admissions committee. Procedures are listed below:

1. Completion of the application for admission to graduate study. These forms may be obtained from the Graduate School, and when completed, are to be returned to the Graduate School.
2. Submission of three official transcripts of all previous college course work directly to the Graduate School.
3. Completion of the Application for Admission to the Department and compliance with all other departmental admission requirements (letters of recommendation, test scores, as identified on the admissions application).

ADMISSION CRITERIA REQUIRED BY THE DEPARTMENT

1. A master's degree or its equivalent in educational psychology, special education, guidance, or related area is required.
2. Submission by an appropriate university or other agency of scores received on the Graduate Record Examination. The tests may be taken on campus at Southern Illinois University at Carbondale.
3. Experience in the public schools or related areas is required.
4. A 4.25 graduate grade point average (based on 5.0 as A) will be required of applicants for the Specialist degree before they will be admitted to the program unconditionally.
5. A student must be admitted by both the Graduate School and the department admissions committee.
6. Students must have academic competencies in the following areas for unconditional admittance to the Specialist Program:

Competency Areas

- | | |
|-----------------|---|
| (a) Statistics | Guid 505 (Basic Statistics) or
Math 410a (Statistical Analysis) or
Math 410b (Statistical Analysis) or
Equivalent |
| (b) Measurement | Guid 530 (Standardized Testing) or
Guid 531 (Basic Measurement) or
Psych 522 (Research Design & Inference) or
Equivalent |

- (c) Personality

Psych 440 (Personality Theory) or
Psych 530 (Personality Theory & Dyna) or
Psych 431 (Psychopathology) or
Equivalent
- (d) Behavior &
Development

Guid 562a (Child Development) or
Guid 562b (Adolescent Development) or
Psych 451 (Advanced Child Psychology) or
Psych 554 (Developmental Theory) or
Equivalent
- (e) Curriculum

El Ed 561 (Curriculum El School) or
Sec Ed 562 (High School Curriculum) or
Ed Ad 560 (Curriculum) or Equivalent

A department admissions committee will inform appropriate university offices when the applicant is accepted to a program of study.

CERTIFICATE REQUIREMENTS

1. The requirements for the Specialist's degree are reviewed in chapter 1 of this catalog. A minimum of 45 quarter hours beyond the Master's degree with a 4.25 grade point average is required for all course work taken at the specialist's level.
2. A candidate is required to pass a written comprehensive and an oral examination over course work after 36 quarter hours have been completed. An evaluation is also made of the candidate's performance as a professional in a public school.
3. A scholarly paper or project is required on a topic formally approved by the student's specialist committee.

The students will follow the guidelines suggested below so that minimal competencies for the specialist degree will be assured.

Required
Hours

4	Analysis of Classroom Behavior	Guid 521a	4
4	Seminars: Counseling	Guid 568	1-12
	Evaluation	Guid 580	4
	School Psychology	Guid 555	1-12
4	Practicum: School Psychology	Guid 548d	1-12
	Counseling	Guid 548c	1-12
	Counseling, Guidance, and Counselor Supervision	Guid 581	1-12
4	Individual Investigation	Guid 597	1-12
4	Seminar—Counseling Process	Guid 481	1-12
4	Individual Appraisal	Guid 532a	4
		Guid 532b	4
		Guid 546a	4
		Guid 546b	4
21	Electives		

EDUCATIONAL PSYCHOLOGY

The guidance and educational psychology department at Southern Illinois University at Carbondale, also offers the Master of Science in Education degree with emphasis in educational psychology. The following consists of a statement of requirements for the Masters degree program.

PROGRAM OBJECTIVES

The basic objective is to provide a background in learning processes for

academically superior students interested in advanced training related to school learning. The program is particularly designed for individuals who may wish to prepare for doctoral work in the research area of school learning and socialization. The curriculum neither presumes nor anticipates certification to teach.

ADMISSION REQUIREMENTS

1. An undergraduate degree from an approved institution of higher learning.
2. An undergraduate grade point average of 3.70 on a 5.0 scale for unconditional acceptance.
3. Non-native English speaking students and students with undergraduate G.P.A. below 3.70 are required to satisfy graduate school and departmental English proficiency requirements.

PROCEDURES FOR ADMISSION TO STUDY

Permission to enter the program is granted by the department committee on selection and retention. Procedures for admission are as follows:

1. Completion of the application for admission to graduate study. Completed forms are to be returned to the Graduate School.
2. Submission of 3 official transcripts from each school attended. Transcripts to be sent directly to the Graduate School by the registrar of each school.
3. Submission of scores on the Miller's Analogy Tests or the Graduate Record Examination, both verbal and quantitative, should be sent directly to the Department of Guidance and Educational Psychology.
4. Submission of three letters of recommendation by professors familiar with the applicant's academic performance. Letters of recommendation should be sent directly by the individual writing the letter to the Department of Guidance and Educational Psychology.
5. Submission of the department application form. This should be sent directly to the Department of Guidance and Educational Psychology.

All items to be sent directly to the Department of Guidance and Educational Psychology should be addressed as follows:

Committee on Selection and Retention
Educational Psychology Masters Program
Department of Guidance and Educational Psychology
Southern Illinois University at Carbondale
Carbondale, Illinois 62901

ACADEMIC REQUIREMENTS FOR RETENTION AND GRADUATION

1. A 4.0 average in a sequence of prescribed courses totaling 48 quarter hours.
2. Preparation of an acceptable master's thesis. The thesis topic is to be formally approved and the thesis is to be read and accepted by the student's adviser and one other member of the departmental faculty.
3. After meeting the preceding standards, the student is recommended for graduation by the committee on selection and retention at the request of his adviser.

CURRICULUM

The Master's program consists of required study in three areas which are designed to provide the necessary foundation in the major areas of Educa-

tional Psychology. The student's program will be determined jointly by himself and his academic adviser.

REQUIRED COURSES (33–37 hours)

I. LEARNING (12 hours)

4 hours—Guidance 515—Psychological Aspects of Education

4 hours—Guidance 511—Educational Implications of Learning Theories

4 hours—Guidance 521a—Analysis of Classroom Behavior

II. QUANTIFICATION PROCEDURES (8 hours)

4 hours—Guidance 505—Introduction to Statistical Methods

4 hours—Guidance 506—Advanced Statistical Methods

III. SOCIAL-DEVELOPMENTAL (8 hours)

4 hours—Guidance 562a—Child and Adolescent Development in Education

4 hours—Psychology 461—Social Psychology

or

4 hours—Psychology 408—Theories of Motivation

IV. THESIS (5–9 hours)

V. ELECTIVE COURSES (11–15 hours)

The student in conjunction with his adviser will elect additional courses to complete the required 48 hours.

Health Education

Master of Science in Education

Master of Science in Education degree programs are offered in health education. The candidate may select from three areas: school health education, community health education, and safety education. A common core of 20 quarter hours in health education is required of all master's degree candidates.

SCHOOL HEALTH AND SAFETY EDUCATION

In school health and safety education, two programs may be followed:

(1) a minimum of 24 hours in health education, a minimum of 16 hours in a minor field, and 8 hours, with departmental approval, from other graduate courses in the University; or (2) a maximum of 40 hours in health education and 8 hours from an approved field of education.

COMMUNITY HEALTH EDUCATION

The program in community health education extends over four quarters of study with 60 quarter hours required for the degree. In addition to the common core of 20 hours in health education required of all master's candidates, the community health education concentration requires Health Education 488, 489, and 500; a minimum of 4 quarter hours in foods and nutrition; 4 quarter hours in communications or group work methods; a full quarter as a field intern (Health Education 590); and, electives to 60 quarter hours.

Higher Education

Master of Science in Education

The Department of Higher Education participates in the Master of Science in Education program with a concentration in higher education.

Pre-service and in-service preparation is provided for persons who expect to teach in two-year and four-year colleges or serve in administrative positions in colleges and universities, and related institutions in: academic administration, college and university business affairs, college student personnel, and community and junior college teaching.

Students interested in one of these master's programs may obtain information and advisement from the advisers of the respective programs through the Department of Higher Education.

Application: Inquiries regarding application should be directed to the chairman of the Department of Higher Education.

Admission: Each applicant must submit an application to the Graduate School. In addition, an applicant is requested to submit to the Department of Higher Education the departmental application form, an autobiographical statement, three letters of reference (special form provided), and, when required, scores on the Miller Analogies Test or the Graduate Record Examination.

Students applying for academic administration or for college and university business affairs should have had two years of full-time experience in higher education. Students applying to the college and university business affairs master's program may be required to have taken certain courses in business or to have at least one relevant competency. Students considering college student personnel should show some evidence of interest or participation in student personnel work as an undergraduate. Students applying for the specialty in community and junior college teaching are expected to have an undergraduate concentration in a subject area commonly taught in a community or junior college. Each application is evaluated on an individual basis with much consideration being given to evidence showing the applicant's commitment to higher education as a field of study and as a life long interest.

Retention: The records of each master's student are reviewed periodically to determine whether the student should continue in the program. Each student works closely with his adviser in planning his program; each student also has a committee which assists in reviewing his progress, in supervising his thesis or research paper, and in administering the final examination.

Program Requirements: Each student will develop with his adviser a suitable sequence of courses that will help him reach his stated academic and professional objectives. In each of the specialties there are special requirements that should be noted:

Academic Administration: 48 quarter hours (minimum).

Core Courses: 20 quarter hours.

Higher Education 513 (4) Organization and Administration of Higher Education

Higher Education 516 (4) College Student and College Culture

Higher Education 535e (2) Problems in Central Administration

Higher Education 535g (2) Academic and Faculty Administration

Higher Education 518 (4) College Teacher and College Teaching

Higher Education 555 (4) Philosophy of Higher Education

An internship experience if an exception was made waiving the pre-admission work experience.

College and University Business Affairs: 48 quarter hours (minimum).

Core Courses: 20 quarter hours.

Higher Education 510 (4) Higher Education in the United States

Higher Education 513 (4) Organization and Administration of Higher Education

Higher Education 518 (4) College Teacher and College Teaching

Higher Education 535e (2) Problems in Central Administration

Higher Education 535g (2) Academic and Faculty Administration

Higher Education 578 (4) Economic Aspects of Higher Education

An internship experience if an exception was made waiving the pre-admission work experience.

One or more professional competencies.

College Student Personnel: 60 quarter hours (minimum).

Core Courses: 20 quarter hours, including 4 hours of practicum.

Higher Education 515 (4) College Student Personnel: Policies and Procedures

Higher Education 516 (4) College Student and College Culture

Higher Education 523 (4) Internship in Higher Education

Higher Education 555 (4) Philosophy of Higher Education

Guidance 505 (4) Introduction to Statistical Methods

A required internship experience.

Students are encouraged to develop an interdisciplinary program preparing them in general student personnel administration or in one or more of the individual student services.

Community and Junior College Teaching: 48 quarter hours (minimum).

Core Courses in Higher Education: 16 quarter hours:

Higher Education 516 (4) College Student/College Culture

Higher Education 518 (4) College Teacher/College Teaching

Higher Education 551 (4) Curriculum Design and Policy

Higher Education 565 (4) Community-Junior College

Courses in Occupational Education: 3 quarter hours:

O.E. 485 (3) Principles & Philosophies of Voc.-Tech. Education
(may be replaced by Higher Education course, when desirable)

Internship: 4 to 12 quarter hours (when feasible). Higher Education 523a-Internship, College Teaching. (An Internship cannot be assured, but effort is made to provide such an experience when possible.)

In each of the separate specialties listed above, variations in the program requirements may be made only with the concurrence of the student's committee.

Research Requirements: Each student shall demonstrate his research competency through writing an acceptable master's thesis or a research paper. A student selecting academic administration or college and university business affairs is usually asked to write a thesis and to demonstrate research competencies as outlined by his committee. Students in college student personnel usually prepare research papers on a topic concerned with student development and related activities. Students in community or junior college teaching must submit an acceptable research paper on a topic in the teaching field with approval coming from both the adviser in the Department of Higher Education and the representative from the subject-area department who works with the student in the writing of the paper. In exceptional cases, the paper may be in Higher Education instead of the teaching field. In some instances, the student may wish to meet the thesis requirement instead of the research paper requirement.

Final Examination: All master's students are required to complete successfully a final examination which may be written or oral or both. Upon

the successful completion of all requirements, including a *B* average for all course work, the student is recommended to the Graduate School for graduation.

Financial Aid: The Department of Higher Education makes an effort to find financial support for its graduate students through a number of graduate assistantships available throughout the University in different administrative offices and residence halls. The student should consult his academic adviser about possible financial assistance including graduate fellowships.

History

General Information

Graduate work in history is offered at both the master's and the doctoral levels. Admission to programs administered by the Department of History must be approved by the department, with approval dependent upon the preparation, ability, and promise of the individual student. For the Master of Arts degree, the department has no formal admission requirements beyond those of the Graduate School. For admission to the doctoral program, each applicant should submit to the department, in addition to the material sent to the Graduate School, the following letters and report: three letters from former teachers, preferably at the graduate level; a letter in which the applicant expresses his professional and personal objectives; and a report of the result of the aptitude test (both verbal and quantitative) and the advanced test in history of the Graduate Record Examination.

Fellowships and teaching assistantships are available to qualified graduate students. All carry stipends, and remission of tuition. Applications for these awards should be submitted by February 1.

Additional information concerning the graduate program in history may be obtained by writing to the chairman, Department of History.

The Master's Degree

History may be chosen as a major or minor for the Master of Arts degree and as the subject-matter major for the Master of Science in Education degree. Four major divisions of historical study are offered: American, Latin American, European, and Asian or African. Candidates for the M.A. degree must consult with the graduate adviser in the Department of History before registering for courses. Candidates for the M.S. in Education degree must consult with the appropriate adviser in the Department of Secondary Education before registering for courses.

For the Master of Arts degree in history, 48 quarter hours of satisfactory graduate work are required; at least 24 of these 48 hours must be on the 500 level. Within this general requirement, at least 32 quarter hours must be in appropriate history courses, with at least 16 of the 32 hours on the 500 level. The remainder of the hours may be taken in courses on the 400 level. At least 15 hours should be taken outside the division of concentration in history. Of these 15 hours required, 8 hours must be at the 500 level. The Department of History strongly recommends that each candidate be enrolled in at least one 500-level course each quarter during his first three quarters in the program. A candidate for the Master of Arts degree must show reading knowledge in a foreign language. With the approval of the department, statistics or computer

programming may be substituted for the foreign language. He may elect to fulfill the research requirement through either the thesis or the non-thesis program.

A candidate in the thesis program should, with the approval of the chairman, select a thesis adviser and a thesis topic by the end of his second full-time quarter in the program. As many as nine quarter hours may be in thesis research. The candidate must submit an acceptable thesis, and pass a comprehensive oral examination covering his field of specialization and his thesis.

A candidate in the nonthesis program must receive an *A* or *B* in two separate research seminars, and copies of both research papers from these seminars must be filed with the department and an approved copy of one paper filed with the Graduate School. Each candidate is required to pass a comprehensive oral examination conducted by a three-man committee. The examination will cover two fields of the candidate's choice, but the fields may not be in the same division.

Division I—American History

Colonial

United States, 1776–1865

United States, 1865–1919

United States, 1919 to present

Mississippi Valley and Illinois

Division II—Latin American History

Colonial

19th Century

20th Century

Division III—European History

Ancient

Medieval

England since 1600

Europe, 1450–1789

Europe, 1789 to present

Division IV—Asian or African History

The Doctor of Philosophy Degree

Candidates in history for the Doctor of Philosophy degree must complete at least two years of full-time graduate work beyond the bachelor's degree or one year beyond the master's degree (or its equivalent), and submit a satisfactory dissertation. The courses and hours of credit necessary for a doctoral student to prepare for preliminary examinations will be determined by the student's advisory committee. The goal is to develop high competence in the five selected fields in which he will be examined.

The department requires all candidates to pass a reading examination in two foreign languages. With the approval of the department, statistics or computer programming may be substituted for one language. The language requirement must be satisfied prior to the preliminary examinations.

The department offers advanced study in fifteen fields of history which are grouped in four major divisions.

Division I—American History

Colonial

United States, 1776–1865

- United States, 1865–1919
- United States, 1919 to present
- Mississippi Valley and Illinois
- Division II—Latin American History*
 - Colonial
 - 19th Century
 - 20th Century
- Division III—European History*
 - Ancient
 - Medieval
 - England since 1600
 - Europe, 1450–1815
 - Europe, 1789 to present
- Division IV—Asian History*
 - East Asia
 - South Asia and Southeast Asia

Each student will be responsible for five fields; either all five in history or four in history and one in a minor subject. For his preliminary examinations, the student will present four fields, all in history or three in history and one in a minor field. He will be certified in a fifth field, either in history or in a minor subject, by taking courses and passing them to the satisfaction of his advisory committee and the professors in that field. Not more than three fields may fall within any one of the above divisions. The preliminary examinations will consist of a three-hour written examination in each of his four fields and two-hour oral examination covering all fields.

After completing his course work, fulfilling the foreign language requirements, and passing the preliminary examinations, the student will be admitted to Ph.D. candidacy and devote his time to the dissertation. Dissertation subjects must be chosen from either American history, Latin American history, or European history. Subjects in American history may fall within any field listed in division I above. Subjects in Latin American history should come from the following areas: regions of special concern to the United States (e.g. the Caribbean), rapidly developing regions (e.g. Mexico), and underdeveloped areas (e.g. the Andean states), with major attention falling within the nineteenth and twentieth centuries. Subjects in European history may fall within any field listed in division III except ancient. The final oral examination will cover the field of the dissertation and related matters.

Assistantships and Fellowships

Fellowships and teaching assistantships are available to qualified graduate students. All carry stipends, and remission of tuition. Applications for these awards should be submitted by February 1.

Additional information concerning the graduate program in history may be obtained by writing to the chairman, Department of History.

Home Economics

The Master of Science degree in home economics is offered by the School of Home Economics, with major concentrations offered through the Departments of Child and Family, Clothing and Textiles, Family Economics

and Management (including Interior Design), Food and Nutrition, and Home Economics Education. The Department of Home Economics Education also offers the Master of Science in Education degree. In addition, a student enrolled in a program leading to the Ph.D. in Education, with a concentration in secondary education, may select the elective portion of his program from the graduate courses offered in the Department of Home Economics Education. The focus of the program in each department is briefly noted below. The course descriptions for each department may be found in Chapter 3 under the department's heading.

Child and Family

The major concentration in the Department of Child and Family is designed to give students a knowledge and understanding of human development and the family, with a special emphasis on physical and psychological needs of children. Practicum training facilitates a recognition and appreciation of educator-child, parent-child, therapist and counselor-child relationships in the interest of human improvement.

Clothing and Textiles

Graduate courses are directed toward increasing the student's awareness of design, construction techniques, industrial procedures and physical and chemical structure of textiles. New developments in textiles and the historical, sociological and psychological aspects of clothing are also studied.

Family Economics and Management (including Interior Design)

The major concentration in the Department of Family Economics and Management seeks to develop the student's understanding and knowledge of factors associated with family resource management. Specific areas of concern are resources of economically disadvantaged families, the consumer's ability to handle available resources and social and economic aspects of housing the family from the viewpoint of the household and the community.

Food and Nutrition

The major concentration in the Department of Food and Nutrition provides advanced knowledge in human nutrition, food science, and food systems. It is concerned with basic research on the function of nutrients, food quality and control, as well as the application of this knowledge to the improvement and maintenance of health by individuals in their homes, communities, and health care institutions such as hospitals, nursing homes, day care centers, and public facilities.

Home Economics Education

The graduate programs in the Department of Home Economics Education are designed to provide advanced professional training for those persons who wish to teach home economics, including occupational and consumer-homemaking programs in secondary schools, post-secondary and adult or college classes. These programs also meet the needs of those who desire to go into teacher training, state supervision, vocational education or cooperative extension work. In addition, a student working for the Ph.D. in Education with a concentration in secondary education who selects the elective portion of his program from courses offered in the Department of Home Economics Education receives training for research,

advanced supervision, and administration in educational programs. All candidates are encouraged to supplement their major in Home Economics Education with preparation in related areas and general professional education.

Requirements for the Master of Science Degree

To be admitted as a candidate for the Master of Science degree program in any department in the School of Home Economics, the candidate must:

1. Qualify as a graduate student (see Chapter 1).
2. Complete an undergraduate degree which need not necessarily be in home economics. Deficiencies in course prerequisites to the graduate courses may be made up after acceptance into the program.
3. Complete any additional departmental requirements which may include the Graduate Record Exam and letters of recommendation.

To qualify for the Master of Science degree, a student must:

1. Meet the general requirements of the Graduate School (see Chapter 1).
2. Complete a minimum of 30 quarter hours in the area of specialization.
3. Complete an additional 18 quarter hours in approved related fields under the direction of the advisory committee.
4. Satisfactorily complete Guidance 505 or equivalent and research methods 500 as approved by the department.
5. Complete departmental requirements for a thesis or research paper.

The department chairman will guide the student in the selection of an advisory committee. The advisory committee chairman in conjunction with the committee will approve and coordinate the student's program of study, prospectus, thesis or research paper, and comprehensive examination. The advisory committee will consist of three faculty members qualified for graduate faculty status.

Instructional Materials

The Department of Instructional Materials offers courses of study leading to the Masters of Science in Education degree. Concentration of study may be in any of the three areas: instructional materials, audiovisual, or library service. The concentration of instructional materials is recommended for most students, for it gives a broader base of study and the public schools are moving toward instructional materials centers rather than toward the separate areas of audiovisual and library service.

The graduate major concentration in instructional materials, toward a Master of Science in Education degree, involves professional training in both audio-visual education and school library service. It meets the state and national certification standards for full-time school librarians and the standards recommended by the Association for Educational Communication and Technology of the National Education Association. In Illinois every school librarian is also required to have earned a teaching certificate.

Fifty-two hours are required for the major. No minor is required. At least 26 hours must be in courses numbered 500 or above. The following courses are required: 413, 417, 510, and 514.

The minor in school library service is offered for students taking a major in another area. This, consisting of a minimum of 16 hours, is in-

tended primarily for teachers who wish to obtain an appreciation of literature for children and adolescents. It is not intended for the preparation of professional school librarians. The following courses are required: 405, 406, 514, and at least 4 hours from 420, 510, 530, or 576.

The Doctor of Philosophy degree in education with a concentration in learning resources may be taken either in the functional area of educational psychology or curriculum and instruction. The procedures and qualifications are those established by the functional areas and information can be obtained by writing to the coordinator of the educational psychology or curriculum and instruction functional area, College of Education.

The doctoral program in learning resources is designed for those individuals who wish to become directors of instructional materials in a large school system, a college, a university, or industry where the scope of the program will require, under the director, separate specialists in the audio-visual and library fields. The graduate of this program would be able to plan long range activities for his unit, work with curriculum committees, with administrators, and with specialists such as psychologists, research directors, and directors of reading centers.

For further information concerning major and minor programs, work experiences, job opportunities, or other related matters, consult the chairman, Department of Instructional Materials.

Inter-American Studies

Course work in the inter-American studies field is offered by the Departments of Anthropology, Economics, Foreign Languages, Geography, Government, and History.

Prerequisites for the Master of Arts degree include a command of the Spanish language adequate to meet the student's needs for research and communication within the area of his program. The director of the Latin American Institute and the supervisory committee will determine the student's linguistic competence on registration and, where necessary, specify what the student must do to improve his proficiency in Spanish. Whenever the student's program involves the need for Portuguese or French, he will also need to demonstrate or attain satisfactory proficiency in that language. In addition, a satisfactory basic preparation in inter-American studies is required.

Requirements for the Master of Arts Degree

1. The completion of at least 30 hours of courses acceptable for graduate credit in one of the above listed departments.
2. The completion of a minimum of 18 hours of related studies approved by the student's supervisory committee which will meet the requirement for a minor in the Latin American Institute. A maximum of three areas is permitted in the field.
3. The completion of a satisfactory thesis on a Latin American topic in the major for which 5 to 9 hours of credit are given.

A minor in inter-American studies for those students with a major in a department outside of the institute will consist of a minimum of 18 hours to be taken in two of the participating departments. Specific course programs will be worked out by the director of the institute in consultation with the chairmen of the departments involved.

In every case the student's final program must be approved by the graduate supervisory committee, acting under policies established by the Latin American Institute and the Graduate School.

Journalism

Programs in journalism leading to the Master of Arts, Master of Science, and Doctor of Philosophy degrees are offered by the School of Journalism. The GRE aptitude tests are recommended for students requesting admission. Each graduate student's total program will be designed specifically for that student by the student in consultation with his academic adviser. Students in journalism programs may specialize in the following general areas: journalism history, behavioral studies of communications, and current problems of the mass media. Although the mere accumulation of credit hours should not be the objective of any student, minimum course requirements are set forth for both the master's and Ph.D. degrees.

Master's Degree

Candidates for the master's degree must complete a minimum of 48 quarter hours of graduate work, including the thesis. Approximately half of the course hours must be earned in journalism and half in non-journalism disciplines. Each student will be challenged to demonstrate a capacity for investigation and independent thought in his thesis. Only those students who pass the ETS Graduate Foreign Language Examination qualify for the Master of Arts degree; others qualify for the Master of Science degree.

Doctor of Philosophy Degree

Minimum course requirements for the Ph.D. degree will include 96 quarter hours beyond the bachelor's degree. Students generally will include a minimum of 36 quarter hours in journalism, 24 quarter hours in each of two non-journalism areas of study, and 12 quarter hours of electives. The student will complete at least 48 quarter hours of course work beyond the master's degree and must have a 4.25 average on course work taken at Southern Illinois University at Carbondale. These course requirements do not include credits earned in dissertation, Journalism 600. Each student must enroll for a *minimum* of 36 hours of dissertation credit, but may be required to enroll for additional dissertation credit beyond the minimum if he is using university facilities or services.

Each student will propose to his academic adviser early in his second quarter a listing of courses to be included in his study program with a statement of justification for these courses. Revisions may be made in his course of study only with the written approval of his academic adviser. In preparing a course proposal, the student is encouraged to deviate from the 36-24-24-12 hour course requirements outlined herein when to do so enables him to devise a rigorous program which best meets his academic, research and professional needs.

The Ph.D. student, in consultation with his academic adviser, will elect two from among these five research tool combinations:

Journalism 432, 433a,b

Journalism 590, History 452, Government 301

Guidance 505, 506, 507 or Mathematics 410a,b,c

Computer Programming

Modern foreign languages (pass ETS test in one or two from among

languages approved by the School of Journalism).

Courses listed as tools are subject to change without notice, at times when departments change course content, titles and numbers.

A student may propose other research tools for the consideration of his academic adviser who, in consultation with the school's graduate faculty admission and retention committee, may approve, modify, or reject the proposal. Courses taken to satisfy research tool requirements may not be counted for Ph.D. degree course credits.

Doctoral students who enroll, either for course credit or for research tool requirement, in one of two major research areas within the department (behavioral and historical) will be encouraged to take at least the basic course in the other research area.

In addition, each student will be required to undergo written and oral preliminary examinations in both his journalism and non-journalism areas of study; prepare a dissertation based on original, scholarly research; stand oral examination over the dissertation; and fulfill all the Graduate School requirements.

Linguistics

Graduate courses in theoretical and applied linguistics are offered leading to the Master of Arts degree in linguistics or in English as a foreign language. Both 400- and 500-level courses are also offered for a minor in linguistics, and in English as a foreign language. Applicants for admission should send inquiries to the chairman, Department of Linguistics, Southern Illinois University, Carbondale, Illinois 62901.

Master of Arts Degree in Linguistics

Applicants for admission to the linguistics program, besides meeting the general conditions for admission to the Graduate School, must have an undergraduate average of at least 4.0 (on a 5.0 scale). They must also satisfy the following additional prerequisites: a set of courses corresponding to Articulatory Phonetics (402a), Introduction to General Linguistics (401a), and Introduction to Structural Linguistics (401b). Applicants with partial deficiencies in the above prerequisites may be provisionally admitted until the prerequisites are met. With regard to these prerequisite courses (which do not carry degree credit), the student who believes himself capable in the material of any of these courses may ask that a proficiency examination be administered. Such an examination will be equal in scope to that usually given at the end of the course. Candidates for the M.A. degree must have current proficiency in a language other than English; this may be native proficiency or the equivalent of the proficiency expected after three academic years of course work. In cases in which there is doubt about the currency or the degree of proficiency, formal language tests will be administered. An undergraduate background in linguistics, foreign languages, English, anthropology, psychology, mathematics, or philosophy is desirable though not required.

For the major, students are expected to take a minimum of 24 hours in linguistics including 2 courses at the 400-level (405, 408), 4 courses at the 500-level (505, 506a, 508, 550a or b), and 20 hours in an elective area. In the elective area the student has the option of an inside minor, which is an additional concentration exclusively on courses in linguistics, or an outside minor. The outside minor may be in a language area

(courses dealing with the structure, phonology, and history of individual languages or families of languages) or a related area (e.g. language learning, English as a foreign language, language and culture, instrumental phonetics, literary studies, including stylistics) in cooperation with other departments of the University.

At the end of their course work, students will take a comprehensive examination covering the areas of their concentration. This examination may not be taken more than twice.

A thesis is required for the M.A. in linguistics. The student, in consultation with his departmental academic adviser, will select a chairman and two other faculty members to serve as his thesis committee; the executive committee of the department must approve the structure of the thesis committee. The chairman is to be a member of the graduate faculty of the Department of Linguistics. One or both of the other committee members may be from outside the department. The topic of the thesis may come from the major field of linguistics, or from the area of the student's minor, with the stipulation that the topic be demonstrably related to the major in linguistics. In the latter case, the thesis committee may be cochaired by a faculty member outside of the Department of Linguistics.

The total credit requirement is a minimum of 49 quarter hours. Students are encouraged to attend the summer linguistic institute of the Linguistic Society of America; credit will be allowed for course work successfully completed.

Master of Arts Degree in English as a Foreign Language

Applicants to the program in English as a foreign language, besides meeting the general conditions for admission to the Graduate School, must have an undergraduate average of at least 3.8 (on a 5.0 scale). An undergraduate background in any of the following fields is desirable: English, anthropology, foreign languages, philosophy, psychology, mathematics. Those applicants who have less than a 3.8 average or who have an undergraduate background other than those specified may be admitted only after consultation with the chairman of the program. Applicants who are not native speakers of English must meet the following additional requirements: undergraduate concentration, or the equivalent, in English language or literature; TOEFL examination score of at least 550. Deficiencies will be made up as necessary.

The curriculum is designed to give systematic work in both theoretical linguistics and applied linguistics (methodology of the teaching of English as a foreign language). For the major, students are expected to take the following courses or their equivalents: 32 hours of theoretical linguistics (401a, 401b, 402a, 403 or 405, 408, 415, 501, 508), 11 or 12 hours of applied linguistics (570, 571b, 572, and 573 or 580), and the remaining credit hours in a related elective, for a total of 48 hours. Students must maintain an average of *B* for the first 26 hours (approximately 2 quarters) of graduate work in order to qualify to take the written comprehensive examination required for the M.A. in English as a foreign language. This examination may not be taken more than twice. If the candidate does not qualify to take the comprehensive, or if he fails its twice, he will receive a certificate of attendance. A thesis is not required for the M.A. in English as a foreign language; the candidate must submit to the chairman a clean copy of a research paper (approved in one of his courses) for submission to the Graduate School. Although there is no formal language requirement

for the M.A. in English as a foreign language, all students without previous experience in a foreign language are strongly urged to study a language during their graduate work in the Department of Linguistics.

Mathematics

Acceptance for graduate study in mathematics and subsequent continuation in the graduate program are at the discretion of the Department of Mathematics, provided that the student has been admitted to the Graduate School and meets the retention standards of the Graduate School. No special program of previous work is required, and applicants with academic degrees in fields other than mathematics are accepted. However, in consultation with the department, a plan for remedying undergraduate deficiencies in mathematics will be arranged.

Graduate work in mathematics is offered leading to the Master of Arts, Master of Science, and Doctor of Philosophy degrees. Major or minor work for the Master of Science in Education degree and minor work for graduate degrees in other fields are also offered. In addition to the general rules, regulations, and requirements of the Graduate School, the following specific requirements pertain to the various degrees available with a major in mathematics. The department should be consulted for complete details.

Master of Arts Degree

1. Course work must include: Mathematics 501a,b,c; 520a,b,c; at least two quarters of one other 500-level sequence in mathematics. Graduate credit in mathematics must total at least 48 hours.
2. Demonstrated ability in reading mathematical literature in French, German, or Russian. This requirement may be met in any of the following ways: (1) by passing an examination given by the Educational Testing Service of Princeton, New Jersey; (2) by passing an examination given by the foreign language examining committee of the mathematics department; (3) by passing with a grade of *B* or better, the c part of the research tool course (in the language elected) offered by the Department of Foreign Languages.
3. A thesis carrying 5 to 9 hours credit in Mathematics 599.
4. Satisfactory performance on a written examination (usually given in the spring quarter) in the following areas: (1) real analysis (452a,b,c; 501a,b,c); (2) algebra (421a,b; 520a,b,c); one chosen by the student and represented by two quarters of one other 500-level sequence in mathematics.
5. Satisfactory performance in an oral examination over the thesis and such other material as the examining committee may feel is most appropriate.

Master of Science Degree

1. Graduate credit in mathematics must be at least 48 quarter hours, at least 24 of which must be at the 500-level, including at least one 500-level a,b,c sequence, unless a program including a minor concentration from another department is planned. Courses used in completing a minor concentration must be approved by the Department of Mathematics as well as by a representative of the department of the minor.
2. Any of the following (or equivalent) courses which have not been

included in a student's undergraduate work are to be included in his graduate program: Mathematics 419a,b; 421a,b; 433a,b; 452a,b,c; and one sequence from Mathematics 426a,b; 475a,b; 480a,b. Substitutes for any of the above sequences may be made provided they do not weaken the total program and are approved by the departmental graduate programs committee and graduate student adviser.

3. The student must satisfy the research tool requirement either by demonstrating ability in reading mathematical literature in French, German, or Russian or by completing a computer science requirement. The language requirement may be met in any of the following ways: (1) by passing an examination given by the Educational Testing Service of Princeton, New Jersey; (2) by passing an examination given by the foreign language examining committee of the mathematics department; (3) by passing with a grade of *B* or better, the c part of the research tool course (in the language elected) offered by the Department of Foreign Languages. The computer science requirement consists of the following: (1) having basic knowledge in computer programming equivalent to that covered in Computer Science 202, and (2) passing with grades of *B* or better 6 hours of computer science courses selected from Computer Science 302a,b; 403; 411; 470.

4. A research paper carrying 3 hours credit in Mathematics 595 or the successful completion of a four-quarter graduate seminar, carrying 4 hours credit.

5. Satisfactory performance on a written examination (usually given in the spring) on the following areas: 419a,b; 421a,b; 433a,b; 452a,b,c; and one 500-level a,b,c sequence or satisfactory performance on the Master of Arts written examination.

6. Satisfactory performance in an oral examination over the research paper and such other material as the examining committee may deem appropriate. No oral examination is required for those successfully completing the four-quarter seminar option.

Doctor of Philosophy Degree

A student will be considered for acceptance into the Ph.D. program if he has demonstrated above average performance in graduate work comparable to that required for a master's degree at most American universities. Once accepted, the requirements are:

1. Satisfactory performance on a comprehensive examination in real analysis, algebra, and topology at a level commensurate with the courses 501a,b,c; 520a,b,c; 530a,b,c. This examination shall be given annually in September and will normally be taken in the September following the first year in the Ph.D. program.

During the summer preceding the fall examination, the students who must take the examination will be given the opportunity to register for three hours credit in each of Mathematics 595a,c,g corresponding to each of these areas. Each section will be assigned to a graduate faculty member who will be available to the student if the student encounters difficulties. (A student may obtain credit for such courses only once.)

2. Demonstrated reading competence in mathematics in two of the languages: French, German, Russian. Competence may be demonstrated in any of the following ways: (1) by passing an examination given by the Educational Testing Service of Princeton, New Jersey; (2) by passing an examination given by the foreign language examining committee of

the mathematics department; (3) by passing with a grade of *B* or better, the c part of the research tool course (in the language elected) offered by the Department of Foreign Languages.

3. Graduate course work (including dissertation credit) beyond that required for a master's degree must total 96 quarter hours of credit. The student should complete during his first year beyond the master's degree any of the courses 501, 520, 530, 555 not previously completed at SIUC or in an equivalent fashion at another institution. Course work must include 18 hours in one field (major) and 9 hours in two other fields (minors) from the following list: algebra; analysis; applied mathematics; differential equations; geometry; logic; number theory; probability and statistics; topology. The course work in the major and minor areas must be at the 500-level and be exclusive of the three quarter core sequences 501, 520, 530, 555.

4. Satisfactory performance on preliminary written and oral examinations on the student's major and minor areas. The written exam shall be only on the student's major area. The oral exam shall also be on the student's minor areas. A student may not take his preliminary examination until after he has completed the research tool requirement for the Ph.D. and has completed 36 hours beyond the master's degree requirement. The student should pass his preliminary examination by the end of the academic year following the academic year in which he passed his comprehensive examination.

5. A dissertation (representing at least 36 hours of credit in Mathematics 600) demonstrating the candidate's capacity for original and independent research in an area of concentration chosen from the following list: algebra; analysis; applied mathematics; differential equations; number theory; topology. This list is subject to change due to changes in the graduate faculty. The student is advised to contact the Department of Mathematics directly for a current list of dissertation areas. The candidate must pass an oral examination on his dissertation.

Microbiology

Graduate courses in microbiology may be taken as a major or minor leading to the Master of Arts degree, or as a part of a biological sciences program leading to the Master of Arts, Master of Science, and Master of Science in Education degrees.

The Doctor of Philosophy degree in microbiology will be awarded to a candidate in recognition of achievement in independent research and in advanced studies. His original contribution to knowledge, evidenced in the dissertation, together with a superior comprehensive scholarship record and satisfactory completion of prescribed examinations are the criteria for the degree. Emphasis will be placed on his critical evaluation of, and familiarity with, the existent developments in microbiology and related areas of study.

The Department of Microbiology offers facilities for research in microbial genetics, cytology, radiation biology, physiology and biochemistry of microorganisms, medical microbiology, immunology, and virology. In addition to the library facilities, reprint collections covering many topics in microbiology are available for student use.

To be eligible for the Doctor of Philosophy degree, the student must satisfy the following requirements: (1) He must complete at least 144

hours of graduate work and research. Credit for research may not exceed 60 of the 144 hours; (2) He must demonstrate his proficiency in statistics and his ability to read, with reasonable facility, scientific literature in one modern language; (3) He must pass the qualifying examination and a final oral examination; and (4) He must submit an approved dissertation based on his research.

A minor may be elected as part of a doctoral program in microbiology, subject to approval of the department, from courses in any program which constitute a major for the master's degree. A minor in microbiology for the doctorate in another biological science consists of general microbiology and 20 hours selected from courses offered by the department.

Molecular Science

Graduate work in molecular science may be taken as a major or minor leading to the Doctor of Philosophy degree. This program, an interdisciplinary program with a core in theoretical and applied physics, presently includes research in the areas of atomic-molecular physics, biophysics, crystallography, geochemistry, materials science, mathematical physics, molecular genetics, nuclear physics, and solid-state physics. It affords the student a unique opportunity to work with the research faculty and facilities in related areas throughout the University and to specialize, if he chooses, in problems embracing several academic disciplines. A molecular science committee appointed by the dean of the Graduate School from eligible graduate faculty members of the various interdisciplinary areas is a continuing body for overseeing and evaluating the program. The chairman of the Department of Physics administers the program, subject to the policies set forth by the molecular science committee, the Graduate Council, and the dean of the Graduate School.

In addition to the general rules, regulations, and requirements of the graduate school, the following specific requirements pertain to the Doctor of Philosophy degree in molecular science:

Admission to the Program

1. A master's degree or equivalent from any area of the physical and life sciences, engineering, or mathematics is required for admission to the program.

2. Competence in French, German, or Russian, as demonstrated by passing the ETS Graduate Foreign Language examination is required for admission to the program. Another language, highly pertinent to a particular research area, may be substituted if a formal petition is approved by the molecular science committee. Passing scores on the ETS exams are determined by the molecular science committee.

Admission to Candidacy

1. Passage of a preliminary examination, both written and oral, in the four core areas of theoretical and applied mechanics, theoretical and applied electrodynamics, quantum theory, and statistical physics, and in one specialty area selected by the student.

2. Demonstrated competence in a second research tool. This may be accomplished through an ETS examination in a foreign language, or by satisfactory demonstration of proficiency in statistics or computer science.

Dissertation

1. A dissertation and its defense with distinction before a committee. The Administrator of the molecular science program should be consulted for complete details.

Music

The School of Music offers degree programs leading to the Master of Music degree and to the Master of Music Education degree. In addition, a student enrolled in a program leading to a Ph.D. in Education, with a concentration in secondary education, may select the elective portion of his program from the graduate courses offered in the School of Music.

Master of Music Degree

Specializations are available in 1) Music History and Literature, 2) Music Theory and Composition, 3) Applied Music and 4) Opera-Music Theatre.

History-Literature and Theory-Composition

The history-literature and the theory-composition majors must complete Music 501-3, 18 hours in their major field including Music 502-6 (2,2,2), 599-9, and 12 hours of music electives to make a total of 48 hours with a minimum of 24 hours at the 500 level. Those majoring in history-literature may substitute two literature courses for two quarters of Music 502. Music 545-6 (3,3) is required of theory-composition majors.

Applied Music

Applied music majors are required to schedule Music 501-3, 502-6 (2,2,2), 598-6 (recital), 595 (1-9) music document, 12 hours of their principal applied field at the 500 level (4 hours per quarter), and 18 hours of music electives to make a total of 48 hours, with a minimum of 24 hours at the 500 level. Two literature courses may be substituted for two quarters of Music 502. The acceptability of the recital given by the applied major in music will be determined by a committee of three faculty—the major applied teacher and two other qualified faculty members approved by the coordinator of graduate studies.

Prior to admission, an applied major may audition in person to attain unconditional admission to the degree program, or to obtain conditional admission to the program, submit a tape recording of his performance. Those submitting tapes may be asked to appear for regular audition to attain unconditional status during his first quarter in residence. Until unconditional status is attained, he may be required to schedule applied music only at the 400 level. For detailed procedures, refer to the pamphlet of the particular area available from the coordinator of graduate studies in music.

Opera-Music Theater

Opera-music theater majors must have an undergraduate degree with appropriate experience in opera or music theatre, or in theatre with additional music study sufficient to qualify in performance, theory, and history of music. Required courses are Music 501-3; 568-6 (opera-theater project) or 598-6 (recital), each accompanied by 595-3 (music document); or

599-9 (thesis). The student must choose a minimum of 22 hours from Music 440Q, 540Q (2-12), 468 (6-12, 3 quarters), 512-3, 556 (2-6), 499 (1-3) special project in opera-music theater, and 8 hours from Theater 402A,B-8, 404-4, 409-4, 412-4, 414-4, 417-4, 432-4, 502-4 to make a total of 48 hours, a minimum of 24 hours at the 500 level.

Master of Music Education Degree

Music education majors must schedule Music 501-3, 503-3, and 599-9 or the equivalent in courses involving a terminal research paper. The requirements include 12 hours in music education, 9 hours in music theory or history-literature, two quarters participation in a performing ensemble, and electives to make a total of 48 hours, a minimum of 24 hours at the 500 level. A maximum of eight hours may be elected for the degree in appropriate fields outside the area of music. Permission must be secured in advance for the selection of these courses from the coordinator of graduate studies in music. A maximum of 12 hours (2 per quarter) in applied music and composition count toward the degree. Of these, 4 hours may be in applied music at the 400 level in other than the student's principal applied field. If the student lacks sufficient skill to elect applied music at the 400 level, he may register for teaching techniques and materials (Music 461 and 462).

General Information

Fees are not charged for individual instruction, practice rooms, or instrument lockers. Instruments are loaned where necessary, without charge. However, certain costs are involved in the purchase of music literature and other incidental supplies used in the various phases of instruction. These costs usually range from \$5.00 to \$15.00 per quarter, exclusive of textbooks.

Qualifying Examinations

Qualifying examinations, used to validate minimum standards in undergraduate theory and music history-literature, will be administered at the beginning of the Fall and Summer quarters and must be taken at the first opportunity after admission. Those passing the examinations may enroll without further conditions. If an examination is not passed, enrollment is limited to 400 level courses in that area until prescribed remedial work has been completed. Such remedial work may not be applied as hours toward the degree requirements. Failure to take these examinations automatically precludes enrollment in any 500 level course in theory or history-literature.

The Thesis, Document, and Research Paper

The Master of Music students (except in applied music) will write a thesis or, in the case of theory-composition majors, an original composition and document. If possible, a reading of the thesis-composition should be tape-recorded; if this should be impractical, another of his compositions shall be substituted illustrating his capabilities in composition. In either case, the tape recording and written manuscript must be filed with the Graduate School. A major professor and a minor professor will be assigned for all Master of Music candidates by the coordinator of graduate studies. In lieu of a thesis, students majoring in applied music will submit a music document for work on which a minimum of three quarters hours

credit must be earned. A major professor will be appointed; a minor professor may be appointed by the coordinator of graduate studies in music if it seems appropriate. Before extensive work is done on the thesis or document, the student should submit, on a form available in the music graduate office, his proposed title and organization, along with a bibliography of material available, to the coordinator of graduate studies in music for approval by the graduate committee. A statement by the major professor should be made on this application form indicating his reactions to the proposal and its acceptability. Although the Master of Music Education degree does not require a thesis, the student may elect to write one, in which case procedures required of others writing a thesis shall apply; he will enroll in Music 599 for nine hours credit. Those students working towards the Master of Music Education degree, if they do not elect to write a thesis, must complete 9 hours of course work, including research terminating with a paper or papers following thesis style. The research paper may be one done in connection with a graduate course which displays the student's capabilities of acceptable research techniques and reporting. Candidates must consult with the coordinator of graduate studies in music who will ascertain the acceptability of the paper. The research paper requirements for the Master of Music degree in opera-music theater will be satisfied as described under the appropriate areas in the preceding paragraphs. Music 595-9 (a project and a document) will be treated in the same manner as a recital and a music document. Two copies of a thesis (the original and first copy) will be deposited with the Graduate School, one copy with the graduate music office and one copy retained by the student. Copies of these papers may be carbons or clear, acceptable Xerox reproductions. Final approval of all theses, documents, compositions, and research papers is given by the coordinator of graduate studies in music.

Guidelines for preparing a thesis are available from the Graduate School Office. All copies of the theses, documents and research papers are to be turned in to the music graduate office not later than two weeks before the student's scheduled oral examinations. The graduate music office will submit the appropriate copies of the papers to the Graduate School.

Comprehensive Examinations

During the terminal quarter, after all proficiency examinations have been passed, the student will be given comprehensive examinations, written and oral, dealing with the general areas of music and his specialization and, when appropriate, his thesis or document. These examinations must be completed not later than three weeks before the graduation date. It should be noted that application for the comprehensive examinations may not be made until all other requirements, with the exception of terminal quarter courses for the degree, have been satisfied. The student may request faculty members who he feels are in a position to know his area and strengths. The orals committee is appointed at this time by the coordinator of graduate studies in music and will be composed of three or more faculty members representing the student's principal areas of concentration. If the student has scheduled six or more hours in a department other than music, a member of this department will be invited to serve on the examining committee. Application for the comprehensive examinations must be made not later than six weeks before the date of graduation.

Occupational Education

Students may pursue the Master of Science in Education degree—48 quarter hours, including 5 to 9 hours of research paper—or the Master of Science degree with a major in occupational education, 48 quarter hours, including 5 to 9 hours of thesis (Occupational Education 599.)

Programs of study are developed by the student and his adviser depending upon deficiencies, interests, and career goals. Programs are flexible, and course work may be done in other units of the University. The student is advised to prepare for one major area of concentration; no minor is required. Some areas of concentration are: teacher of enterprise: man and technology (formerly industrial arts); teacher of industrial oriented health, or personal and public service occupations; coordinator of cooperative occupational education; and supervisor, director, or administrator of secondary, area vocational, community junior college, or other vocational-technical or occupational educational programs. Forty-eight hours are required. Required courses are 485-3, 500A-4, 540-4, and 541-4.

Students with bachelor's degrees in education, science, technology, or other specialties may qualify for advanced study which involves technical subjects, study in work situations and educational institutions, and internship in teaching or other professional assignments.

A student enrolled in the program leading to a Ph.D. in Education, with a concentration in secondary education, may select the elective portion of his program from the graduate courses offered in the Department of Occupational Education.

One-half or one-quarter time teaching or research assistantships, and fellowships are available to qualified applicants. Additional information about programs, courses, assistantships, and fellowships may be obtained from the chairman of the Department of Occupational Education.

Philosophy

The Department of Philosophy offers graduate work leading to the Master of Arts and Doctor of Philosophy degrees. Graduate courses in philosophy may be used also as a minor in programs leading to the Master of Arts or Master of Science in Education degrees. Students who do not plan to continue work in philosophy beyond the master's level are encouraged to elect a graduate minor or to combine philosophy with another subject in a 60-hour double major.

The department expects an applicant for admission to its graduate program to have had at least 24 hours' work in philosophy or closely related theoretical subjects, including at least one quarter in ethics, one in logic, and a year in the history of philosophy. The department may waive a portion of this credit requirement in favor of maturity and of quality and breadth of academic experience. The applicant will be required to make up serious background deficiencies by taking appropriate undergraduate philosophy courses without credit.

The applicant should request three individuals familiar with his work to send letters of recommendation to the director of graduate studies of the department.

For admission to the graduate program native English speaking applicants should submit with their application scores for the Graduate Record

Examination Verbal and Quantitative Aptitude Tests. Doctoral applicants should also submit scores on the GRE Advanced Test in philosophy. The department may, where other evidence of competence seems so to warrant, accept a candidate upon the condition that he later submit acceptable scores.

Each new graduate student in the program is required to demonstrate competence in formal logic during his first year in residence either through appropriate course work or by passing with a grade of *B* or better an examination equivalent to the Philosophy 320 final suitably supplemented with additional materials on Aristotelian logic.

The Department of Philosophy requires the candidate for a master's degree to present a thesis, for which 9 hours of credit are allowed, and to complete a minimum of 39 additional hours of course work. He must pass two examinations: a written examination covering the nature and proffered solutions to the persistent problems of philosophy as dealt with by major philosophers from Thales to the present and an oral examination devoted chiefly to the thesis. In the written examination emphasis will be placed on such classical figures as Plato, Aristotle, Descartes, Spinoza, and Kant, but the student will be expected to answer questions involving at least two recent philosophers, one of whom will be an American.

A reading knowledge of one foreign language, usually French or German, must be demonstrated by passing the Doctor of Philosophy proficiency examination in that language, or by passing the appropriate 288c foreign language course with a grade of *B* or better.

At the time of his acceptance in the program the student will be assigned an advisory committee who will help him plan a program of study designed to prepare him for admission to candidacy. After the student has accumulated at least 36 hours of credit beyond the master's degree, and before he begins work on the dissertation, he must take a written preliminary examination on the thought of one major figure in the history of philosophy and in the following four areas: history of philosophy; logic, methodology, and philosophy of science; metaphysics and theory of knowledge; and value studies.

Before he is allowed to take the preliminary examination the student must have met the research tool requirement in one of the following ways; (1) demonstrating a reading knowledge of two foreign languages by examination or by passing the appropriate 288c language course with a grade of *B* or better; (2) showing an appropriately higher proficiency in one language; or (3) demonstrating a reading knowledge of one foreign language and completing satisfactorily two or more courses at the graduate level in an outside area as approved by the student's committee.

After he has passed his language examinations and the preliminary examination and has completed 48 hours of work beyond the master's degree, the student is admitted to candidacy and assigned a doctoral dissertation committee which will supervise the research and writing leading to the dissertation. After the dissertation has been accepted by the committee, the student is given an oral examination on the dissertation and related topics.

The department has available each year a number of assistantships for qualified graduate students. Applications for these assistantships should be sent to the department before February 1 of the academic year preceding that for which the application is made. All graduate students in

philosophy are expected to have some supervised experience in teaching elementary work in the field, either through the regular assistantships or through special assignments.

Physical Education

Graduate courses in physical education may be taken as a major or minor toward the Master of Science in Education degree or the Doctor of Philosophy degree in education. The number of hours required in physical education at the master's level is 32 for a major or 16 for a minor. The total number of hours required for the master's degree is a minimum of 48 quarter hours.

Master's Degree

The departmental requirements for unconditional admission as a master's degree candidate are:

1. Fulfillment of the requirements for admission to the Graduate School.
2. Presentation of at least the equivalent of an undergraduate minor (preferably a major) in physical education.
3. Presentation of at least one undergraduate course in kinesiology and at least one in educational psychology or psychology of the particular field of the student's specialty.
4. Possession of the ability to teach and demonstrate an acceptable variety of skills and techniques in physical education activity.

A student may be conditionally admitted to the program and may be permitted to do graduate course work while he removes deficiencies.

Requests for transfer of credits from other institutions will be considered by the department only before the completion of the first quarter of enrollment.

Minor

Students with a major in a related area may take a minor in physical education. This consists of 16 hours chosen from one of the areas of concentration in consultation with a physical education adviser.

Requirements

The Department of Physical Education offers programs in several areas. Core courses common to all specialties are P.E. 500, 503, and either 504 or 599. The courses are designed to provide common experiences to all students regardless of their specialization. For 599 five copies of the thesis must be bound. Two copies are deposited with the graduate school and two are deposited with the department.

Area of Specializations

1. The Experimental Physical Education Program

This program is intended to prepare students to enter advanced study and to perform scholarly research which emphasizes depth in a selected science. A student, in conference with his adviser, designs a program which satisfies his special interest.

2. The Professional Physical Education Program

This program is designed to develop a high level of competency in teaching physical education in colleges, secondary, and elementary schools.

The student, in conference with his adviser, designs a program which satisfies his special interest.

3. The Applied Physical Education Program

The purpose of this program is to prepare coaches of athletic teams to (1) increase their knowledge of fundamental principles which are basic to the coaching and administration of athletics and (2) to develop a broad perspective of the role of athletics in the total educational environment.

Physics

Graduate work in physics may be taken leading to the Master of Arts and Master of Science degrees, and the Doctor of Philosophy in molecular science. Graduate courses in physics may also be taken as part of a physical sciences program toward the Master of Science in Education degree.

In addition to the general requirements of the Graduate School there are other specific requirements for the master's degrees in physics as follows:

The following courses are specifically required for both M.A. and M.S. degrees: Physics 511 (or mathematics equivalent), Physics 510 (a and b only), and Physics 530.

Master of Arts Degree

This program is designed primarily for those entering the molecular science Ph.D. program. The M.A. degree is not a requirement of the molecular science Ph.D. but may be taken if desired by the student. A reading knowledge is required in French, German, or Russian as demonstrated by passing one of the Educational Testing Service's Graduate Foreign Language Examinations, administered by the University Counseling and Testing Center once each quarter. The M.A. in physics will be granted on the basis of a research paper and 33 quarter hours of course work at the 500 level. Each candidate for an M.A. degree is required to pass an examination, written or oral or both, covering his graduate work including the research paper. This examination is given by the student's advisory committee.

Master of Science Degree

This program is specifically designed for those who wish a professional degree and do not plan to continue beyond the master's level. A reading knowledge of a foreign language or demonstrated competence of computer skill is required. This requirement can be met by passing one of the Educational Testing Service's Graduate Foreign Language Examinations (administered by the University Counseling and Testing Center once each quarter, in the case of language), or a similar examination for testing computer skill. English can be substituted for either of the above requirements at the discretion of the graduate advisor provided it is not the native tongue of the candidate. A thesis is required, based upon not more than nine or less than five quarter hours of 599 level effort. This may be included in the minimum 24 hour requirement of course work at the 500 level as stated in this catalog. This should be distributed preferably over several quarters of enrollment. Each candidate for an M.S. degree is required to pass an examination, written or oral or both, cover-

ing his graduate work including the thesis. This examination is given by the student's advisory committee.

Doctor of Philosophy Degree

The doctoral program is within a University-wide framework of molecular science with a core in theoretical and applied physics. See molecular science description for specific details. The physics program is a flexible one, designed to give the student a background in depth in the general principles and techniques of modern physical theory and at the same time to satisfy his individual interests and needs. Properly qualified graduate students from the areas of the physical sciences, life sciences, engineering, and mathematics are invited to apply for advanced study where the student's interests may be interdisciplinary with physics; e.g., biophysics, chemical physics, geophysics, materials science, and mathematical physics. One research emphasis in the department is in the general field of molecular physics; dissertation topics in this field include studies of motional, structural, electrical, and magnetic properties encountered in liquid, surface, and large molecule physics. Theoretical research in such areas as electromagnetic theory, thermodynamics, statistical, and quantum mechanics is being tempered to a considerable degree by the directions taken in the experimental aspects of the molecular science program.

Physiology

Graduate training in physiology may be taken leading to the Master of Arts and Doctor of Philosophy degrees. Graduate courses in physiology are also applicable to the Master of Science degree program in biological sciences and to the Master of Science in Education degree (biological sciences).

The Department of Physiology at SIU at Carbondale is a broad one, including competence in the teaching of mammalian physiology, cellular and comparative physiology, anatomy and histology, pharmacology and endocrinology, biophysics and bioengineering, biomathematics and biomedical computing, and medical electronics. This extraordinary breadth of competence means that the department is prepared to make special arrangements for interdisciplinary graduate training programs for individual students. All graduate student programs are arranged to provide a basic knowledge of the field of physiology, after which each student specializes in some particular area of study.

Each student is expected to select a major adviser early in his graduate training, after which an advisory committee will be appointed which will help him plan his entire program and supervise his progress. Regular checks of progress are made to ensure quality of the training.

Admission to the master's degree program in physiology usually requires the equivalent of an undergraduate degree in a biological science, plus inorganic and organic chemistry, at least one year of college physics, and one year of college mathematics. However, students with majors in related areas, such as chemistry, physics, mathematics, psychology, engineering, etc., are encouraged to apply to the program, and special programs can be set up for such students.

Requirements for completion of the master's degree program include a minimum of 48 quarter hours of graduate credit, which must include enough didactic courses to ensure an adequate academic foundation in

physiology. A maximum of 16 quarter hours of graduate credit earned at other institutions may be transferred toward the 48-quarter-hour requirement. A minor is not required for the master's degree, but may be taken if the student's advisory committee thinks it is in order. Some specific research tools (e.g., statistics or computer science) are expected to be part of every student's training program. For the completion of the master's degree requirements the student must perform a competent research task and write a thesis on this research, and must pass an examination (written or oral) administered by his advisory committee.

Requirements for admission to the doctor's degree program in physiology are essentially similar to those for admission to the Master's degree program, with the addition that acceptable courses in physical chemistry, calculus, and statistics are deemed essential. Students with their training in other fields can usually obtain the requisite biological training in the course of their program, and are encouraged to consider the physiology program.

Doctoral students are expected to attain competence in at least two research tools appropriate to the field of physiology.

Students in the doctor's degree program in physiology will be required to pass a written examination on the entire field of physiology and on the area of specialization before they are admitted to candidacy for the degree. To complete the requirements for the doctor's degree, the student must perform research which makes a significant contribution to knowledge in the field and to report this research in an acceptable dissertation. This research is expected to be of sufficient quality to merit publication in a major journal of the field. An oral examination over the topic of the dissertation and over the subject matter of the discipline of physiology is required to complete requirements for the doctoral degree.

The student entering the doctor's degree program in physiology can expect to spend a minimum of three years of training beyond the bachelor's degree or a minimum of two years beyond the master's degree.

The Department of Physiology has a close working relationship with the School of Medicine, and there are numerous opportunities for graduate training and research in clinical areas. Physicians and nurses, medical technicians, and other paramedical personnel are encouraged to consider graduate training in physiology in expanding their career capabilities.

Plant Industries

The department offers the Master of Science degree with specialization in the areas of crop science, soil science, and horticultural science. Requirements for admission are the same as for the Graduate School, but students with a bachelor's degree in other fields will be required to meet the department's undergraduate requirements.

The Master of Science degree requires a minimum of 48 quarter hours. There is no foreign language requirement. A thesis is ordinarily required, but a student may elect a nonthesis option with the approval of his committee.

It is customary to require supporting courses in botany, microbiology, chemistry, statistics, and other areas essential to a problem in the student's chosen field and to prepare him for acceptance for the Doctor of Philosophy degree if he has that potential. Once the general field has been selected, the research and thesis may be completed in any one of the

many divisions of that field. In horticulture, for example, the research and thesis may be in vegetables, tree-fruits, small-fruits, ornamental plants, or turf management; in soils, the problem may relate to fertility, soil physics, soil microbiology, soil chemistry, or soil and water conservation; in field crops, the problem may be directed toward crop production and management, weeds and pest control, or plant breeding and genetics. Often two of these more restricted areas can be combined in one problem. A final oral examination is required covering both the student's course work and his thesis problem.

For additional information about the program or graduate assistantships in the department; contact the department's graduate adviser, Room 176, Agriculture Building.

Psychology

The Department of Psychology offers graduate work leading to the Master of Arts, Master of Science, and Doctor of Philosophy degrees in the following areas: experimental, clinical, and counseling psychology. The primary emphasis is on doctoral training, for which the master's degree is a prerequisite.

The goal of graduate study in the Department of Psychology at Southern Illinois University at Carbondale is to develop psychologists who will have a broad perspective and scientific sophistication as well as the requisite skills to advance the field of psychology and meet changing needs. The program emphasizes formal course work in the core curriculum and specializations; and preprofessional activities in training assignments and in research and practicum opportunities.

Admission and Advisement

Separate application forms must be submitted to the Department of Psychology and to the Graduate School. Graduate School application forms may be obtained from the Graduate School office, and departmental application forms may be obtained from the Department of Psychology. Students will be accepted for graduate work in psychology only upon approval by the departmental admissions committee as well as the Graduate School. Evaluations of applicants by the departmental admissions committee are based on information from the application form, GRE scores, transcripts, and letters of recommendation.

Upon admission to the department, each student is assigned to a faculty adviser, who assists him in academic matters, including the planning of his entire program of study: required courses, planned electives, anticipated dates for fulfillment of specified requirements, etc. Upon formation of the thesis or dissertation committee, the chairman of that committee automatically becomes the student's academic adviser.

Core Curriculum

During the first year all students are required to take a three course sequence in quantitative methods and research design (522a,b, and c or the equivalent). By the end of the second year all entering B.A. students should have completed the thesis requirement (599, 5-9 hours). Six additional elective courses in areas other than the major are required in order to provide breadth as well as some degree of depth in the total field of psychology. In consultation with his adviser, the student may select his

electives from any form of the following specialty areas, subject to the approval of the faculty teaching in those areas: physiological, sensation perception, learning, personality, social, developmental, quantitative, or any other area in the department or an approved area outside the department. The student should take these electives early in his tenure to facilitate the integration of his major and minor areas. All core requirements should be completed by the end of the ninth quarter of residence.

Areas of Specialization

EXPERIMENTAL PSYCHOLOGY

The specialization in experimental psychology offers a broad academic course of advanced study, primarily for students working towards careers in teaching and research. While the student may select courses from several areas, he is expected to concentrate in at least one area of experimental psychology: learning, sensory processes, social, developmental, physiological, personality, quantitative. The following courses are required: 509, 510, 526, a seminar in procedures and problems in clinical psychology, and a course in computer programming. The student is also required to take research credit during all but the first three quarters of residence.

CLINICAL PSYCHOLOGY

The clinical psychology program, approved by the education and training board of the American Psychological Association, is designed to develop clinical psychologists for careers in clinical service, teaching, and research. All clinical students take the core of courses and receive early and continued practicum training in both clinical activities and research. Individual interests are accommodated through electives and training assignments, or through a specialty program in experimental clinical or child clinical. The following courses are required of all clinical students: 523, 530, 537, 541, 593E, 598. In addition to the clinical core: (1) general clinical students are required to take 531, 543a and b, and additional hours of 593e; (2) the experimental clinical students are required to take 509; at least four courses that are experimental or research oriented, e.g. 532; and at least two clinical skills courses, e.g. 545; (3) Students in the child-clinical specialty are required to take 451, a seminar in psychopathology of childhood, 552, 554, 556, and 593J.

COUNSELING PSYCHOLOGY

The counseling psychology program, approved by the education and training board of the American Psychological Association, is designed to teach students a wide range of skills which will be most useful in a university setting, either in an academic department or a counseling center. Students may also be prepared for positions in hospitals, community agencies, and educational and correctional institutions. The student is expected to develop competence in counseling, psychological assessment, consultation, research, and teaching. The required courses are as follows: 530, 536, 537, 541, 593F, and 598. In addition, the following electives are recommended: 531, 532, 533, 538, 539, 543, 545, 593F, and 595.

Research, Practicum, and Training Assignments

Research or practica are required in each area of specialization. In addition, each term the student must be engaged in a training assignment

which supplements formal course work by professional activities such as research, teaching, or clinical service. The assignment varies according to the needs, professional goals, and competencies of the student, and increases in responsibility as he progresses. The assignments require from 10 to 20 hours of service per week.

Master's Degree Requirements

Each candidate for the master's degree is required to complete a thesis. A student will ordinarily require two years to complete the master's degree. The master's degree requires a minimum of 72 quarter hours of acceptable graduate credit, distributed according to the requirements of the student's major area.

Doctoral Requirements

ADMISSION

Admission to the Ph.D. program requires a master's degree, a grade point average of 4.25 or above in graduate studies, and acceptance by the department. A student who receives his master's degree from SIU at Carbondale must apply formally to the Graduate School for admission to doctoral-level study.

Records of students entering the program with a master's degree from another institution are evaluated by the departmental admissions committee which notes deficiencies, recommends methods for removing them, and specifies a time limit to do so. Such deficiencies must be removed before the student can be classified as a Ph.D. candidate. The student is recommended to the graduate dean for admission to Ph.D. candidacy only when he has completed the statistics sequence, and all of the preliminary examinations.

Internship

Doctoral students who are majoring in clinical or counseling psychology must complete an approved internship: 48 weeks for the clinical student, and the equivalent of nine months for the counseling student. The student may take his internship at any time after the completion of his M.A., and he will be approved for internship only if his master's thesis prospectus has been approved by his committee by the end of the fall quarter prior to his beginning his internship. If the student postpones his internship until the completion of all his academic work, the Ph.D. will be awarded after the completion of the internship.

The student is responsible, in consultation with his adviser, for scheduling and obtaining his internship. Unless an exception has been approved by the clinical counseling committee, the internship will be with an APA approved internship agency.

Preliminary Examinations

These written preliminary examinations consist of a six-hour major exam and a four-hour minor exam, both composed primarily of essay questions that require substantive knowledge of experimental and theoretical topics. Questions are not limited to course content. The examinations are designed to ensure the breadth and depth in the student's training, encourage him to organize and integrate his knowledge, and inform the faculty as to the student's competence.

Every student is expected to pass each examination the first time it is taken. In any event, the student will not be permitted to take either the minor or the major exam more than twice.

Minors

The examining committee shall consist of at least two faculty members, one of whom will be designated as chairman. After preliminary discussion of a topic area with his proposed committee chairman and potential committee members, the student must meet with the director of his major area and present for final approval his request for the topic area and his examining committee (including additional examiners if appropriate, and alternate readers).

The student must meet with his committee at least ten weeks prior to the examination in order to agree upon topics to be covered by the examination and to decide what additional preparation is necessary to assure his adequately prepared action. Any changes in topic area or composition of the committee must be approved by the director of his major area. Should the student fail an examination, there is the option of forming a different committee to administer the second examination subject to all the rules stated above.

Major

Fields of specialization for the preliminary examination in the major are listed below:

Experimental Any one field from the following may be selected for the examination in the major area of Experimental: physiological, sensation-perception, learning, personality, social, developmental, quantitative, cognitive.

Clinical The major examination includes the following: psychological assessment, psycho-therapy, psychopathology, and personality. Students in general-clinical and in specialized areas, e.g., experimental-clinical are given examinations with different emphases.

Counseling The major examination includes two fields: (a) counseling, and (b) psychological evaluation.

DISSERTATION

The student may not register for dissertation credit before he has passed his minor examination and is in preparation for his major examination to be taken within the same quarter or the next time preliminary examinations are given. He may register for a maximum of 12 hours of dissertation credit before passing the preliminary examinations. A student may not hold a prospectus meeting before he has successfully completed both his minor and major examinations.

Thesis and Dissertations

Master's research may either be an original study or a replication of an important study. A dissertation should be an original and significant contribution to the science of psychology.

THESIS AND DISSERTATION COMMITTEE

After having contacted a prospective chairman for his thesis, and having discussed with him the proposed research and the composition of the

committee, the student meets with the chairman of the department to obtain formal approval. The chairman of the department approves or modifies the composition of the committee.

A master's thesis committee consists of three members, including the chairman of the committee and a psychology faculty member who is typically from some field other than the student's major area of interest. The Ph.D. dissertation committee consists of five members, one of whom serves as chairman. One of the members must be from a department other than psychology.

PROSPECTUS

Prior to starting the experimental research on a thesis or dissertation, a student must submit a written prospectus to each member of his committee. A carefully written prospectus ordinarily serves as the opening chapters of the thesis or dissertation. The student also prepares an abstract (normally no more than two pages) for distribution to psychology faculty one week before his prospectus meeting. The approval of the prospectus indicates that the committee members accept the research design. Faculty members not on the committee may attend the prospectus meeting, or may forward suggestions and comments to the committee chairman prior to the meeting. Prospectus meetings are not scheduled during the recess period between quarters.

If the prospectus is approved with no major modifications, two copies of the prospectus and a letter of approval, noting any minor modifications are sent by the committee chairman to the department chairman for filing in the student's permanent records. If major modifications are needed, the student may be asked to rewrite the prospectus, circulate the revised prospectus, arrange another committee meeting, and then file the revised prospectus as above. A prospectus must be approved at least one quarter before graduation.

STYLE

The student has the option of writing his thesis or dissertation in the traditional fashion or in journal style. In the latter case, ancillary material (full survey of literature, subsidiary analyses, etc.) are placed in the appendices, although figures and tables appear in the text. The psychology department prefers that citations, table headings, etc. follow the APA style (Publication Manual of the American Psychological Association, 1967 revision, Washington D.C.).

GENERAL PROCEDURES

A student should not register for 599 or 600 hours until he has a supervisor and will actually be using university facilities, or faculty time for assistance and direction. He must register each quarter that he will be using university facilities or faculty time, whether or not he is in residence.

Prior to graduation (a minimum of five weeks for master's students and eight weeks for doctoral students) the candidate must submit a final rough draft of his thesis or dissertation to his full committee so that appropriate suggestions can be made. At least one week usually expires between the submission of the rough draft and the oral examination.

NUMBER OF COPIES

Four copies of the complete thesis or dissertation are required: two copies

are submitted to the Graduate School for placement in the University library, and two bound copies—one for the committee chairman, and one for the departmental thesis and dissertation library.

ORAL EXAMINATION

The Department of Psychology requires an oral examination, conducted by the student's thesis or dissertation committee, for each M.A. and Ph.D. candidate. The examination covers the thesis or dissertation and also includes questions designed to ascertain the student's general competence in Psychology.

Oral examinations are open to all interested observers. Notices of the time and place of the examination, and abstracts of the thesis or dissertation, are circulated throughout the department and, in the case of Ph.D. examinations, throughout the university. Two copies of the abstract should be given to the graduate program secretary.

The candidate obtains copies of the oral examination form and the thesis or dissertation evaluation form from the graduate program secretary, and delivers them to his committee members on the day of his orals.

General Information

WAIVING OF COURSE REQUIREMENTS

The student who wishes to have a course waived should consult with his adviser. If the adviser agrees, the student submits a written petition to his major area committee, which decides how proficiency in the course will be determined.

GRADING POLICIES

Any student who receives a grade of *INC* is responsible for contacting the instructor to determine the time allowed for the completion of the course (normally not more than one year). If the course is not completed within the time limit, the *INC* is regarded by the department as indicating unsatisfactory performance in the course.

For internal records to be used within the department only, plusses and minuses are added to the standard *A*, *B*, *C* grades reported to the registrar.

STUDENT EVALUATION

All students are evaluated by the faculty at least once a year, at the end of Spring Quarter. In addition, new students are evaluated in the beginning of the Winter Quarter (first year), and students on probation at times specified in their probation. The evaluation is based on the following criteria: (1) academic performance on a ten point rating scale (*A*+ = 10); (2) ratings on the training assignment, and (3) progress toward the degree. The student's evaluation may also be based upon evidence concerning professional attitudes or ethical behavior. For new students, achievement in courses taken primarily by first year students is one important criterion for determining whether a student shall be permitted to continue in the program.

Each student's adviser informs him of his evaluation and of any faculty recommendations as soon as possible after the meeting. In addition, the department chairman writes a formal letter notifying the student of his evaluation and recommendations.

Recreation and Outdoor Education

The Department of Recreation and Outdoor Education offers a broad interdisciplinary program of studies preparing students for administrative careers in (1) leisure education and recreation management, or (2) environmental and outdoor education. The program leads to the Master of Science in Education degree.

Requirements for admission imposed by the department are in addition to those of the Graduate School. The department will ordinarily accept as candidates for the master's degree only those applicants who: (1) have graduated from an accredited four year college or university; (2) have an undergraduate degree in recreation or an allied field; (3) have a 3.7 (5-point scale) over-all grade point average, or alternatively, a 3.9 over-all for the last two years of undergraduate work; (4) have a 4.0 over-all average in recreation or an allied field; and (5) final acceptance will be decided by the graduate faculty.

Applicants who do not meet these minimal requirements or their equivalent, but do meet the minimum standards of the Graduate School, can be considered for acceptance only on petition to the department's graduate studies committee, which, if granted, will be accompanied by a statement specifying the special conditions or requirements of admission.

The requirements may include four letters of recommendation as designated by the graduate faculty, a written examination, and other evaluative data as determined by such faculty.

A minimum of 48 quarter hours of credit, no more than 5 of which may be for the thesis, constitutes the basic course requirements for the Master of Science in Education degree. At least 33 of these hours must be at the 500 level.

A student must maintain an overall 4.0 (5-point scale) grade point average in order to be eligible for the Master of Science in Education degree.

An advisory committee is chosen for each student. All elements of the student's program must receive the approval of this committee. A thesis or research paper is required for the Master of Science in Education degree, the topic of which is chosen in consultation with the adviser at the earliest practical time.

The final oral examination will cover the thesis or research paper and the major area in which it was written, and it may also test the candidate's general competence in the field of Recreation and Outdoor Education.

Leisure Education and Recreation Management

A student admitted to the master's program in recreation and outdoor education for the concentration in leisure education and recreation management will work closely with his adviser in designing a program to fit his needs for professional preparation in his chosen area of specialization. The areas of specialization in recreation are: (1) park and community recreation, (2) recreation for special populations, (3) outdoor recreation, and (4) commercial recreation. Students are expected to complete (1) the core professional courses: Recreation 500, 520, 525, 530, 540, 570 and EDAF 500; (2) twelve to sixteen hours of electives in an area of special-

ization; (3) Recreation 599-5, a thesis in recreation, or Recreation 596-4 to 8, independent study conducted in a recreation setting. Students choosing the 596 option are required to write a research paper.

Environmental and Outdoor Education

A student admitted to the master's program in recreation and outdoor education for a concentration in environmental and outdoor education will design a program to fit his professional needs under the direction of his adviser. Three areas of specialization are available: (1) Outdoor Education, (2) Environmental Education, and (3) Nature Interpretation. Students are expected to complete (1) the core professional courses: Recreation 510-4, 560-4, 596-8, EDAF 500-4, and El. Ed. 561-4; (2) twelve to sixteen hours of electives in an area of specialization; and (3) Recreation 599-5, a thesis in Environmental and Outdoor Education.

Rehabilitation

In response to pressing human and social needs, the applied field of rehabilitation has solidly entrenched itself as a professional discipline over the past twenty years. Multidisciplinary courses of study have been drawn together from the behavioral, social, and medical sciences appropriate to the development of competent practitioners and programmers in rehabilitation and welfare agencies. The overall program is left purposely broad and flexible to permit the inclusion of training innovations and emerging career patterns.

The Rehabilitation Institute offers graduate programs leading to a Master of Arts or a Master of Science degree in behavior modification and rehabilitation counseling. Each degree requires a minimum of 72 quarter hours of course work and field experience. The distinction between the awarding of M.A. and M.S. degrees in these programs will be made on the basis of demonstrable research performance. The M.S. degree students will concentrate primarily on preparation for entry into the helping, professional fields, and ordinarily they will complete a project or research paper in their area of specialization. The M.A. degree will be awarded only when a student elects to accomplish a research project of an experimental nature involving demonstration of the abilities to formulate research questions, appropriately manipulate experimental variables, and formalize an analysis of data so obtained. An M.S. degree in rehabilitation administration may be obtained by the successful completion of a minimum of 48 credit hours of course work and field experience.

These concentrations are sufficiently open to permit a student to emphasize work with a particular population such as the emotionally disturbed, correctional wards, mentally retarded, physically handicapped, economically deprived, or others. The graduate may work in such settings as state-federal vocational rehabilitation programs, clinics, hospitals, workshops, correctional centers, youth camps, or employment service offices. Some degree programs also require the completion of a three- to six-month internship in an approved agency or institution.

Application forms for both the Graduate School and the Rehabilitation Institute must be separately submitted. Forms for the former may be obtained from the Graduate School and institute forms may be obtained

from the director, Rehabilitation Institute. Acceptance in the program is contingent on the final approval of the admissions committee of the Rehabilitation Institute after processing by the Graduate School.

Rehabilitation Counseling

This is a six-quarter (72 hours of credit) graduate program leading to either the Master of Arts or Master of Science degree. The trained professional counselor must demonstrate competence in establishing a counseling relationship, case evaluation, assessment procedures, program planning and coordination, and vocational placement, as well as have an awareness of professional and community resources that can be utilized in the rehabilitation process. Required courses: 480, 511, 519, 532, 541, 551, 556, and 561. The student will also be given quarterly field work assignments (585c) and must complete a full quarter internship in a rehabilitation setting. Completion of a terminal project, research paper, or experimental research project is required depending on the degree selected by the student.

There is sufficient flexibility in the curriculum so that special interests and needs of students can be pursued by careful selection of electives. Some suggested electives include personality dynamics, social psychology, community development, group processes, educational psychology, economic deprivation, and processes in social work. A special plan of study and field experience is available for students emphasizing rehabilitation in the area of crime and corrections or the mentally retarded. Comprehensive examinations are satisfied through oral examination by the student's advisory committee.

Behavior Modification

The behavior modification major is designed to train students in the application and evaluation of techniques which have demonstrable utility in the modification and development of human behavior. Empirical principles derived from functionally established relationships in human behavior are translated into practical technological tools.

Within this framework, students may specialize in environmental programming and direct service with such broad groups as the mentally retarded, mentally disordered, slow learners and problem children, and in specific problem areas such as incentive programs for job training, learning disabilities, stuttering, cigarette smoking, sexual behavior, and language development.

Candidates in the behavior modification program elect to pursue either the M.A. or M.S. degree, and depending on the degree selected complete as a terminal requirement a project, research paper, or experimental research project. Both degree programs require the completion of 72 credit hours combined from substantive, laboratory, and practical experience areas. Course programs are tailored to fit the needs and interests of individual students. Most students will enroll in a first-year course sequence which includes Rehabilitation 485, 520, 526, 533, 535, and 563. Further course work may include substantive areas such as sexual behavior, child behavior, programmed instruction, and electives from other departments. All students participate in a one-quarter full-time internship at an affiliated training center. Comprehensive examinations are satisfied through oral examination by the student's advisory committee.

Rehabilitation Administration

The design of this major is to prepare generalists to serve as administrators, coordinators, supervisors, and programmers in such rehabilitation settings as workshops, clinics, special schools, youth centers, and state agencies. Requirements for the M.S. degree are a minimum of 48 quarter hours of course work and field experience, at least one quarter of full-time internship and a research paper. The internship may be waived for the candidate who already has a wide range of experiences in rehabilitation or welfare agencies.

Candidates will develop competencies in program planning and development, organization and administration of service/training units, and in staff development and supervision. Specific course requirements are Rehabilitation 480, 501, 551, 556, 561, and 585a. Select courses in the Departments of Administrative Sciences and Marketing are also strongly recommended. Comprehensive examinations are satisfied through oral examination by the student's advisory committee.

Secondary Education

Programs leading to the Master of Science in Education degree, the Specialist's degree, and the Ph.D. are offered in this department.

Master's Degree

This program is directed by a committee of three professors chaired by a chief program adviser and is subject to review by the departmental faculty. Each candidate's program is planned through a secondary education adviser in cooperation with the department of the student's teaching field.

ADMISSION

Departmental application and recommendation forms must be completed before an adviser is assigned. These forms are available in the departmental office, 323 Wham Building.

Unconditional admission may be given when the:

1. Student has met certification requirements for teaching at the secondary level.
2. Grade point average is 3.700 or above (5 point scale).
3. Courses in a certifiable subject field for the secondary school are sufficient to constitute an acceptable teaching major.

Conditional admission may be given when the:

1. Student has not completed certification requirements.
2. Grade point average is between 3.400 and 3.700 (5 point scale).
3. Academic teaching field is deficient in hours or courses. Such deficiencies as are noted on the admission form must be removed as rapidly as is possible.

PROGRAM OF STUDIES

A minimum of forty-eight quarter hours is required for the Master of Science in Education degree. Twenty-four quarter hours of graduate course work must be taken in education. Twenty-four quarter hours of course work at the graduate level must be completed in a certifiable teaching area. Exceptions may be approved by the graduate committee for students

whose previous experience or preparation warrants special consideration (e.g., foreign students, second master's degree, etc.).

REQUIRED CORE COURSES

Secondary Education 508—Current Development in Selected Subject Areas in Secondary Education—4 quarter hours

Secondary Education 562—Secondary School Curriculum—4 quarter hours

Educational Administration and Foundations 500—Research Methods—4 quarter hours (must be completed within first 24 quarter hours of work)

Secondary Education 575—Independent Study—4 quarter hours (should follow EDAF 500 and be used to complete the Research Requirement of this program), OR

Secondary Education 599—Thesis—3 to 9 quarter hours (minimum of 5 quarter hours to be counted toward a master's degree)

ELECTIVES IN EDUCATION

Eight quarter hours are to be elected from courses currently available in secondary education and other departments of the College of Education. Some education-related courses offered outside the College of Education have been approved by the department and may be elected with the adviser's consent to fulfill part or all of this requirement (e.g., English 581).

COURSES IN THE TEACHING FIELD

Twenty-four quarter hours of graduate level course work will be taken in the student's teaching area. To be counted on the master's program, all courses must be 400 or 500 level (graduate) courses.

RESEARCH REQUIREMENT

The research requirement for this degree may be completed as described in the following section:

1. The student successfully completes Educational Administration 500 (Research Methods) during the first 24 quarter hours of his work and then selects either of the following.
2. He enrolls in Secondary Education 575 for four quarter hours or selects a thesis topic.
 - a. If he elects Secondary Education 575, he and the professor in charge of the research agree upon the research problem and determine the conditions for completing the study. When the study has been completed to the professor's satisfaction, one copy (original) will be sent to the Graduate School. A second copy will be filed with the adviser.
 - b. If he elects to meet the research requirement by preparing a thesis, he will be assigned a committee of three professors who will plan with him for the writing of the thesis. The committee will also serve as the examination team before whom the thesis is defended. The department will, upon approval, transmit the thesis to the Graduate School. Thesis credit up to 9 quarter hours may be granted.

COMPREHENSIVE EXAMINATION

The comprehensive examination will be administered each Spring and Summer Quarter and in other quarters by request. This two-part exam-

ination covers (1) the area of secondary education and (2) the student's teaching field.

The student may elect to take the examination after completion of thirty-six quarter hours of course work. In no case may the completion of this examination be later than five weeks prior to the expected date of graduation. Application forms for the examination are available in the departmental office, and must be filed with the adviser during the quarter preceding the quarter in which the examination is to be taken.

ADVISEMENT

When the applicant has received notice of his admission to the master's degree program, he should contact the office of secondary education and make an appointment to meet with his adviser.

He and the adviser will outline his graduate program, set up a cumulative folder, and complete his first course request form.

In the event that the applicant cannot begin his program at the time indicated on the application, he should contact his adviser immediately. All students are expected to begin formal course work within twelve months of the admission date. Failure to do so will necessitate reapplication for admission to the program.

PROGRAM COMPLETION

In addition to general Graduate School requirements described elsewhere in this catalog, and departmental requirements described in this section, the following schedule applies: A minimum of five weeks before the expected time of graduation the student . . .

- (1) must apply for graduation at the Office of Admissions and Records.
- (2) must have departmental approval of his completed research paper or thesis.

Note: Any exceptions to statements of policy or requirements made in this section must be cleared through the graduate committee of the Department of Secondary Education.

Secretarial and Business Education

General Information

Graduate courses in business teacher education may be taken as a major or minor in the Department of Secretarial and Business Education leading to the Master of Science in Education degree.

Admission to the program must be approved by the Department of Secretarial and Business Education, with approval dependent upon the preparation, ability, and promise of the individual student. For the Master of Science in Education degree, the department has no formal admission requirements beyond those of the Graduate School.

The graduate program is planned for those students who have an adequate subject-matter background in at least one of the following business teaching areas: (1) secretarial, (2) general business or consumer education, (3) bookkeeping and accounting, (4) distributive education, or (5) data processing. Deficiencies in background, if any, must be eliminated by taking appropriate courses.

Master's Degree

The program is aimed at upgrading and making more proficient those individuals who have already met or surpassed the minimum requirements

for teaching business subjects in the high school, community college, or other type of educational institution offering business education curricula.

The major in business teacher education consists of a minimum of 48 quarter hours of course work distributed as follows:

1. Eighteen or more hours in business teacher education courses, such as: improvement of instruction in the secretarial subjects, teaching distributive education, teaching bookkeeping and accounting, teaching consumer education, principles and problems of business education, research in business education, and organization and administration of cooperative vocational business education. A minimum of two of the following courses is required: SEC 500, 502, 503, 508, 509, 510. Four hundred-level courses taken for undergraduate credit cannot be repeated for graduate credit.

2. Twelve or more hours in business or economics courses offered by the following departments of the School of Business: accountancy, administrative sciences, business administration, economics, finance, marketing, and secretarial (excluding the business teacher education courses).

3. Twelve or more hours in courses offered by the various departments of the College of Education.

Each student's program is tailored to meet his particular needs and interests, within the general requirements of the Graduate School for master's degrees.

In keeping with the general requirements of the Graduate School, each student is required to conduct an investigation and write a thesis or a research report. Those who have special interest and ability in research or who expect to go on to advanced graduate study are encouraged to write a thesis.

The thesis may be counted for not more than nine nor less than five quarter hours of credit. Two copies of the approved thesis must be presented to the graduate school at least three weeks prior to the date of graduation, to be bound and shelved in the library. For nonthesis programs, a research paper should show evidence of the student's knowledge of research techniques and should be based on a special project.

The passing of a final written examination is required at the end of the program. The examination is given each May and July. Broad, essay-type questions are asked that require the student to apply the knowledge he has acquired in solving realistic problems. Each student selects four of the following areas to be included in his examination, writing on each area from forty to sixty minutes: (1) teaching typewriting, (2) teaching shorthand and transcription, (3) teaching bookkeeping and accounting, (4) teaching office practice and machines, (5) teaching general or basic business and consumer education, (6) teaching distributive education, (7) teaching data processing, (8) vocational business education, (9) office management, (10) records administration, (11) principles and problems of business education, (12) research in business education, (13) tests and measurements in business education, (14) administration and supervision of business education.

Fellowships and teaching assistantships are available to qualified graduate students. All carry stipends and remission of tuition. Applications for these awards should be submitted by February 1.

Additional information concerning the graduate program in business teacher education may be obtained by writing to the chairman, Department of Secretarial and Business Education.

Sociology

The Department of Sociology offers programs of graduate study leading to the Master of Arts and Doctor of Philosophy degrees. The department ordinarily requires a grade point average of at least 4.0 for admission to the master's degree program and a minimum grade point average of 4.5 for admission to the Doctor of Philosophy degree program. Graduate Record Examination scores on both the aptitude and the advanced (sociology) sections must be submitted with the application for admission.

A minimum of 48 course hours is required for the master's degree. There are no specific course requirements, but the student must pass a comprehensive written examination covering major areas of the discipline. A thesis or a research paper is required to complete requirements for the degree.

Several areas of major or minor concentration are provided for advanced work beyond the general master's program. These are: theory-methodology; social disorganization, deviance, and control; social organization; social psychology; sociology of the family. There are no minimum course hour requirements, specific course requirements, or research tool requirements for the Doctor of Philosophy degree. A diagnostic examination is given in the fall and spring quarters, and students are required to take this examination the first time it is offered following their entrance into the Doctor of Philosophy program. To attain the status of candidate for the Doctor of Philosophy degree, the student must pass a comprehensive written examination in two major (one in theory-methodology) and two minor areas. A dissertation is required to complete requirements for the degree. After approval of the dissertation by the candidate's dissertation committee, an oral examination, primarily on the content and implications of the dissertation, is scheduled and conducted by the committee in open meeting.

Applicants for admission to graduate study in sociology should apply in writing to the chairman of the department. Detailed statements of departmental requirements for the Master of Arts and the Doctor of Philosophy degrees are available upon request. Additional information on programs may be obtained from the departmental director of graduate studies.

Special Education

Several programs leading to a Master of Science in Education degree are offered by the Department of Special Education. Courses which lead to certification as a teacher of exceptional children may be included in the master's degree program. This training is specifically designed for individuals who have had successful teaching experience in regular classrooms and who wish to qualify as teachers of mentally retarded, behaviorally disordered, or learning disabled children.

For persons holding certification in some area of teaching exceptional children, a program designed to meet the requirements for special education administrative positions is offered. This is a program which is flexible enough to meet the needs of persons with a background in any one of a variety of special education areas.

A Sixth-Year Specialist's certificate program in special education with emphasis on one or more areas, including special education supervision, is available.

A Doctor of Philosophy degree in education with a concentration in special education is offered. This program has its base in the Graduate School and College of Education graduate policies. Specific course requirements for the emphasis in special education include extensive seminar experiences in the study of all types of exceptional children.

A number of graduate fellowships, both at the master's and doctoral level, under Public Law 91-230 are available to qualified persons seeking careers in special education through study in this department.

All special education doctoral students are required to work in departmental teaching or research activities for a minimum of four clock hours per week during each term of their full time enrollment. A total of four to eight hours of academic credit is granted for these practicum activities. The purpose of this requirement is to provide an opportunity for the doctoral student to participate in progressively more responsible professional activities under the supervision of the departmental faculty.

Speech

Courses are offered in speech leading to the Master of Arts, Master of Science, and Doctor of Philosophy degrees. The Master of Arts and Master of Science degrees are offered with specialization in interpersonal communication, interpretation, rhetoric and public address, speech education, language behavior, and general speech. Competence in one foreign language is required for the Master of Arts degree. Courses in speech may be taken as a part of the program leading to the Master of Science in Education degree. The Doctor of Philosophy degree is offered with specialization in interpersonal communication, interpretation, rhetoric and public address, speech education, language behavior, and theater.

Applicants must meet the minimum requirements of the Graduate School and should have completed a minimum of 24 quarter or 16 semester hours in speech or related areas. A program for remedying deficiencies in background can be arranged upon petition to the graduate committee of the Department of Speech.

Application for admission to graduate study in speech should be directed to the Graduate School. In addition to material sent to the Graduate School, each applicant should submit to the Department of Speech three recommendations from former teachers and an application form indicating his professional and personal objectives. The official application forms for the supporting materials requested by the department may be obtained from the chairman of the graduate studies, Department of Speech.

Acceptance for graduate study in speech and subsequent continuation in the graduate program are determined by the graduate committee of the Department of Speech.

Master's Degree Programs

A minimum of 48 quarter hours of credit is required for the degree. At least 24 of these hours must be at the 500 level. The course work may be in one or two specialties or in general speech.

A student who completes only the minimum of 48 hours of work may

devote no more than 16 hours outside the Department of Speech. However, a student may petition the Graduate Committee for a program to include 24 hours outside the department.

A faculty adviser is named for the individual student before the end of the first quarter in residence. The faculty adviser and the student will plan the program of study.

A student must have an overall 4.25 grade point average in order to be eligible for the master's degree.

The requirements for the master's degree may be met by either of the following plans:

Plan 1

Each student must complete a minimum of 48 hours of credit, with no more than nine hours or fewer than five hours counted toward a thesis. The thesis is submitted to a committee of three members of the graduate faculty, at least two of whom must be from the Department of Speech. This committee must approve the prospectus and will administer the oral examination over the thesis and course work.

Plan 2

Each student must complete a minimum of 48 hours of course work. A research paper is submitted as evidence of knowledge of research techniques. This paper should be based on a special project or specific courses as recommended by an advisory committee composed of the student's adviser and one other member of the graduate faculty selected by the student and adviser. This advisory committee must approve the research paper before it is submitted to the graduate committee and, finally, to the Graduate School for its permanent records. A comprehensive written examination is to be taken over the course work.

The student will be given a choice as to which of the above plans he wishes to pursue. The graduate committee of the Department of Speech will make the final recommendation for graduation.

Doctor of Philosophy Degree

The program should include at least 32 hours in the major area of competence and 16 hours in the minor area of competence. Major areas within the Department of Speech include: interpersonal communication, interpretation, rhetoric and public address, speech education, language behavior, and theater. The minor area of competence may be outside the Departments of Speech and Theater, but approval must be obtained from the student's advisory committee and the graduate committee. A student may petition to apply not more than eight hours from a cognate area outside the Departments of Speech or Theater to his major area of competence. Total hours outside the department may not exceed twenty-four. The proposed program must meet the Graduate School requirements for residence and shall exclude course work taken to meet the research tool and dissertation requirements.

After the student has completed 24 quarter hours of his program, his progress shall be reviewed by the graduate committee to determine continuation, change or termination of the program. The advisory committee for each student shall be responsible for assembling the necessary information (grades, recommendations, progress in tool requirements, etc.) for consideration in reaching the above decision.

The student must maintain a 4.5 grade point average in his major area of competence and a 4.25 average in his minor area of competence through-

out his program of study. If the grade average in either area of competence drops below the minimum, the student is placed on academic warning for the following two quarters.

Advisory Committee

An advisory committee shall be established during the first quarter of graduate study to plan the program of study with each student. The committee shall be composed of two professors from the major area of competence and one professor from the minor area of competence. The chairman of the committee shall act as the primary adviser and sign the Graduate Course Request form. This advisory committee is responsible for certifying to the graduate committee that the student has met all departmental requirements for admission to candidacy and has passed the Ph.D. preliminary examination.

Research Tool

Before admission to candidacy, the student must demonstrate competence in one research tool. This shall embody skills needed in understanding materials in the field or in the conduct of research for the dissertation or in continuing research contributions in his field of specialization.

Competency may be achieved in a language, statistics, computer programming, or, in some cases by the completion of sixteen hours of additional course work outside the Departments of Speech or Theater. Special cases may be considered upon petition to the graduate committee.

Twelve hours of work in statistics taken within the University with an average grade of 4.0, plus the completion of a research project in the Departments of Speech or Theater, usually will be considered a demonstration of competency in statistics. In some cases, the final examination of the third quarter of the statistics sequence plus the research project will indicate the student's competency in statistics.

For the foreign language tool requirement, proficiency usually will be determined by an E.T.S. examination or the completion of the sequence of three graduate language courses at Southern Illinois University at Carbondale designed for the research tool with a grade of *B* or better. Languages for which there are no E.T.S. examinations or for which there are no regular courses taught will be handled individually upon petition. A research project which utilizes the language will complete the tool requirement.

Computer programming may be utilized when the student is interested in conducting quantitative research. This research may be for the dissertation or some other research project. Competency will be determined by the completion of a research project in the Departments of Speech or Theater.

In some cases, a student may satisfy the research tool requirement through the completion of sixteen hours of additional course work outside the Departments of Speech or Theater but within the University. Such courses must comprise a unified approach to the study of a single area which can be demonstrated as necessary for the dissertation work. The courses must be approved by the graduate committee after the student's dissertation topic has been determined in conjunction with his advisory committee. A 4.0 average will be required for the courses. Final approval will be contingent on the successful completion of a preliminary research project germane to the dissertation topic, utilizing the courses selected to meet the tool requirement.

Preliminary Examinations

The student must pass preliminary examinations over the two areas of competence, the preparation and administration of which are determined by the advisory committee in consultation with the student. The examination may be taken after completion of the course work and prior to completion of the research tool requirement, upon unanimous approval of the advisory committee.

Dissertation

The dissertation director shall, upon consultation with the student, be responsible for setting up a dissertation committee, supervising the dissertation, and administering the final oral examination. The dissertation committee shall approve the dissertation proposal and pass upon the completed dissertation and oral examination.

Speech Pathology and Audiology

The Department of Speech Pathology and Audiology has as its objective the training of personnel for communication science research, for college and university teaching, and for the diagnosis and treatment of persons with speech and hearing impairments. Course work at the master's level may be planned to meet the academic and professional requirements for the following two certificates: (a) the special certificate in speech and language impaired of the Illinois State Teacher Certification Board; (b) the Certificate of Clinical Competence of the American Speech and Hearing Association. ASHA certification is usually required for work in agencies, hospitals, medical centers, etc. The program in clinical training is approved and registered with the Education and Training Board of the American Board of Examiners in Speech Pathology.

Professional experiences for graduate students are provided in the following settings: the University's Clinical Center; a summer residential camping program for persons with organic speech problems; the V.A. Hospital in Marion; A. L. Bowen Center for Retarded Children; nursing homes; and Anna State Hospital. Cooperative programming is maintained with other public and private agencies such as the Division of Vocational Rehabilitation, the Easter Seal Society, the National Association of Speech and Hearing Agencies, and the University of Illinois Division of Services for Crippled Children. Students participate in traveling speech and hearing clinics which serve schools and communities through the media of surveys, diagnostic examinations, and therapy. The department has available S.R.S. traineeships in addition to graduate and research assistantships. Students can also apply through the department for the special doctoral research assistantships and graduate fellowships available from the Graduate School.

Specialized experiences with orthodontists, prosthodontists, plastic surgeons, otologists, and others of the medical and dental professions are available in the St. Louis and Chicago areas. The development of the new medical school at Southern Illinois University at Carbondale and the new dental school at Southern Illinois University at Edwardsville also hold promise for program enrichment. Emphasis is on the interdisciplinary relationships with other professions throughout the training process.

The department maintains many active research facilities which provide laboratories and specialized equipment for the study of both the normal

and impaired functions of the speech and hearing processes and their relationship to language formulation. The speech science laboratory is equipped for electromyographic study of the speech musculature, radio telemetry, electrophysiology of hearing, evoked potential and spectrographic analysis of speech signals. The experimental audiology laboratory, which includes an anechoic chamber, is equipped for investigation in air and bone conduction sensitivity, localization and speech discrimination. It also has facilities for automatic audiometry, PSGR, middle ear impedance, and aural reflex experimentation. Facilities are also available for the use of palmar sweat and electro skin measurements as physiological indices of emotion, for the study of relationships of orofacial anomalies to voice and speech disorders, and for the experimental analysis of behavior and behavior modification.

Graduate courses in the Department of Speech Pathology and Audiology may be taken for a major leading to the Master of Science and Doctor of Philosophy degrees.

G.R.E. aptitude test scores must be submitted to the department. They are not mandatory for admission, however, and may be submitted shortly after admission, usually within the first quarter of residence.

Additional information regarding financial aid, programs, and application procedures can be secured by writing to the chairman, Department of Speech Pathology and Audiology, Southern Illinois University at Carbondale, Carbondale, Illinois 62901. Inquiries from qualified graduates in other fields are welcomed. For example, students interested in the interdisciplinary engineering biophysics program may register for the speech and hearing science courses.

Master's Degree

The master's degree requires a minimum of 48 hours of acceptable graduate credit (4.0 average) at least 24 quarter hours of which are of the 500 level, and the completion of an approved thesis or research paper. Specific course requirements and total number of hours are determined by advisement after consultation with the graduate student. A comprehensive examination over course work may be given by the faculty three quarters after the beginning of full time work for purposes of advisement and assessment of student's academic status.

It is recommended that the master's degree culminate in the academic and practicum requirements for the Certificate of Clinical Competence in Speech Pathology or Audiology as designated by the American Speech and Hearing Association and for the special certificate in speech and language impaired of the Illinois State Teacher Certification Board.

A candidate for the master's degree has two options: to write a thesis, or a research paper. The thesis may be counted for not more than 9 nor less than 5 quarter hours of credit. A research paper is required of those who do not undertake a thesis. A paper should show evidence of the student's ability to formulate and present research in a form which demonstrates an acceptable level of scholarship. All students intending to pursue doctoral studies are encouraged to write a thesis. If the student plans to continue at Southern Illinois University at Carbondale, it is mandatory.

Doctor of Philosophy Degree

The student, after consultation with his academic adviser, is expected to propose to the graduate faculty of the department the academic program

he intends to pursue prior to taking the preliminary examination for admission to candidacy. The proposed program must meet the Graduate School requirements for residence, and shall exclude course work designed to meet the research tool requirement. The program must also include a cognate area which will assure a meaningful competence in subject matter outside the student's major department. Graduate faculty approval of the proposal signifies an agreement between the student and the department.

After satisfactory completion of the above, the student may request the preliminary examination. The preliminary examination shall be written and administered by no fewer than 5 graduate faculty members representing the student's specialization, cognate, and research interests. Should the student fail the first examination, he may, with faculty approval, repeat the examination once within a 12-month period.

After successful completion of the approved academic program, research tool, and the preliminary examination, the student will be admitted to candidacy for the degree. The candidate must then complete a dissertation showing that he is capable of independent research.

After successful completion of the approved academic program, research tool, and the preliminary examination, the student will be admitted to candidacy for the degree. The candidate must then complete a dissertation showing that he is capable of independent research.

The final examination shall be oral and cover the subject of the candidate's dissertation and related academic and professional matters.

Research tool

a. The research tool shall replace neither a required nor a prerequisite element of the student's proposed academic program and must be completed before the student will be permitted to take the preliminary examination for admission to candidacy.

b. The student must demonstrate an ability to deal with descriptive and inferential statistics and research design techniques. Ordinarily this will be accomplished by completing a three-course sequence (12 quarter hours) in statistics, such as the sequence available in the Department of Guidance and Educational Psychology. Competency will be demonstrated by achieving a *B* average in the course sequence, or by proficiency. The sequence should be considered to be outside of any specific degree requirement.

Theater

The Department of Theater offers programs of study leading to the Master of Arts and the Master of Fine Arts degrees and the Doctor of Philosophy degree in speech with a major in theater.

Graduate study in theater (at the master's level particularly) is organized more or less formally into the following areas of study: 1. Acting. 2. Directing. 3. Design: Scenic/Costume. 4. Playwriting. 5. History & Criticism. 6. Dance. 7. Children's Theater. 8. Cognate and Interdisciplinary Fields: Dramatic Literature, Asiatic Theater, Black Studies, Soviet and East European Theater, Music Theater, or an approved interdisciplinary group of courses.

All candidates for the M.A., M.F.A. and Ph.D. degrees will be expected to select one of these areas as their major field and to demonstrate special competence in that field. Ph.D. candidates will also be expected to

demonstrate competence in a cognate speech area: oral interpretation, interpersonal relations, rhetoric and public address, speech education, or language behavior.

Candidates, after admission to the program, are sent a required reading list of plays on which a diagnostic test (to determine for the student's benefit and the department's his weaknesses and strengths) is given during the first quarter of residency. The test also requires the writing of an essay selected from a list of topics in the field.

Application for admission to graduate study in theater should be directed to the Graduate School. The applicant must have the registrar of each college previously attended send three complete official transcripts of all undergraduate and graduate work directly to the Graduate School. Supporting materials for the application should be sent to the director of graduate studies in the theater department. These materials consist of (1) a personal and professional data form, and (2) three letters of recommendation from former teachers or supervisors. The official forms for these materials may be obtained from the director of graduate studies, Department of Theater. Applications and supporting materials should be submitted at least eight weeks prior to the beginning of the quarter in which the student expects admission to study.

Departmental processing of applications for acceptance as a graduate student in theater is the responsibility of the department's graduate adviser, who serves as adviser for all graduate students until such time as a faculty adviser or committee is named for the individual student, which will normally be done not later than the end of the first quarter in residence.

Graduate students are urged to supplement their class work with practical experiences in acting and production. Membership in the Southern Players is open to graduate students, and they may also earn graduate credit as members of the Southern Touring Company and the Summer Stock Company.

Master of Arts Degree

Requirements for admission imposed by the department are in addition to those of the Graduate School. The department will ordinarily accept as candidates for the master's degree only those applicants who: (1) have graduated from an accredited four year college or university; (2) have completed a minimum of 24 quarter or 16 semester hours in the field of theater or speech; (3) have a 3.7 (5-point scale) over all grade point average, or alternatively, 3.9 over all for the last two years of undergraduate work; and (4) have a 4.0 over all average in theater or speech. Applicants who do not meet these minimal requirements or their equivalent, but who do meet the minimum standards of the Graduate School, can be considered for acceptance only on petition to the department's graduate adviser which, if granted will be accompanied by a statement specifying the special conditions or requirements of admission.

A minimum of 48 quarter hours of credit, no more than 9 of which may be for the thesis, constitutes the basic course requirements for the Master of Arts degree. At least 24 of these hours must be at the 500 level. The course work must be so planned as to include at least four hours of work in each of three of the eight areas of study.

A student who completes only the minimum of 48 hours of course work may devote no more than 8 of those hours to courses outside the department unless the work is in a cognate field which has been approved as a

replacement for one of the areas of concentration within the department. In the latter event, as many as 16 hours in outside fields may be counted within the 48 hour minimum.

Each candidate for a Master of Arts degree must include in his studies the departmental course Theater 500: Introduction to Graduate Study in Theater. Candidates for the Master of Arts must demonstrate proficiency in a foreign language or complete a research-tool project relevant to either (1) professional skills (acting, directing, playwriting, etc.) or (2) a research area in a specialized interest.

A student must maintain an over all 4.0 (5-point scale) grade point average in order to be eligible for the Master of Arts degree.

The departmental graduate adviser is at the service of each student; he registers students in courses and helps them plan their programs. He also confers with the student in the selection of the chairman and members of a thesis committee. The topic of the thesis, which is required, is chosen in consultation with committee chairman at the earliest practical time.

The final oral examination will cover the thesis and the major area in which it was written, and it may also test the candidate's general competence in the field of theater.

The Master of Fine Arts

While the department's requirements for admission to graduate-degree programs coincide with those of the Graduate School, a student who wishes to earn the M.F.A. degree must follow a special procedure in order to qualify for admission to this degree program. He must take 17 hours of core courses in the department: a directing course (402a or b), 526: Seminar in Theater Art-Aesthetics, 438: Contemporary Developments in the Theater, one course in the student's specialization with directing students taking a course in acting, qualifying project: 2 hours of Theater 530. If a student has taken any of these courses elsewhere, other courses suggested by the graduate adviser or his advisory committee shall be substituted. Successful completion of these courses with a grade of *B* or better will not in itself assure the student of candidacy for the M.F.A. degree; he must also satisfy the faculty that he is artistically qualified for admission to the program by demonstrating above-average talent in one of three areas: (1) acting-directing, (2) design: scenic/costume, and (3) playwriting. Artistic qualification can usually be determined after a student has taken four hours of courses in one of the above three areas (courses taken in the 17-hour core will count) and after he has demonstrated his ability in his specialty by submitting a portfolio of designs, for example, or by directing or designing a laboratory production or by submitting play manuscript(s). Each potential candidate will also be interviewed by a faculty committee or jury. The judgement of the faculty committee in the evaluation of artistic qualifications will be final.

Students who fail to qualify for admission to the M.F.A. program of studies may petition to enter a program leading to an alternate degree.

Once admitted as a candidate for the M.F.A., a student will proceed to complete 73 hours of courses (including 6-9 for a thesis-project in his area of specialization) under the guidance of his adviser.

It is assumed that the majority of students applying for admission to the M.F.A. program would be graduates of institutions other than S.I.U. All such transfer students must give evidence of having completed elsewhere practical training of thoroughness and quality which is the equivalent of the undergraduate work offered in theater at S.I.U. at Carbon-

dale. Transfer students who hold an M.A. or M.S. in theater from another institution will not, under any circumstances, be accepted for the M.F.A. until they have successfully fulfilled the requirements and thus given evidence at S.I.U. at Carbondale of their qualifications.

Doctor of Philosophy Degree

Potential doctoral students should carefully study the program description in speech. Doctor of Philosophy degree candidates are required (1) to complete a minimum of 32 hours in theater and 16 hours in speech, and (2) to complete a theater dissertation. Qualified candidates may offer a creative equivalent in producing, playwriting, or design, under the supervision of an advisory committee. Candidates for the Doctor of Philosophy degree with a major concentration in theater must demonstrate competence in one research tool (refer to speech for description) relevant to skills needed for understanding materials in the field, or in the conduct of research for the dissertation, or in continuing research contributions in the field of specialization. Candidates must also satisfy the graduate staff that they are qualified for candidacy by passing a comprehensive preliminary examination. Graduate courses in theater may also be taken as a secondary concentration leading to the Doctor of Philosophy degree with a specialization in one of theater-speech areas.

Candidates for the Doctor of Philosophy degree who have a special interest in dramatic literature may earn the degree by substituting a limited number of dramatic literature courses (approved by their adviser) as offered in the Department of English for theater courses.

An undergraduate major in theater is not essential for admission to candidacy for a graduate degree. A student with an undergraduate major in speech or English, for instance, may audit undergraduate courses in theater to make up any deficiencies.

Zoology

Graduate work in zoology may be taken as a major or minor toward the Master of Arts, Master of Science, and Doctor of Philosophy degrees. The departmental director of graduate studies should be consulted in regard to current programs, specific requirements, and individual questions. Graduate programs in zoology are as flexible as possible consistent with the goal of academic excellence.

Candidates for the Master of Science and Master of Arts degrees must have the consent of the department and at least 35 quarter hours of undergraduate credit in zoology. Credit in physical sciences and mathematics also is required. Deficiencies determined in undergraduate preparation may be removed concurrently with graduate work.

The doctoral degree is a research oriented degree awarded for high accomplishment in a particular discipline or interdisciplinary area. Admission to the doctoral degree program in zoology ordinarily requires previous training in animal science. A good background in all life sciences, chemistry, mathematics, and physics is desirable. Each student's program of study is based upon the results of an advisory examination, the student's overall background, the requirements of the preliminary examination, and the proposed specialization. The student's adviser aids in the selection of a minor and establishes the program requirement. A dissertation demonstrating scholarly merit and the ability to perform independent research are required.

3 / Course Descriptions

Here are described all of those courses offered by Southern Illinois University at Carbondale offered at the 400- and 500-level. Courses are listed numerically within each subject-matter area. Areas are listed below in order of their appearance on the following pages.

Administration of Justice	Elementary Education	Interior Design
Agricultural Industries	Engineering	Journalism
Animal Industries	Engineering Technology	Linguistics
Anthropology	English	Mathematics
Art	Family Economics and Management	Medical Education Preparation
Biology	Food & Nutrition	Microbiology
Black American Studies	Foreign Languages	Music
Botany	Classical Studies	Occupational Education
Business Administration	French	Philosophy
Accountancy	German	Physical Education
Administrative Sciences	Greek	Physics
Finance	Latin	Physiology
Marketing	Romance Philology	Plant Industries
Chemistry & Biochemistry	Russian	Psychology
Child & Family	Spanish	Recreation & Outdoor Education
Cinema & Photography	Forestry	Rehabilitation
Clothing & Textiles	Geography	Secondary Education
Community Development	Geology	Secretarial and Business Education
Computer Science	Government	Social Welfare
Design	Guidance & Educational Psychology	Sociology
Economics	Health Education	Special Education
Education	Higher Education	Speech
Educational Administration & Foundations	History	Speech Pathology and Audiology
	Home Economics Education	Theater
	Industrial Technology	Zoology
	Instructional Materials	

The first entry for each course is a three-digit numeral which serves to identify the course. Courses numbered 400–499 are open to both seniors and graduate students, unless designated otherwise. Courses numbered above 499 are for graduate students only.

Following the course identification number is another number, which indicates the maximum credit allowed for the course. The maximum may vary, and specific quarter hours may be assigned for each quarter a course is given.

Following the course description there may be prerequisites which must be satisfied before a student is permitted to enroll. Graduate students will not receive graduate credit for 400-level courses graded on a Pass/Fail basis. Graduate credit is awarded for 500-level courses which have been approved to be graded on a S/U only basis.

Graduate students at Southern Illinois University at Carbondale are required to purchase textbooks and instructional materials and supplies needed for each course. Field trips are required for certain courses.

To learn in which quarter a course is offered, the student should consult the Schedule of Classes, published quarterly by University Graphics, Southern Illinois University at Carbondale, Carbondale, Illinois 62901.

Administration of Justice

411-4 Critical Issues in Criminal Justice. Emergent phenomena in the system of criminal justice investigated to demonstrate the pertinence of theory to practice. Includes role conflicts in law enforcement and corrections, police professionalism, its place and function, the offender as a client for services, corrections as a setting for research, the juvenile court, and career patterns and difficulties.

416-4 Introduction to Research in Administration of Justice. Philosophy, theories, and methods of research. Principles of scientific inquiry contrasted with the constraints and demands of the criminal justice community. Prerequisite: consent of instructor.

417-4 Research Practicum in Administration of Justice. Review of alternative research models for measuring dispositional concepts. Interpretation of research. Construction and analysis of tools appropriate to some aspect of the administration of justice. Prerequisite: 416 or consent of instructor.

472-4 The American Correctional System. (See Sociology 472.) A survey of the correctional field, covering probation, institutional treatment, and parole. Historic development, organizational structure, program content, and current problems. Prerequisite: consent of instructor.

473-4 Juvenile Delinquency. (See Sociology 473.)

474-3 Law Enforcement Administration. (See Government 474.)

483-4 Current Problems in Corrections. An exploration of contemporary problems in the control and treatment of sentenced offenders and a review of research trends in corrections. Prerequisites: 472 or consent of instructor.

489a-4 Probation, Classification, and Parole. An introduction to the structure and function of those elements of the correctional process primarily concerned with the evaluation, treatment, and control of offenders with particular attention to the casework components of the process. Prerequisite: consent of instructor.

489e-2 to 4 Independent Study in Corrections. Supervised readings or independent investigative projects in the various correctional aspects of crime control, institutional management, and specific correctional programs. Prerequisite: written permission of Center Coordinator.

501-12 (4,4,4) Criminal Behavior: Problems and Characteristics. Must be taken in a,b,c sequence. Communalities in multidisciplinary study and knowledge in criminal behavior presented by teaching teams.

515-4 Crime Prevention and Control. Development factors and active intervention techniques in preventing crime and delinquency. The roles of agencies such as police, schools, churches, mental health clinics, and other service organizations.

561-4 World Criminal Justice Systems. Comparative criminal justice systems in world regions and nations including the United Nations. Prerequisite: consent of instructor.

572-4 Seminar in Criminology. (See Sociology 572.)

578-1 to 6 Seminar in Correctional Rehabilitation Counseling. (See Rehabilitation 578.)

580-4 Design, Planning, and Management in the Administration of Justice. Simulated planning and design experience with real justice system problems. Each student is required to investigate a criminal justice sub-system, study the literature and theoretical foundations on modifying such systems, and develop a plan to deal with the system.

582-4 Criminal Law and the Correctional Process. (See Government 582.)

583A-6 Supervised Field Work (Internship.) Experience in state and federal institutions, probation and parole departments, juvenile courts, delinquency control programs, and public or voluntary agencies. Orientation sessions precedes placement. Prerequisite: consent of instructor. Graded on S/U grade system.

583B-6 Supervised Field Work (Internship.) (Same as 583A except grading is on A through E basis.)

584-4 Seminar in Correctional Program Management. (See Government 584.)

591-1 to 5 Supervised Readings in Selected Subjects. Prerequisite: consent of instructor and department chairman.

599-1 to 9 Thesis. Prerequisite: written permission of academic coordinator.

Agricultural Industries

Field trips are required for certain courses.

410-1 to 6 Problems in Agricultural Services. Discussion, assignments, and special workshops on problems related to inservice training programs in agriculture. Prerequisite: consent of instructor.

411-3 Agricultural Extension. A study of the history, organization, objectives, programs, and methods of agricultural extension work. Prerequisite: junior standing.

412-4 Principles of Agriculture Mechanization. Theory and use of educational materials and devices adaptable to the needs and interests of educators involved in agricultural mechanization laboratories. Prerequisites: Secondary Education 310 and 8 hours of mechanization or equivalent.

417-4 Agricultural Development in Emerging Countries. Principles and practices in improving agriculture in areas with limited capital and low levels of technology. Prerequisites: 204 or GSB 211.

418-3 Marketing Practices and Problems in Developing Countries. Types of markets, assembly of products, storage, transportation, quality determination, and pricing practices which are peculiar to the developing countries. Market organization and practices for the major export products and the principal domestic foods and fibers in such countries. Methods of progressively improving such markets. Prerequisite: 354 or Economics 215.

420-2 to 6 Knowledge and Skills Related to Agriculture Education. Designed to improve the techniques of agricultural education workers in the field. Emphasis will be on new technical developments and the most effective method of presenting these developments. Prerequisite: Previously demonstrated ability in area selected for advanced study.

450-4 Advanced Farm Management. Application of linear programming to farm planning including enterprise selection, resource allocation and least cost ration formulation. Farm decision making under uncertainty and analysis of farm expansion alternatives. Prerequisite: 350.

451-4 AgriBusiness Management. Functions of top management, such as: determining objectives; developing sound and consistent policies for achieving objectives; organizing the administrative personnel to carry out the plans; guiding and maintaining the organization. Prerequisite: senior standing.

456-11 (3,2,2,2,2) Agricultural Marketing Problems and Practices. (a) Co-operatives. Development of the agricultural cooperative movement, agricultural cooperative organization, legal requirements, principles and practices of agricultural cooperative associations. (b) Livestock. Problems and their solutions in marketing livestock. (c) Field Crops. Problems and their solutions in marketing field crops. (d) Dairy and Poultry. Problems and their solutions in marketing dairy and poultry products. (e) Horticultural Crops. Problems and their solutions in marketing horticultural crops. Field trip cost \$5. Prerequisite: 354 or consent of instructor.

460-4 Agricultural Law. Relations of common-law principles and statutory law to land tenure, farm tenancy, farm labor, farm management, taxation, and other problems involving agriculture. Prerequisite: senior standing or consent of instructor.

471-4 Land Resource Economics. (Same as Forestry 471 and Economics 471). The use of land as an economic variable in production of goods and services; land markets; group versus individual conflicts; and land utilization as related in institutional arrangements. Prerequisite: Econ. 215 or equivalent.

473-4 Advanced Agriculture Power Systems. Detailed study of the mechanics of internal combustion engines and component systems. Prerequisite: 373 or equivalent.

478-4 Agricultural Materials Handling Systems. Arrangement of feed handling, storage, and processing systems for agricultural products. Includes cleaning, sorting, and drying. Prerequisite: 215, 350, or equivalent.

482-1 to 3 Seminar on International Agricultural Problems. Discussion of methods by which foreign students can adapt information and training obtained in U.S. oriented courses to the solution of important agricultural problems in their home countries. May be supplemented by work experience and research on the University farms, in laboratories, and in the library. Prerequisite: consent of instructor.

483-3 Introduction to Communicating Technology in Rural Areas. For field and administrative personnel preparing for or working in regions of rural economic development. Examines ecology and cultural elements of rural populations affecting the communication/adoption of technology. Basic forms common to the flow/communications of new technology. Develops alternative communication strategies for specific programs. Prerequisite: junior standing.

485-3 Principles and Philosophies of Vocational and Technical Education. (See Occupational Education 485.)

505-3 Agricultural Industries Research Methodology. Social science research methodology in agriculture. To include types of research problems encountered, sources of data, problems in developing new data and methods of analysis. Prerequisite: consent of department chairman.

512-2 to 6 Agricultural Occupation Internship. Prepares coordinators to fulfill their responsibilities in selected areas of agricultural related occupations through an internship in the area of specialization and through orientation to related technical information. Prerequisite: 312 or consent of chairman.

520-1 to 6 Readings. Readings in specialized topics under the direction of an approved graduate faculty member.

525-4 Cooperative Vocational-Technical Education. (See Occupational Education 525.)

550-4 Resource Allocation in Agriculture. A theoretical and empirical examination of the effects of recent rural programs and policies on resource allocation in agriculture. Prerequisite: 12 hours of economics or agriculture economics.

552-2 Advanced Agricultural Prices. Continuation of analysis of factors affecting agricultural prices; the application of these factors in price prediction. Prerequisite: 352.

554-4 Advanced Agricultural Marketing. Current complex problems in agricultural marketing and methods of developing solutions; cooperative activities. Prerequisite: 12 hours or equivalent in economics and agricultural economics.

575-1 to 6 Individual Research. Directed research in selected topics under the supervision of an approved graduate faculty member.

581-1 to 6 Seminar. Study and discussion in selected topics under the supervision of an approved graduate faculty member.

588-1 to 12 International Graduate Studies. University residential graduate study program abroad. Prior approval by the department is required both for the nature of program and the number of quarter hours of credit.

599-1 to 9 Thesis. Work in the research for and presentation of a thesis under the supervision of an approved faculty member.

Animal Industries

Field trips are required for certain courses.

415-9 (5,4) Animal Nutrition. (a) Physical and chemical properties of nutrients and their uses and principles involved in determination of nutrient requirements. (b) An integration of the basic facts concerning the nature of nutrients and their metabolism. Must be taken in a,b sequence. Prerequisites: 315 and a course in chemistry.

419-4 Stable Management and Horsemanship. Lectures and laboratory experience. Routines of stable operation, horse care, training, and management. Field trips. Prerequisite: 319.

420-4 Commercial Poultry Production. Broilers, layers, and turkeys as adapted to poultry speciality farms. Field trips. Prerequisite: 121.

421-3 Animal Production in Developing Countries. World animal production, practices, and institutions which affect productivity. The adaptability of animals to serve mankind. Prerequisite: one year biological science.

430-5 Dairy Cattle Management. Application of principles of genetics, nutri-

tion, physiology, and economics to the management of the dairy herd. Field trip required. Prerequisite: 315 and 332.

431-4 Reproductive Physiology of Domestic Animals. Comparative physiology of reproduction in farm animals and the principles of artificial insemination. Prerequisite: 121 or one course in physiology.

432-3 Quantitative Inheritance of Farm Animals. A review of the principles underlying the influence of mutation, selection, migration, and random drift in animal breeding population; estimation and interpretations of heritabilities and genetic correlations; effects of variances of quantitative traits of farm animals. Prerequisite: 332.

433-3 Dairy Cattle Nutrition. Application of the latest knowledge of digestion and metabolism in ruminants, and their nutritional requirements to dairy herd feeding. Prerequisite: 315.

434-3 Physiology of Lactation. Anatomy of the mammary gland, hormonal control of development and secretion, milk synthesis, physiology and mechanics of milking. Prerequisite: organic chemistry and physiology.

456b-2, 456d-2 Agricultural Marketing Problems and Practices. (See Agricultural Industries 456.)

465-4 to 5 Swine Production. Breed selection, breeding, feeding, management, and marketing of swine. Field trip. Prerequisites: 315, 332.

479-4 Animal Behavior. (Same as Psychology, Zoology 479.) Prerequisite: GSA 209 or equivalent.

480-4 Sheep Production. Breeding, feeding, and management of sheep. Field trip. Prerequisites: 315.

485-4 Beef Production. Breeding, feeding, and management of beef cattle as applied to cow and calf production. Prerequisite: 315.

487-4 Commercial Livestock Feeding. Principles and problems in fattening beef cattle and sheep for market. Prerequisites: 315.

502-3 Surgical Research Techniques in Farm Animals. Basic methods of experimental surgery and sampling of biological materials in research on farm animals. Practice of techniques discussed in the lectures. Prerequisite: consent of instructor.

505-4 Research Methods in Agricultural Science. Experimental design and biometry as applied to agricultural research.

506-4 Instrumentation Methods in Agricultural Science. Basic methods and techniques of instrumentation are taught in the lectures with application of instruments commonly involved in agricultural research carried out in laboratories. Prerequisite: consent of instructor.

515-4 Nutrient Utilization in Domestic Animals. Nutrient utilization, including digestion, absorption and metabolism, and relationship of energy metabolism to energy source and body function. Prerequisite: 415a, 505b.

516-4 Minerals and Vitamins in Animal Nutrition. Basic and applied principles of mineral and vitamin metabolism. Emphasis on metabolic functions, reaction mechanisms, and interrelationships. Prerequisite: 515 or Chemistry 350.

520-1 to 6 Readings in Animal Industries. Readings in specialized fields under direction of approved graduate specialists.

575-1 to 6 Individual Research. Investigation of a problem in animal science under the supervision of an approved graduate specialist.

581-1 to 6 Seminar. Problems relating to various phases of animal industries.

588-1 to 12 International Graduate Studies. University residential graduate study program abroad. Prior approval by the department is required both for the nature of program and the number of quarter hours of credit.

599-1 to 9 Thesis. Minimum of 5 hours to be counted toward a master's degree.

Anthropology

400-4 Man and Culture. The nature of culture and cultural process. Relationships of culture and man as an individual and as a group. Emphasis on "the anthropological point of view."

401-4 Language in Culture. Language as a part of culture. Linguistics and the study of culture.

403-3 or 4 General Archaeology. Theory and methodology. The basic concepts underlying anthropological interpretations of man's past. Prerequisite for undergraduates: 302 or consent of instructor.

404-6 (3,3) Technology, Art, and Anthropology. Development of man as an

art-loving and tool-using being. Technological and artistic traditions of non-western peoples, past and present. (a) Technology and anthropology. (b) Art and anthropology. Sequence a,b recommended. May be taken b,a or a or b only.

407-3 General Ethnology. Ethnology as a major sub-field of anthropology, including interest in ethnohistorical studies as well as the more traditional aspects of the field.

408-3 History of Anthropological Thought. The growth of anthropology as an academic discipline to about 1940, with emphasis upon the concepts and ideas since 1860.

409-3 Applied Anthropology. The application of anthropological principles to the solution of problems of the modern world. Contributions of anthropology to the work of the educator, social worker, administrator, business man, government official, and other specialists dealing with man in Western and non-Western cultures.

410-3 Current Problems in Social Anthropology. Current problems in the description and analysis of non-Western social systems. Emphasis on kinship and social structure.

413-3 General Linguistics. General, philosophical. Emphasis on linguistic theory, origin of language, acquisition of language, language change, dialectology.

415-3 Logic of the Social Sciences. (Same as Philosophy 415). Logical and epistemological examination of the social studies as types of knowledge. Basic problems in philosophy of science with major emphasis upon social science: relationship of theory to fact, nature of induction, nature of causal law, testability, influence of value judgments, etc. Intended for students with considerable maturity in a social science or in philosophy.

418-4 Languages of the World. Emphasis on language families, linguistic history and genetic relationships, and typological classification. Of special interest to specialists in fields other than linguistics. Prerequisite: consent of department.

430-3 Archaeology of North America. An introduction to the methods of archaeology and a survey of prehistoric Indian cultures north of Mexico, with particular emphasis upon the cultures of the Mississippi Valley.

441-3 Comparative Economics. A comparative study of economic systems, with emphasis upon those found in primitive societies. Studies of systems which fall outside the conventional systems such as capitalism, socialism, and fascism.

442-3 Comparative Folklore. A comparative study of the role of folklore in various cultures of the world, with emphasis upon non-literate societies. Analysis of motifs, themes, and other elements; comparisons between non-literate and literate groups.

443-3 Comparative Law. Legal premises upon which societies are based; systems of the non-literate world; case studies of instances where these systems come into contact with those of literate, technologically advanced cultures.

444-3 Comparative Religion. Comparative study of religious systems, with emphasis upon those of non-literate societies. Examination of basic premises and elements of those belief systems normally excluded from discussions of the "Great Religions." Case studies of acculturation between these two categories, the "primitive" and the "Great," or "World," religions.

445-3 Cross-Cultural Studies of Personality. Similarities and differences in personality structures including the historical development of this as an anthropological subdiscipline. Basic and modal personality, national character, culture change and personality, culture-bound reactive syndromes, and cognitive anthropology discussed.

465-6 (2,2,2) Museum Methods. Practical experience and associated philosophical-educational context of museum methods in exhibition/display, processing, cataloging, preservation, etc. Prerequisite: junior standing.

466-2 Museum Administration. Problems and policies associated with museum administration, either as a specialist in large organizations or as general museologist when the director serves as a multi-purpose staff member. Prerequisite: junior standing.

470-9 (3,3,3) Special Studies of World Languages. Languages or language families with focus on history and structure. Any one quarter concentrates on language of a major geographical area. Prerequisite: 413, or Linguistics 401 a or b, or consent of instructor.

471-6 (3,3) Ethnomusicology. (Same as Music 471 except no prerequisite.)
483-1 to 18 Individual Study in Anthropology. Guided research on anthropological problems. Consent of department required to enroll, unless required and scheduled with another anthropology course.
497-1 to 18 Honors Individual Research. Honors students participate in graduate seminar work with the consent of the instructor.
499-3 to 12 Honors Thesis. Directed work on research problems. The topic of the thesis may be simple or complex, depending on the time expended on it. Paper to be of publishable quality. Prerequisite: 399 and consent of department.

From year to year, the areal and topical coverage of the following 17 courses will vary, as will the instructors. Students should consult the department about subjects to be covered.

510-3 to 9 Seminar in New World Archaeology.
511-3 to 9 Seminar in Mesoamerican Archaeology.
512-3 to 9 Seminar in Old World Archaeology.
520-3 to 9 Seminar in the Ethnology of the New World.
521-3 to 9 Seminar in the Ethnology of Mesoamerica.
522-3 to 9 Seminar in the Anthropology of Oceania.
523-3 to 9 Seminar in the Anthropology of Africa.
545-3 to 9 Seminar in Linguistics.
550-3 to 9 Seminar in the Cultures of Latin America.
560-3 to 9 Seminar in Comparative Social Organization.
562-3 to 9 Seminar in the Anthropology of Contemporary Peoples.
565-3 to 9 Seminar in Cultural Change and Development.
567-3 to 9 Seminar in Anthropological Theory and Method.
570-3 to 9 Seminar in Art and Technology.
575-3 to 9 Seminar in the Individual and Culture.
581-3 to 9 Seminar in Anthropology.
582-1 to 27 Problems in Archaeology. Guided research upon archaeological problems. Graded on a Satisfactory/Unsatisfactory basis only. Prerequisite: consent of department.
584-1 to 27 Problems in Cultural Anthropology. Guided research upon problems of ethnology, social anthropology, and linguistics. Graded on a Satisfactory/Unsatisfactory basis only. Prerequisite: consent of department.
585-1 to 27 Readings in Anthropology. Guided readings designed to cover special topics and to fill gaps in the student's specialized anthropological background. Prerequisite: consent of department.
595-6 (3,3) Field Methods in Ethnology. Includes anthropological methods of enquiry and documentation of culture and habitat together with appropriate instruction in the techniques of field work, such as photography and sound recording. Stress will be laid in the second part of the course (595b) on the linguistic context of culture; its appropriate recording and structural body.
596-6 (3,3) Field Methods in Archaeology. Includes anthropological methods of enquiry and documentation of culture and habitat, together with appropriate instruction in the techniques of field work. Stress will be laid in the second part of the course (596b) on the practical application of archaeological methods and techniques to field work.
597-1 to 27 Fieldwork in Anthropology. To be arranged with department. Graded on Satisfactory/Unsatisfactory basis only.
599-1 to 9 Thesis.
600-1 to 36 Dissertation. No more than 18 hours in any quarter.

Art

Art studio courses: (401-430; 501-530) directed towards individual research in the student's major field. Emphasis is placed upon the history, materials, processes, and ideas that form the content and experience of the student's major field. Permission of the major adviser in each studio is required.

Art History Courses: 440's, 450's, 540's, 550's.

Art Education Courses: 460's, 560's.

401-2 to 24 Painting I.

403-2 to 24 Drawing I.

405-2 to 24 Sculpture I.

410-2 to 24 Printmaking I. Prerequisite: 358-12.

415-2 to 24 Weaving I.

420-2 to 24 Ceramics I.

428-2 to 24 Glassblowing I. An in-depth studio experience exploiting the use of glass as an artistic medium. Prerequisite: restricted to art majors only, graduate standing or 8 hours ceramics and permission of instructor.

430-2 to 24 Metalsmithing I.

445-9 (3,3,3) Modern Art. (a) 19th century. (b) Early 20th century, (c) Mid 20th century.

447a-3 The Art of Ancient Egypt and the Near East. A survey of principal monuments and archeological evidence relevant to an appraisal of the origins and development of art in the early civilizations of Africa, Western Asia, Europe and the Aegean from prehistoric times to the rise of the Persian Empire.

447b-3 The Art of Ancient Greece. A study of the origins, development and influence of art produced in Greece and its colonies from the Bronze age to the Roman Empire.

447c-3 The Art of The Ancient Romans. An appraisal of the material culture of art of the Roman civilization, its debt to other ancient civilizations and achievements in architecture, sculpture and painting from its foundation until the reign of Constantine.

448a-3 Early Christian and Byzantine Art. A survey of problems related to art and architecture produced in Christian communities and under the aegis of the Byzantine Empire until the Fall of Constantinople.

448b-3 Early Medieval and Romanesque Art. A study of the development of architecture and Art in Europe from the fall of the Roman Empire to the formulation of the Gothic style.

448c-3 Gothic Art. A survey of major developments in Architecture, Sculpture, and painting in Europe from the earliest formulation of Gothic Style to its decline in the Renaissance period.

449a-3 Art of the Renaissance in Europe. A study of developments in art during the 15th Century in Italy and the Lowlands leading to the High Renaissance and its impact in European painting, sculpture, and architecture of the 16th Century. Prerequisite: 225a,b,c.

449b-3 Baroque Art in Europe. A study of the formation of national style in the arts of Italy, Spain, Austria, Germany, France, Flanders and Holland from the 16th Century to the 17th Centuries with particular attention to major masters.

449c-3 The Art of 18th Century Europe. A study of architecture, sculpture and painting in European countries and colonies from the end of the 17th Century to the French Revolution with particular emphasis on the Rococo Art of Italy, England, Spain and France.

455-15 (3,3,3,3,3) Advanced Art History. In depth analysis of the inception, development, and decline of art of the following periods: (a) Ancient, (b) Middle Ages, (c) Renaissance, (d) Early American, (e) Modern. Prerequisite: 225.

458-6 (3,3) Methodology of Art History and Criticism. Lecture, discussion and presentation of (a) the research tools of art history and (b) history of art criticism with practical experience in both areas.

459-6 (3,3) Museology-Seminar. A survey of gallery and museum techniques.

460-2 to 12 Research in Art Education. Students demonstrate via class presentations, term papers, and answers to written examinations knowledge of basic research techniques, findings and applications; important literature of art education; and broad research meanings. Prerequisite: 307.

461-4 Art Education for Elementary Teachers II. Follows the Art 300 sequence (a-c) in greater depth with emphasis on correlating art involvement with art history, intercultural understanding, experience with team teaching and more mature self-assigned studio experiences adaptable to the elementary art curriculum. Prerequisite: 300a and b.

466-2 to 12 Studio in Art Education. Students demonstrate via individual studio projects, term papers and class critiques understanding of individual teacher-directed self-evaluative teaching methods.

501-2 to 24 Painting II.

503-2 to 24 Drawing II.

504-2 to 24 Sculpture II. Prerequisite: consent of instructor.

511-2 to 24 Printmaking II. Prerequisite: consent of instructor.

515-2 to 24 Weaving II.

520-2 to 24 Ceramics II.

530-2 to 24 Metalsmithing II.

558-2 to 5 Readings in Art History. Individual assistance and investigation to discover new meaning and involvement in graduate studio work through the literature of art.

559-3 to 12 Problems in Art History. Group seminar to discuss and present aspects of the history of art in relation to both traditional and contemporary artistic concerns.

560-2 to 12 Seminar in Art Education. Students show evidence, via class presentations, term papers and evaluations of individual and/or group projects, of understanding important literature, developments and trends in the field of art education. Prerequisite: bachelor's degree in art education.

566-2 to 12 Research in Art Education. Students show through class presentations, term papers, surveys of research reports and formulations of research designs, understanding of advanced art education research procedures, analyses and implications. Prerequisite: bachelor's degree in art education.

Biology

There is no graduate program in biology (see Chapter 2 for Biological Sciences). Four hundred level courses in biology may be taken for graduate credit, however, unless otherwise indicated in the course description.

401-4 Ecology. Course designed to present principles and methods of present-day ecology.

Black American Studies

There is no graduate program in Black American Studies. Four hundred level courses may be taken for graduate credit, however, unless otherwise indicated in the course description.

409-8 (4,4) Black American Social Problems. Comparative study of the social problems which afflict black Americans and their consequences including crime and delinquency, mental and emotional disorders, drug addiction, housing condition, poverty and unemployment, and labor conditions. Must be taken in a,b sequence. Not for graduate credit. Prerequisite: consent of instructor.

Botany

400-5 Plant Anatomy. An introduction to cell division, development, and maturation of the structures of the vascular plants. Laboratory fee \$5. Prerequisites: 301 or consent of instructor.

404-5 The Algae. Structure, development, and relationships of the algae. Laboratory and some field work. Laboratory fee. Prerequisite: 300.

405-5 Mycology. Structure, development, and relationships of the fungi. Problems of economic and scientific interest stressed. Laboratory. Prerequisite: 300.

406-5 Industrial Mycology. A consideration of the myriad ways in which fungi impinge on man's affairs, with special emphasis upon their various industrial application—real and potential. 3 lectures and 4 laboratory hours per week. Prerequisite: 405 or consent of instructor.

410-4 The Taxonomy and Ecology of Bryophytes and Lichens. Floristic studies of the moss, liverwort, and lichen communities of southern Illinois. Prerequisite: consent of instructor.

411-4 The Bryophytes and Pteridophytes. Structure, development, and relationships of the liverworts and mosses, and the ferns and fern allies. Laboratory. Prerequisite: 301.

412-4 The Spermatophytes. Structure, development, and relationships of the gymnosperms and angiosperms. Laboratory fee. Prerequisites: 301, GSA 303.

414-5 Paleobotany. (Same as Geology 414.) An introduction to the study of fossil plants emphasizing the major features of plant evolution and the applications of paleobotany to problems in the botanical and geological sciences. Lecture, laboratory, and field trips. Student cost about \$5. Prerequisite: 301 or Geology 221.

420-4 Physiology of Fungi. A treatment of the physiological activities of fungi

with particular stress upon (1) those aspects peculiar to the group by virtue of their being nonchlorophyllous plants, and (2) an exploration of the possible explanations of the parasitic vs. the saprophytic habit. Prerequisite: consent of instructor.

425-15 (5,5,5) Advanced Plant Physiology. (a) Physics of the plant, water relations, membrane phenomena, photobiology. (b) Chemistry of the plant, anabolic and catabolic processes, photosynthesis, respiration, chemosynthesis. (c) Covers the absorption, translocation, function and interaction of inorganic nutrient elements in green plants with application to forest, agronomic, and horticultural species. Prerequisites: 320, Chemistry 305, or a chemistry minor.

428-3 Plant Nutrition. The physiological importance of carbon-, nitrogen-, and phosphorus-containing compounds is stressed. Prerequisites: organic chemistry, minor in botany or agriculture.

440-14 (4,5,5) Advanced Ecology. (a) management and ecology of grasses and grasslands, (b) physiology and autecology of forest species, (c) sampling methods and community analysis. Prerequisite: Biology 307 or consent of department.

441-4 Field Studies of the Lower Plants. Field course designed to learn the names of the macroscopic algae, fungi, lichens, and bryophytes in southern Illinois. Emphasis on distinguishing characteristics and economic importance.

442-4 Field Studies of the Higher Plants. Field course designed to learn the names of ferns, trees, and wildflowers in southern Illinois. Emphasis on distinguishing characteristics and economic importance.

446-12 Tropical Ecology. Three weeks of marine ecology on the atolls and extensive barrier reef near Belize, British Honduras, and three weeks of terrestrial ecology at several locations inland. Prerequisite: advanced undergraduate or graduate standing in one of the biological sciences.

447A-4 to 12 Botanical Field Studies in Latin America. Four to eight weeks long. Acquaints students with plants in various environments of Latin America and with methods of field study, collection, and preservation. Cost per individual will be determined by type of study and location. Prerequisite: advanced standing in one of the biological sciences and consent of instructor.

447B-4 to 12 Botanical Field Studies in the Rocky Mountains. Acquaints students with plants in various environments of the Rocky Mountain region and with methods of field study, collection, and preservation. Cost per individual approximately \$250, which includes room and board at the Yellowstone Bear-tooth Camp near Red Lodge, Montana. Prerequisite: advanced standing in one of the biological sciences and consent of instructor.

449-3 Elements of Taxonomy. Principles of taxonomic research including classical and experimental methods. 1 lecture and 4 laboratory hours per week. Field and laboratory expenses \$5. Prerequisite: GSA 303 or equivalent, or consent of instructor.

450-3 Plant Geography. World distribution of plants and plant communities related to historical, environmental, and floristic factors. Prerequisite: consent of instructor.

456-5 Plant Pathology. (Same as Plant Industries 355.) A study of plant diseases caused by fungi, bacteria, and viruses. Special attention given diseases of southern Illinois plants. Laboratory and field trips. Laboratory fee. Prerequisite: consent of instructor.

457-4 Forest Pathology. Nature and control of forest and shade tree diseases. A study of tree diseases in forests, parks, streets, and nurseries. Fungi important in decay and stain of timber and its products are included. Laboratory fee. Prerequisite: 456 or consent of instructor.

470-4 Methods of Teaching High School Biology. Methods, objectives, types of courses taught in secondary school biology. Laboratory and field trips. Prerequisite: major in botany or zoology.

484-4 Palynology. (See Geology 484).

490-6 (4,2) Photographic Methods in Scientific and Biological Photography. (a) Black and White. (b) Color. Specimen photography, photomicrography, macrophotography, infrared and ultraviolet photography. Slides for presentation, materials and methods used in scientific publications. Prerequisite: consent of instructor.

500-5 Biosystematic Plant Anatomy. Study of the taxonomic implications of developmental and positional variation of tissues and cell types within plants. Two lecture and six laboratory hours per week. Prerequisite: 400. Recommended: 412, 449.

503-20 (5,5,5,5) Advanced Angiosperm Taxonomy. Systematic treatment of all families of (a,b,c) dicotyledoneae and (d) monocotyledoneae. Prerequisite: consent of instructor.

522-5 Advanced Microtechnique. Preparation and presentation of research materials. Laboratory work only. Prerequisite: consent of department. Credit on work completed.

524-3 Advanced Plant Genetics. A consideration of incompatibility systems, paramutation, cytoplasmic inheritance, developmental genetics, and other genetic topics as they occur in higher plants. Prerequisite: Biology 305 or equivalent.

525-5 Cytology. (Same as Zoology 525.) Physiochemical, chemical, and morphological organization of the cell. Ultrastructure of the cellular organelles. Cytochemical and submicroscopical organization of the hereditary material. Morphology and function of the spindle of the nucleus and chromosomes during the mitotic cycle. Synthesis and replication of nucleic acids. RNA and protein synthesis. The genetic code. Enzymes and cell metabolism. Prerequisite: Biology 305.

526-5 Cytogenetics. Correlation of cytology with genetics. Cell mechanics and nuclear division. Mitosis, meiosis, crossing over and mapping of chromosomes. Mutation, mitotic agents, effect of irradiation, polyploidy, structural aberrations, polytene chromosomes. Synthesis of new species, comparative karyomorphology. Evolution and cytogenetics. Prerequisite: 525 or consent of instructor.

533-3 to 4 Growth and Development in Plants. External and internal factors as they effect development and growth of plants, photoperiodism, and the role of growth-promoting substances. 1 hour to be arranged. Prerequisite: 320 or consent of instructor.

535-3 Energetics of Aquatic Ecosystems. Energy flows in aquatic habitats; photosynthesis and respiration rate determinations under natural and laboratory conditions; determination of dominant genera in the communities; daily and annual energy budgets; factors influencing utilization of light by biotic systems; influence of daily and annual energy budgets on stratification on current systems, and on seasonal succession in the community. Prerequisite: consent of instructor.

542-3 Biosystematics. An examination of species concepts and factors effecting the formation of species. Evidence from the fields of genecology, cytotaxonomy, genetics, numerical taxonomy, and chromotography are discussed as well as the phenomena of hybridization, polyploidy, and apomixis. Prerequisite: Biology 305.

543-5 Experimental Ecology. Experiments on plant response to environmental factors. Design of experiments, statistical methods, presentation of individual research findings. Laboratory. Prerequisites: 320, GSA 340, or consent of instructor.

551-4 The Natural Vegetation of the Mississippi Basin, Upland. Floristic studies of the upland vegetation which occurs in the central basin of the Mississippi River. Student cost \$10. Prerequisite: GSA 303 or consent of instructor.

552-4 Mississippi Flora, Aquatic. An analysis of the aquatic vegetation of the Central Mississippi basin, discussing importance to wildlife. Student cost \$10. Prerequisite: GSA 303 or consent of instructor.

555-12 (4,4,4) Advanced Plant Pathology. (a) A study of facultative fungal parasitism with emphasis on the physiology of host-parasite interactions. (b) A study of obligate fungal parasitism with emphasis on the physiology of host-parasite interactions. (c) A study of bacterial and viral parasitism with emphasis on the physiology of host-parasite interactions and biochemistry of virus reproduction. Prerequisite: 456 or consent of instructor.

570-2 to 5 Readings.

580A-1 to 3 Seminar. Prerequisite: botany major.

580B-2 Plant Ecology Seminar. Designed to acquaint the student with classical, contemporary or controversial aspects of plant ecology. Prerequisite: GSA 340 or consent of instructor.

581-4 Advanced Systematics.

584-3 Advanced Palynology. (See Geology 584.) Prerequisite: 484.

590-2 to 4 Introduction to Research. Methods of presentation of research materials, including written reports, graphs, photographs, bibliographies. Taxonomy students learn to write keys and descriptions; Botanical Latin; nomenclature.

591-3 to 9 Research. Assignments involving research and individual problems. Prerequisite: consent of department.

599-3 to 9 Thesis. Work in the research for and presentation of a thesis. Not more than 9 hours nor fewer than 5 hours will be allowed on thesis work. Total hours in 591 and 599 cannot exceed 15 hours to be applied to the master's degree.

600-1 to 36 Dissertation. Minimum of 36 hours to be earned for the Doctor of Philosophy degree.

Business Administration

Courses in this listing require admission to the MBA program or clearance through the assistant dean for graduate study in business administration.

500-4 Research Methods and Communications. Analysis and functional applications of the communication process in the planning, design and presentation of business research data. Provision of a rationale for subsequent studies involving investigative methods. Prerequisite: enrollment in MBA program or consent of instructor.

501-4 Quantitative Methods for Decision Making. Study of the means for testing the validity and reliability of managerial conclusions. Selected areas include criteria development, value analysis, and statistical analysis, including both parametric and non-parametric applications of analysis. Prerequisite: enrollment in MBA program or consent of instructor.

502-4 Business and Society. Study of the external environment of business; social, political, legal, and ethical dimensions; conflicts of business-labor-government power groups. Social responsibilities in the formulation of a business management philosophy. Prerequisite: enrollment in MBA program or consent of instructor.

510-4 Managerial Accounting and Control. Relationship of accounting to the functions of production, finance, and distribution; emphasis is given to the usefulness of accounting in administering and controlling an enterprise. Prerequisite: enrollment in MBA program or consent of instructor.

511-4 Accounting Theory. Contemporary advanced accounting theory, including controversial issues with emphasis on net income determination and asset valuation; particular attention given to current publications of the professional and governmental agencies. Prerequisite: enrollment in MBA program or consent of instructor.

512-4 Advanced Auditing. Development of auditing theory and its implications for auditing practice; emphasis on auditing standards and concepts, pronouncements and bulletins of the American Institute of Certified Public Accountants, and current literature. Prerequisite: enrollment in MBA program or consent of instructor.

513-4 CPA and Advanced Accounting Problems. Highly technical problems not covered in undergraduate courses primarily drawn from the American Institute of Certified Public Accountants' examinations. Prerequisite: enrollment in MBA program or consent of instructor.

514-4 Controllershship. Function of controllershship in a business organization; analysis of the duties and responsibilities of a controller; contribution of a controller to effective planning, coordination, and control through accounting; case studies. Prerequisite: enrollment in MBA program or consent of instructor.

519-4 Seminar in Accounting. Discussion of current problems and theories in accounting. Prerequisite: enrollment in MBA program or consent of instructor.

521-4 Business Conditions Analysis. Intensive review of national income accounting and macro theory. Source material and analytical techniques. Student required to make detailed forecast of gross national product, industry, and a company projection. Prerequisite: enrollment in MBA program or consent of instructor.

526-4 Managerial Economics. Develops conceptual framework for business decision making with emphasis on demand, costs, prices, and profits. Credit may not be earned in both Economics 440 and this course. Prerequisite: enrollment in MBA program or consent of instructor.

530-4 Financial Management. A study of financial principles and practices with special emphasis on their relation to managerial planning and control. Prerequisite: enrollment in MBA program or consent of instructor.

531-4 Financial Policies. An evaluation of selected financial policies of cor-

porate enterprise with emphasis on capital budgeting, on the equity and current position. Prerequisite: enrollment in MBA program or consent of instructor.

532-4 Financial Institutions and Markets. The principal financial institutions and markets will be studied in relation to their contribution to the efficient operation of the individual enterprise and the total economy. Prerequisite: enrollment in MBA program or consent of instructor.

533-4 Investment Concepts. Fixed return and variable return securities, investment services, industry and issue analysis, empirical studies of groups and individual stock price movements. Prerequisite: enrollment in MBA program or consent of instructor.

539-4 Seminar in Finance. Current issues and practices in business finance. Each student will select a problem for intensive exploration and report his findings to the class. Prerequisite: enrollment in MBA program or consent of instructor.

540-4 Managerial and Organization Behavior. Case analyses of human problems in the business organization. Application of findings of behavioral science research to organizational problems. Development of direction and leadership skills. Prerequisite: enrollment in MBA program or consent of instructor.

541-4 Operations Analysis and System Controls. Study of production functions of the firm. Analyses of operational inter-relations, design of planning procedures, and the application of control systems. Prerequisite: enrollment in MBA program or consent of instructor.

542-4 History and Theory of Management. An analytical study of the background and growth of management theory from its early beginnings to the present. Emphasis will be largely on the theory and practice of business management. Prerequisite: enrollment in MBA program or consent of instructor.

543-4 Personnel Management. Review of recent developments and current trends in personnel administration based on evaluation of the present state of the literature. Prerequisite: enrollment in MBA program or consent of instructor.

544-4 Production Management. Study of the production function associated with various kinds of businesses. Concern is on the integration of production with other functions of business. Analyses with focus upon managerial problems. Prerequisite: enrollment in MBA program or consent of instructor.

549-4 Seminar in Management. Study of contemporary theory and practice and recent trends in the field of management. Individual and group research reports. Prerequisite: enrollment in MBA program or consent of instructor.

550-4 Marketing Management. A managerial approach in the determination of policies employed in solving problems in marketing. Prerequisite: enrollment in MBA program or consent of instructor.

551-4 Product Strategy and Management. Product management and its relationships with business policies and procedures; the development of multi-product strategies, means of developing such strategies, and the problems and methods of commercialization. Prerequisite: enrollment in MBA program or consent of instructor.

552-4 Advanced Marketing Analysis. The development of advanced procedures, methods and theory of quantitative and qualitative analysis of primary and secondary marketing data. Prerequisite: enrollment in MBA program or consent of instructor.

553-4 Logistics Management. The planning, operation, organization, and management of the logistics system of the firm. Topics: transportation and location as elements of the system, inventories and service as constraints upon the system. Prerequisite: enrollment in MBA programs or consent of instructor.

554-4 Marketing Theory. Emphasis on evaluation of the role of theory in explaining and understanding the marketing function. Theory in related disciplines considered in regard to evolving marketing theory. Prerequisite: enrollment in MBA program or consent of instructor.

555-4 Consumer Behavior. Emphasis on theories and experimental techniques drawn from the behavioral sciences. Prerequisite: enrollment in MBA program or consent of instructor.

559-4 Seminar in Marketing. Students select and defend, on an individual basis, problems in marketing theory, research, and policy. May be repeated once with consent of department. Prerequisite: enrollment in MBA program or consent of instructor.

580-4 International Business Operations. International dimensions of a firm's operations. Alternative methods for reaching foreign markets, operational adjustments, and specific problems in dealing with foreign environments. Prerequisite: enrollment in MBA program or consent of instructor.

590-4 Independent Study. Directed independent study in selected areas of business administration. Prerequisite: enrollment in MBA program or consent of instructor.

598-4 Business Policies. A decision-making frame of reference for application of functional and tool area courses to business cases. Analysis of external and internal environmental constraints on business policy formulation and administration. Prerequisite: enrollment in MBA program or consent of instructor.

599-4 to 8 Thesis. Prerequisite: enrollment in MBA program or consent of instructor.

ACCOUNTANCY

There is no graduate degree program offered through the Department of Accountancy. Four hundred level courses in this department may be taken for graduate credit, however, unless otherwise indicated in the course description.

410-4 Accounting Concepts. Interpretation and critical analysis of reports, statements, and other accounting data from the viewpoint of users of financial information. Restricted to graduate students.

432-4 Problems in Federal Taxation. Study of income tax problems which arise from partnership, corporation, estate, and trust types of organization. Brief study of social security, federal estate, and gift taxes. Student does research in source materials in arriving at solutions of complicated tax problems. Prerequisite: 331.

442-4 Advanced Cost Accounting. Managerial decision-making, profit planning and control through direct and relevant costing, nonmanufacturing costs, return on investment and transfer pricing, capital budgeting, inventory models, subjective probabilities, statistical methods, and operations research. Prerequisite: 341.

453-4 Advanced Accounting. Accounting principles and procedures relating to specialized topics, including partnership equity, installment and consignment sales, fiduciaries, international operations, branches, and business combinations. Prerequisite: 351b.

455-4 Accounting for Public Organizations. Financial and managerial accounting concepts peculiar to the planning and administration of public and quasi-public organizations, such as governmental units, institutions, and charitable organizations. Includes the conventional budgetary-appropriation prices, as well as some of the more recent accounting developments related to public decision making. Prerequisite: 251b or equivalent.

456-4 Auditing. Objectives, standards, and procedures involved in examining and reporting on financial statements of business organizations. Prerequisite: 341 and 351b.

458-4 Accounting Systems. Accounting systems, design, and installation. Examination of existing systems and practice in systems design. Designing reports for management. Prerequisite: 341, 351b.

459-4 Internship in Accounting. Supervised work experience in professional accounting. Prerequisite: outstanding record in accounting and approval of department and firm. Mandatory Pass/Fail.

475-4 Budgeting and Systems. Concepts, methods, and tools used in the design of management information systems. Techniques developed to identify problems in coordinating and controlling business activities. Prerequisite: 251b.

477-4 Current Developments in Accounting Theory. Critical analysis of current developments in accounting theory, especially as reflected in the publications of major accounting association. Prerequisite: 351b and consent of instructor.

ADMINISTRATIVE SCIENCES

There is no graduate program offered through the Department of Administrative Sciences. Four hundred level courses in this department may be

taken for graduate credit, however, unless otherwise indicated in the course description.

402-1 Personal Adjustment to Business. The job placement process and the work environment from the viewpoint of the applicant. Emphasis on career planning, manpower analysis, placement and interviewing techniques with a stress on the transition from the academic community to the business and professional environment. Not offered for graduate credit. Prerequisite: senior standing.

431-4 Organizational Behavior II. A study of classical and modern theories concerning complex organizations. Particular emphasis on processes and issues of dividing work, achieving coordination, and organizational change and adaptation. Prerequisite: 341, or consent of instructor.

440-4 The Management Process. Analysis of management theories and the administrative process. Specific managerial activities are analyzed and discussed. Functional relationships in administered organizations are explored. Restricted to graduate students who have not taken 340 or equivalent.

452-4 Business Operations Analysis. Analysis of business operations and management problems emphasizing problem formulation, performance measures, decision criteria and various mathematical models and their application; linear programming, game theory. Prerequisite: 340; Mathematics 140a, or equivalent; GSD 110 or equivalent; or consent of instructor.

456-4 Management Information Systems. Organizational activities and informational requirements of management viewed as systems modeled for systematic investigation leading to effective management and decision making. Representative management systems studied, charted, and manipulated. Prerequisite: 340, 345, 452.

460-4 Work Measurement For Wage and Salary Control. Research design and methodology for wage and salary administration in an organization; fundamental considerations in evaluating jobs and positions; compensation methods and wage incentive systems. Prerequisite: 385.

474-4 Management Responsibility in Society. Analysis of the political, social, and economic environments in which the manager must function and the manner in which the executive has both adapted to and influenced his environment. Prerequisite: 340, senior standing, or consent of instructor.

479-4 Problems in Business and Economics. (Same as Economics 479.) Applications of economic theory and tools of analysis to practical business problems. Cost and demand functions are analyzed from a policy standpoint. Prerequisite: 340; Economics 215, 308, or equivalent; Marketing 301 or equivalent; senior standing; or consent of instructor.

480-4 Recent Problems in Labor Law. Social, economic, and legal evaluation of recent labor problems, court decisions, and legislation. Concern is on long-run legislative impact on manpower planning, dispute settlement, and utilization of employment resources. Prerequisite: 385 or consent of instructor.

481-4 Administrative Policy. Integration and analytical application of business core courses to comprehensive business cases. Emphasis on policy issues in the identification and resolution of business problems. Methods of providing simulated experience such as business gaming will be used where appropriate. Prerequisite: 340, Finance 320, Marketing 301, or equivalent.

483-4 Advanced Production Management. Internal problems of managerial control of production including recent developments in theory and techniques: case material will be utilized for the development of analytical ability. Prerequisite: 380.

485-4 Problems in Personnel Management. Analysis of problems in personnel administration arising from the current developments in organization. Included are case problems, special reports, and personnel practices. Prerequisite: 361, 385.

499-1 to 8 Special Topics in Management. Utilizes special faculty resources. Prerequisite: 16 hours in business and consent of chairman.

FINANCE

There is no graduate program offered through the Department of Finance. Four hundred level courses may be taken for graduate credit, however, unless otherwise indicated in the course description.

421-4 Management of Business Finance. The principal problems of managing

the financial operation of an enterprise. Emphasis upon analysis and solutions of problems pertaining to policy decisions. Prerequisite: 320.

422-4 Advanced Financial Management. The development of ability to use sophisticated analytical tools by the discussion of case situations dealing primarily with capitalization, return on investment, and cost of capital. Prerequisite: 421.

430-4 Business Finance. An introductory course combining both a description of the structure of business financing and an analysis of functional finance from a managerial viewpoint. Restricted to graduate students.

473-4 Government Regulation of Business. Social and economic assessment of environmental factors influencing business policies and strategies. Emphasis is placed on legislation affecting competition and allocation of the firm's products and resources. Prerequisite: senior standing.

475-4 Forecasting and Budgeting. Methods and problems associated with the development of data used in planning financial activities. Prerequisite: 320.

480-4 International Financial Management. Financial behavior of multinational firms. Emphasis on the modifications of conventional financial models to incorporate uniquely foreign variables. Prerequisite: 320 and Economics 315.

MARKETING

There is no graduate program offered through the Department of Marketing. Four hundred level courses may be taken for graduate credit, however, unless otherwise indicated in the course description.

401-4 Retail Management. Designed to present the basic principles and decision areas such as location, layout, organization, personnel, merchandise control, sales promotion, advertising, etc., of retail merchandising through a managerial perspective. Prerequisite: 301.

438-4 Sales Management. Developing and training a sales force. The different types of sales forces. Managing sales functions: determining salesmen's territories, quotas, compensation. Budget preparation. Development and implementing the merchandise plan. Prerequisite: 363.

439-4 Industrial Marketing. Designed to give an over-all view of the field of Industrial Marketing. Additional emphasis to be placed on decision criteria. Prerequisite: 363.

450-4 Introduction to Managerial Marketing. Designed to give an over-all view of the field of marketing and the field of marketing policy decisions. Cases are used to illustrate theory covered. Prerequisite: Restricted to graduate students.

452-4 Physical Distribution Management. Integration of physical distribution activities of the firm into a system. Transportation and location as elements of the system. Inventories and service as constraints upon the system. Planning, operation, organization, and management of the system. Prerequisite: 301, Economics 215.

463-4 Advertising Management. A study of advertising from the viewpoint of business management. Problems of integrating advertising into marketing programs and related advertising issues are emphasized. Prerequisite: 363 and 390.

493-4 Marketing Policies. A comprehensive and integrative view of marketing policy formulation. Marketing decisions analyzed and discussed. Prerequisite: 363, 390, and 4 additional hours in marketing.

499-4 Undergraduate Seminar in Marketing. Aspects and issues in the field of marketing. Seniors of high academic standing only. Prerequisite: by invitation, 16 hours of marketing.

Chemistry and Biochemistry

All laboratory courses in chemistry and biochemistry require the student to purchase either special notebooks or workbooks, costing within the range of \$1.00 to \$6.00.

411-4 Intermediate Inorganic Chemistry. Modern inorganic chemistry involving atomic structure, chemical bonds, complexes, and chelate structures; chemistry of familiar and less familiar elements. 4 lecture hours per week. Prerequisite: 461c or 460 with consent of instructor.

412-3 Inorganic Preparations. A study of several important inorganic syntheses. 1 lecture and 6 laboratory hours per week. Prerequisites: 122c, 123c, 305c or 342c and 343c.

416-4 X-Ray Crystallography. (See Geology 416.) Prerequisite: Chemistry 122b, 123b, one year of college physics and Mathematics 150b.

432-8 (4,4) Instrumental Analytical Measurements. Theory and practice of instrumental analytical measurements, including spectrophotometric, electro-analytical, and chromatographic methods. 2 lecture and 6 laboratory hours per week. May be taken in either sequence. Corequisite: 461b.

433-3 Intermediate Quantitative Analysis. A study of the analysis of complex materials, with emphasis on separations, functional group analysis, and instrumental applications. 2 lecture and 3 laboratory hours per week. Prerequisites: 432a or b and 461c.

438-3 Review of Analytical Chemistry. A review in depth of current analytical practices in research and industry, including fundamental equilibria, separations, and modern instrumental techniques; designed to update graduate students who are deficient in these areas. Prerequisite. Chemistry 433 or equivalent.

446-4 Qualitative Organic Analysis. A systematic study of the separation and identification of organic compounds. 2 lecture and 6 laboratory hours per week. Prerequisite: 122c, 123c, 342c, 343c, or consent of instructor.

450-4 Survey of Biochemistry. Function and metabolism of amino acids, proteins, enzymes, carbohydrates, lipids, and nucleic acids. For preprofessional students, chemistry majors, and others with a one-year course in organic chemistry. Three lecture and three laboratory hours per week. Not offered for graduate credit. Prerequisite: 305c or 342c and 343c.

451-9 (3,3,3) Biochemistry. (a) Chemistry and functions of amino acids, proteins, and enzymes. (b) Carbohydrate chemistry, function, and metabolism; biochemical energetics; citric acid cycle; oxydative phosphorylation. (c) Photosynthesis; lipid chemistry, function, and metabolism; nitrogen metabolism; nucleic acid and protein biosynthesis; metabolic regulation. Prerequisite: 122c, 123c, and 305c or 342c and 343c.

455-8 (4,4) Biochemistry Laboratory. Modern biochemical laboratory techniques. (a) Isolation, purification, and characterization of constituents of living cells. (b) Investigations of pathways, kinetics, energetics, and regulatory mechanisms related to metabolism and enzymic activity. One lecture and 8 laboratory hours per week. Prerequisite: concurrent enrollment in 451b and c.

460-5 Principles of Physical Chemistry. A one-term course in physical chemistry designed especially for non-chemistry majors including prospective teachers of high school chemistry. Three hours of lecture and six hours laboratory per week, one hour of which will be used for special instruction. Prerequisite: 122c, 123c, and 305c or 342c and 343c, Mathematics 150b, and one year of physics or consent of department.

461-12 (4,4,4) Physical Chemistry. A fundamental course in physical chemistry. 3 lecture and 3 laboratory hours per week. Must be taken in a,b,c sequence. Prerequisite: 122c and 123c, 12 hours of physics, and Mathematics 252b.

464-3 Introduction to Quantum Chemistry. Quantum chemistry as applied to atoms and molecules. Three lecture hours per week. Prerequisite: 461c or consent of instructor.

468-4 Elements of Physical Chemistry. Open only to graduate students in chemistry whose diagnostic examinations indicate a need for this course, and to qualified non-chemistry majors. Prerequisites: twelve hours of physics, one year of calculus, and at least one year of chemistry.

471-3 Industrial Chemistry. A survey of modern industrial chemistry and an introduction to chemical research processes. 3 lecture hours per week. Prerequisite: 305c or 342c and 343c.

472-12 (4,4,4) X-Ray Crystallography. (Same as Engineering 402.) Prerequisite: 461b.

490-2 Chemical Literature. A description of the various sources of chemical information and the techniques for carrying out literature searches. 2 lecture hours per week. Prerequisites: 122c, 123c, and 305c or 342c and 343c, reading knowledge of German or consent of instructor.

496-1 to 12 Chemical Problems. Investigation of individual problems under the direction of a staff member. Prerequisite: consent of instructor and department chairman.

504-3 Mechanisms and Syntheses in Organic Chemistry. Examination of the

fundamental mechanisms and syntheses of organic chemistry. Prerequisite: 342c and 343c.

511-9 (3,3,3) Advanced Inorganic Chemistry. Lecture. (a) A theoretical and empirical treatment of chemical bonding and molecular structure. (b,c) Systematic treatment of physical-inorganic chemistry based on the principles learned in (a). The b,c sequence is not mandatory. Prerequisite: 461c.

519-2 to 30 (2 to 6 per quarter) Advanced Topics in Inorganic Chemistry. Selected topics such as kinetics of inorganic reactions, stereochemistry of inorganic systems, chemistry of coordination compounds, nonaqueous solvent systems, and others. Prerequisites: 511a and consent of instructor.

531-3 Theory of Quantative Analysis. The phenomena utilized in analytical chemistry with emphasis on separation, organic reagents, and complex methods. Lecture. Prerequisite: 433 or satisfactory field examination.

532-3 Instrumental Methods of Analysis. Theory and practice of instrumental measurements in analysis with emphasis on commercial samples and applications to research. Lecture and laboratory. Prerequisite: 432 or satisfactory field examination.

539-2 to 30 (2 to 6 per quarter) Advanced Topics in Analytical Chemistry. Selected topics such as microanalytical chemistry, absorption spectroscopy, and electroanalytic chemistry. Prerequisite: 432 and 531.

541-3 Advanced Organic Chemistry. An advanced course covering covalent bonding, structure, stereochemistry, reactions, reaction mechanisms, substituent effects, correlation of physical and chemical properties, and physical methods in organic chemistry. Lecture. Prerequisite: 504 or field examination.

542-3 Advanced Organic Chemistry. Continuation of Chemistry 541. Lecture. Prerequisite: 541.

543-3 Advanced Organic Chemistry. Continuation of Chemistry 542. Prerequisite: 542.

547-3 to 6 Advanced Laboratory Preparations in Organic Chemistry. Prerequisites: 446 and consent of instructor.

549-2 to 30 (2 to 6 per quarter) Advanced Topics in Organic Chemistry. Specialized topics in organic chemistry. The topic to be covered is announced by the department. Prerequisite: 543.

552-3 Carbohydrate Chemistry. Simple sugars, oligosaccharides, and polysaccharides. Three lecture hours per week. Prerequisite: 451c.

553-3 Plant Biochemistry. Three lecture hours per week. Prerequisite: 451c.

554-3 Biochemical Mechanisms. Molecular transformations in biochemistry in terms of general mechanistic principles in chemistry. 3 lecture hours per week. Prerequisite: 451c.

556-9 (3,3,3) Advanced Biochemistry. Protein and nucleic acid chemistry with emphasis on structure and function. Three lecture hours per week. Prerequisite: 451c.

559-2 to 30 (2 to 6 per quarter) Advanced Topics in Biochemistry. Selected topics such as enzymology and physical biochemistry. Prerequisite: 551.

561-3 Chemical Thermodynamics. Basic methods and theories as applied to chemical problems. Lecture. Prerequisites: 461c or consent of instructor.

562-6 (3,3) Quantum Chemistry. Basic Principles. Lecture. Prerequisite: 464 or consent of instructor.

563-3 Chemical Dynamics. Experimental description and classical theories of the rate of chemical reactions; kinetic theory of non-uniform gases and its application to reacting systems; molecular beam techniques. Lecture. Prerequisite: 461c.

564-3 Statistical Thermodynamics. Elements of statistical mechanics and application to relatively simple systems. Alternates with 563. Prerequisite: 562 or consent of instructor.

569-2 to 30 (2 to 6 per quarter) Advanced Topics in Physical Chemistry. Colloids and macromolecules, quantum chemistry of atoms, diatomic molecules or polyatomic molecules, statistical mechanics and others. Prerequisite: 561.

594-1 to 15 (1 to 6 per quarter) Special Readings in Chemistry. Assigned library work in any of the five fields of chemistry with individual instruction by a staff member. (a) Analytical. (b) Biochemistry. (c) Inorganic. (d) Organic. (e) Physical. Prerequisites: 24 hours of 500-level chemistry and consent of division.

595-0 to 9 Advanced Seminar in Chemistry. Advanced level talks presented by graduate students; (a) analytical, (b) biochemistry, (c) inorganic, (d) organic, and (e) physical chemistry. Prerequisite: 24 hours 500-level chemistry and consent of division.

598-1 to 48 Research. (Graded S/U.) Prerequisite: consent of chairman.

599-1 to 9 Thesis. Prerequisite: consent of chairman.

600-3 to 48 Dissertation—Doctoral. Prerequisite: admission to Ph.D. candidacy.

Child and Family

Graduate work in the Department of Child and Family is offered toward a concentration for the M.S. degree in home economics.

408-2 to 12 Workshop. Designed to aid workers in professions related to child and family. Emphasis for the workshop will be stated in the announcement of the course.

445-4 Administration of Pre-School Programs. Planning and organizing programs for preschool or residential facilities including budgeting, staffing, programming and evaluation. Prerequisite: 345a and 345b or consent of instructor.

456-4 Infant Development. Current theories and knowledge concerning growth and development of infants with related laboratory and field experiences. Prerequisite: 237 or Psychology 301 or equivalent.

466-4 Practicum in Parent-Child Study. Designed to increase student's ability to work with parents and parent groups through an awareness of factors in the parent-child relationship and knowledge of current research and methods in parent education. Integration with infant and child development laboratories and related field experience. Prerequisites: 227, 237 or equivalent.

471-2 to 6 Field Experience. Supervised learning experiences in community nursery schools and public agencies. Prerequisite: consent of instructor.

481-2 to 6 Readings. Child development and family living readings under staff supervision. Prerequisite: consent of instructor and chairman.

490-4 Introduction to Marriage and Family Counseling. Problems and techniques of premarital, marital, divorce, family, and family crisis counseling. Counseling individuals singly, in family units, and in groups. Prerequisite: 227 or equivalent and consent of instructor.

500-4 Research Methods. The study of principles of research design and basic techniques in child and family research. Prerequisite: Guidance 505, Mathematics 420 or consent of instructor.

556-4 The Pre-School Child. Growth of the child from birth to six years with emphasis on the various aspects of growth and their inter-relationships.

562-4 Child Development through Home and School. The normal, healthy development of children as it takes place in the home and is promoted by the curriculum and other school activities.

566-4 Interpersonal Relationships within the Family. A study of factors that promote satisfactions within the immediate family; planning and preparing teaching units, and source materials in this field.

571-4 Recent Research. Review of selected research in areas of child and family.

572-2 to 8 Special Problems. For qualified students who need to pursue certain topics further than regularly titled courses permit. Prerequisite: consent of chairman.

599-2 to 9 Thesis. Minimum of 5 hours counted toward a master's degree.

Cinema and Photography

There is no graduate degree program offered through the Department of Cinema and Photography. Four hundred level courses in this department may be taken for graduate credit, however, unless otherwise indicated in the course description.

Students who take courses in the Department of Cinema and Photography supply their own film, photographic paper and certain specialized chemicals for still photography production courses, and film, processing, recording materials and editing supplies for motion picture production courses. In courses which involve analysis and screening a number of films, a \$5.00 screening fee is assessed. For some courses supplementary textbooks are required.

403-4 Studio Portraiture. Theory and practice of formal studio portrait photography. Prerequisite: 322 and consent of department.

- 404-4 Environmental Portraiture.** Theory and practice of formal and informal portraiture outside the studio. Prerequisite: 322.
- 405-4 Commercial Photography.** Study and use of studio lighting techniques for commercial photography. Prerequisite: 322 and consent of department.
- 406-4 Advanced Commercial Photography.** Assignments in areas of commercial photography in black and white and color. Prerequisite: 405.
- 407-4 Publications Photography.** Photographic news reporting with emphasis on single pictures and short picture stories. Prerequisite: 322.
- 408-4 Advanced Publications Photography.** Production of picture essays including research, lay-out, captions, and text. Black-and-white and color. Prerequisite: 407.
- 409-4 Picture Editing.** Picture usage and layout and methods of photographic reproduction for the mass media.
- 415-4 Technical and Scientific Photography.** Introduction to photographic methods used in science and research. Prerequisite: 322.
- 418-4 Documentary Photography.** Methods, approaches, and work in documentary photography. Prerequisite: 322.
- 420-4 Experimental Photography.** Experimental approaches to the creation of photographic images. Prerequisite: 322.
- 421-4 to 8 Personal Photographic Expression.** Development of personal vision in photography. Usually taken 4,4. Prerequisite: 322 and consent of department.
- 422-4 Advanced Color Photography.** Study and production of color photographs. Emphasis on experimental techniques. Prerequisite: 322.
- 450-4 Film and Society.** Major social issues associated with the cinema. Examination of attempts to regulate and control the medium. Prerequisite: 350 and consent of department.
- 456-1 to 6 Workshop in Film Production.** Crew work on university film productions. Prerequisite: consent of department and film production.
- 457-4 Mixed Media Production.** Multi-media theory. Creation and coordination of presentations involving visual and aural media. Prerequisite: 322 or 357 and consent of department.
- 458-1 to 12 Projects in Cinema and Photography.** Individual or crew projects in motion picture production or still photography. Usually taken 4,4,4. Prerequisite: consent of department.
- 460-4 History of the Silent Film.** Emphasis on the theatrical film to 1929. Screening fee. Prerequisite: 350 for cinema and photography majors.
- 461-4 History of the Sound Film.** Theatrical film from early sound experimentation to the present. Screening fee. Prerequisite: 350 for cinema and photography majors.
- 462-4 History of the Documentary Film.** The development of the documentary film as illustrated by the work of representative film makers. Screening fee. Prerequisite: 350 for cinema and photography majors.
- 463-4 History of the Experimental Film.** Survey of experimentation in cinema from the turn of the century, through the avant-garde periods, to contemporary independent films. Screening fee. Prerequisite: 350 for cinema and photography majors.
- 470-4 Special Cinematic Forms.** Innovation in technique and content in animated, advertising, and experimental films. Production of short innovative films. Prerequisite: 357 or equivalent and consent of department.
- 480-1 to 12 Individual Study in Cinema and Photography.** Research in history, theory, or aesthetics. Usually taken 4 per quarter. Prerequisite: consent of department.
- 490-4 Senior Thesis.** Preparation of a portfolio, film, research or critical paper under the supervision of a Cinema and Photography faculty member. Normally taken during the last quarter in residence, the senior thesis is evaluated by the departmental faculty, and is required of all majors. (Not for graduate credit) Prerequisite: consent of department. Mandatory Pass/Fail.

Clothing and Textiles

Graduate work in the Department of Clothing and Textiles is offered toward a major concentration for the M.S. degree in home economics.

Students will be required to purchase additional supplies for some clothing and textiles courses.

432-2 to 8 Workshop. Discussion and analysis of current topics in clothing and textiles. Emphasis stated in announcement. Prerequisite: 8 hours in clothing and textiles.

433-4 Custom Clothing Production. Flat pattern and draping approaches to evolve patterns for various designs, figure types and fabrics; fitting; and custom finishes. Emphasis on work for custom business. Prerequisite: 333 and 364.

434-4 History of Clothing. Development of clothing in western civilization to the present time. Consideration of social, economic and esthetic factors and technical innovations influencing clothing. Prerequisite 329.

435-4 Industrial Clothing Production. Design of a line to specifications; drafting; toiles; mass-production costs; work flow; use of industrial equipment. Field trip required. Prerequisite: 333 and 364.

470-3 Seminar. Topics considered at level of design room, research laboratory, mill, store, and consumer. Prerequisite: consent of chairman.

473-4 Advanced Tailoring. Concepts developed during fitting and tailoring of male or female garments. Organization of work and time management. Prerequisite: 360 or proficiency.

474-4 Advanced Textiles. The physical and chemical analysis of textiles. Problems dealing with economic and industrial developments, standards, labeling, and legislation. Current literature of developments in the field. Prerequisites: 304 or equivalent.

481-1 to 6 Readings. Supervised study of clothing and textiles literature in area of special interest. Prerequisite: senior standing.

500-4 Research Methods. Study of methods of research in clothing and textiles. Critique of published literature and theses. Development of research design. Prerequisite: statistics.

570-6 (3,3) Seminar. Individual preparation and presentation of topics related to clothing or textiles. Prerequisite: consent of chairman.

572-1 to 8 Special Problems. Independent study for qualified students. Prerequisite: consent of chairman.

582-4 Foundations of Fashion. Anthropological approaches to fashion and socio-economic and psychological forces as determinants of fashion in modern times. Prerequisites: 329 and 339, or consent of chairman.

583-3 (1,1,1) College Teaching of Clothing, Textiles. Central ideas, objectives, and current practices. For preparation of college teachers.

599-1 to 9 Thesis. Minimum of 5 hours to be counted toward a master's degree.

Community Development

401-4 Introduction to Community Development. This survey includes an analysis of the history, values, and techniques of various approaches to community development and explores some of the specific social issues and problems which confront community development practitioners. Prerequisite: 4 hours of sociology or consent of instructor.

402-4 Comparative Community Development. Surveys the historic, economic, organizational, and other aspects of international community development programs under the auspices of world and regional agencies, or of multi-national, national, or local sponsorship, focusing primarily upon specific case studies. Prerequisite: 401, 4 hours sociology, or consent of instructor.

490-1 to 8 Seminar in Community Development. The identification and analysis of special problems in community development. Prerequisite: 401.

499-1 to 5 Independent Study in Community Development. Supervised study and projects in fitting with the needs of each student. Prerequisite: consent of instructor.

501-4 Small Group Process in Community Development. Review of the literature on small groups and the techniques of working with them. Examines small group processes, ranging from informal personal interaction to formal problem-solving and decision making. Special attention given to problems of communication and to the concept of role. Prerequisite: 401, consent of instructor.

502-4 Community and Change. Classical and modern theories of social change and their relevance and applicability to development problems. Helps students select and adapt these theories to a variety of situations both in this country and abroad. Prerequisite: 401, consent of instructor.

503-4 Problems and Approaches to Community Development. Focuses upon a range of CD problems and models and deals with selected skills necessary to the CD technician. Prerequisite: 401, consent of instructor.

511-4 Laboratory in Small Group Process. Application of CD as a problem-solving method in a small group situation. Problems of establishing goals and reaching them, and problems of power, resources, and decision-making are dealt with in a group setting. Prerequisite: 401, 501, or consent of instructor.

512-4 The Change Agent in Planned Change. Laboratory to parallel the substantive-theoretical content of 502. Utilizes case study, role playing, and participant observation approaches to explore, in depth, relations between theory and practice in the actual processes of community change. Prerequisite: 401 or consent of instructor.

513-4 Laboratory in Consulting Styles and Techniques. Emphasis upon the CD practitioner and how he works. Field consultants, community workers and organizers, and persons skilled in distinctive approaches to CD are brought into the classroom. Students also observe practitioners in the field and, as individuals or teams, participate in community change projects. Prerequisite: 401, 503, and consent of instructor.

596-1 to 8 Independent Study in Community Development. Independent study under the supervision of a faculty member in the Community Development Institute or work on a terminal research paper or advanced field project. Prerequisite: 401, consent of instructor.

598-4 Research Seminar in Community Development. Helps students planning individual field research projects, especially terminal research projects or master's theses. Prerequisite: 401, or consent of instructor.

599-1 to 8 Thesis Research. Credit is given for a master's thesis when it is accepted and approved by the thesis committee. Prerequisite: 401, 501, 502, 503, 511, and 598.

Computer Science

403-3 Data Structures. Data, strings, stacks, arrays, lists, trees, storage systems and structures, searching and sorting, and list and string processing languages. Prerequisite: 302a.

411-3 Structure of Programming Languages. Introduction to the formal definition of a language. Representation and evaluation of arithmetic expressions. Extensive analysis of the structure of an algorithmic language. Prerequisite: 302a.

414-3 Systems Programming I. Interpretive systems, assemblers, loaders, compilers. Addressing techniques, program segmentation, and linkage. Explicit input-output references. Batch processing systems. Time sharing, multiprogramming, and multiprocessor systems. Prerequisite: 403.

442-3 Discrete Structures. (Same as Mathematics 428.) Review of sets, functions, and relations. Algebraic structures including semi-groups, groups, and Boolean algebras. Subalgebras, congruence relations, homomorphisms, and direct products. Elements of graph theory. Applications to various areas of computer science. Prerequisite: Mathematics 301.

445-3 Applied Boolean Algebra. (Same as Mathematics 429.) Applications to switching circuits and propositional logic. Circuit simplification, logical circuits, and sequential circuits. Prerequisite: 442.

451-3 Introduction to the Theory of Computation. (Same as Mathematics 451.) Automata, their behavior and basic properties. Turing machines. Examples and applications to computing functions and recognizing sets. The concept of an algorithm. Definition and examples of formal grammars. Prerequisite: 442 and either 445 or consent of instructor.

461-6 (3,3) Numerical Calculus. Algorithms for the solution of numerical problems encountered in scientific research work. Emphasis on the use of high speed, digital computers. Elementary discussion of error, polynomial interpolation, quadrature, solution of nonlinear equations and linear systems, matrix calculations, solution of differential equations. May not be taken for credit by graduate students in computer science or mathematics. Students may not receive credit for both 461 and 464. Must be taken in a,b sequence. Prerequisites: 202, Mathematics 305a, and 221.

464-6 (3,3) Numerical Analysis I. (Same as Mathematics 475.) Theory and practice of computation. Emphasis on methods useful with high speed digital

computers. Solution of nonlinear equations, interpolation and approximation, numerical differentiation and integration, solution of differential equations, matrix calculations and the solution of systems of linear equations. Students may not receive credit for both 461 and 464. Must be taken in a,b sequence. Prerequisite: 202, Mathematics 305a and 221.

470-4 Theory of Simulation. Methodology, including generation of random numbers and design of experiments. Discrete and continuous models for stochastic processes. Simulation languages. Emphasis on the use of the computer in constructing simulation models. Prerequisites: 202 and either Mathematics 150b or 140b.

472-3 Introduction to Mathematical Programming. (Same as Mathematics 472.) Theory of linear programming, game theory, dynamic programming. Prerequisite: Mathematics 221 or 321.

495-1 to 9 Readings. Supervised readings. Prerequisites: consent of instructor and department.

514-3 Systems Programming II. File system organization and management. Process and data modules. Remote and hierarchical job control. Characteristics of large systems. Command languages and interpreters. Commands of a multiprogramming system. Microprogramming. Prerequisite: 414.

516-6 (3,3) Compiler Construction. Review of grammars and languages. Structure of algorithmic languages. Syntactical description, algorithms for translation, string manipulation, formula manipulation. Storage allocation. Organization of a simple complete compiler. Automated compiler design and bootstrapping techniques. Machine independent compilers. Optimization techniques. Prerequisite: 403 and 411.

518-3 Large-scale Information Processing Systems. Data organization and storage structure techniques. Designing best systems by organizing files and segmenting problems into computer programs to make efficient use of hardware devices. Documentation methods and techniques for modifying systems. Prerequisite: 414.

531-3 Information Structure and Retrieval Systems. Natural language processing on digital computers. Structure of semiformal languages and models for the representation of structured information. Semiautomatic and automatic retrieval systems. Evaluation of retrieval effectiveness. Prerequisite: 403.

536-3 Artificial Intelligence and Heuristic Programming. Selected topics from heuristic methods, problem-solving, game-playing, theorem-proving, pattern recognition, learning and adaptive systems, and simulation of natural systems. Prerequisite: 403.

551-3 Automata Theory. (Same as Mathematics 528.) Finite automata, decision problems, regular sets, and derivatives and star heights of regular expressions. Algebraic analysis of automata. Emphasis on semigroup and decomposition theory. Probabilistic automata. Prerequisite: 451.

554-3 Formal Languages. (Same as Mathematics 527.) Grammars including regular, context-free, context-sensitive, and type 0 phrase structure. Normal forms, restricted grammars, post productions. The relation between grammars and abstract machines. Decision problems of formal languages. Prerequisite: 451.

557-3 Theory of Computability. (Same as Mathematics 529.) Turing machines and recursive functions. Church's thesis. Solvable and unsolvable problems including the halting problem. Recursively enumerable sets. Complexity classification. Prerequisite: 451 or consent of instructor.

564-6 (3,3) Numerical Analysis II. (Same as Mathematics 572) Mathematical and computer-oriented treatment of numerical problems in linear algebra and the solution of ordinary and partial differential equations, integral equations, and boundary value problems. Prerequisite: consent of instructor.

590-1 to 18 Special Topics. Advanced topics from the various fields of computer science. Prerequisite: consent of the instructor.

593-1 to 9 Seminar. Supervised study. Preparation and presentation of reports. Prerequisite: consent of instructor.

595-1 to 9 Readings. Supervised readings. Prerequisites: consent of instructor and department.

597-1 to 9 Special Problems. Individual projects. Prerequisite: consent of department.

599-1 to 9 Thesis. Minimum of 5 hours counted toward a master's degree. Prerequisite: consent of department.

Design

420-2 Portfolio and Display Techniques. Assist the student in planning and preparing a portfolio and resume for approaching his segment of the job market. (Offered for undergraduate credit only.) Prerequisite: Senior standing in Design or consent of instructor, and undergraduate status.

430-4 to 8 Advanced Visual Communication. Advanced work in visual design, with emphasis on creative research, and experimental design solutions to two- and three-dimensional communication problems. (Offered for undergraduate credit only.) Prerequisite: 335 or consent of instructor and undergraduate status.

435-24 (8,8,8) Human Communications Design Lab. Exploration and visual design as applied to various mediums of communication. (Offered for undergraduate credit only.) Prerequisite: design major or consent of instructor and undergraduate status.

445-24 (8,8,8) Computer Graphics Lab. Creative utilization of existing computer programs; designing graphic qualities in the final output and learning to direct resources economically toward a successful end product, i.e., plots, documents, slides, film, etc. (Offered for undergraduate credit only.) Prerequisite: 335, 340 or 341 or consent of instructor and undergraduate status.

450-4 Further Structural Studies. Further studies of ideas introduced in Design 350 and Design 351. Offered for undergraduate credit only. Prerequisite: consent of instructor and undergraduate status.

462-24 (8,8,8) Design and Environment. Practical experience through projects in cooperation with outside organizations. Analysis of a problem; develop, communicate and implement solutions. Need not be taken in sequence. Offered for undergraduate credit only. Prerequisite: design major or consent of instructor and undergraduate status.

464-24 (8,8,8) Human Settlement-Practice of Design. Using the theoretical criteria already developed, to study and propose design outlines to future patterns of human settlement. Offered for undergraduate credit only. Prerequisite: 354 and undergraduate status.

485-24 (8,8,8) Design Science Lab. Procedural methodology and systems approach to comprehensive design science. Offered for undergraduate credit only. Prerequisite: senior standing in design or consent of instructor and undergraduate status.

491-4 to 24 Senior Seminar in Design. Special projects in design developed with adjunct and visiting professors. Offered for undergraduate credit only. Prerequisite: consent of department and undergraduate status.

496-4 to 12 Special Problems in Design. Independent design project developed by student in conjunction with faculty sponsor and approved by department chairman. Offered for undergraduate credit only. Prerequisite: senior standing in Design and consent of department and undergraduate status.

499-4 to 12 Senior Honors Research. Research projects for senior honors students developed by the student and faculty sponsor and approved by department chairman. Offered for undergraduate credit only. Prerequisite: senior standing in Design and consent of instructor and undergraduate status.

520-4 to 10 Educational Tool Systems. Designs of specialized instructional tools, including design of learning environments and ancillary support systems for programmed learning.

530-4 to 12 Studies in the Industrial Process. Design of products and product systems utilizing contemporary technology for solutions to significant human needs.

535-4 to 12 Research in Product Design. Studies of specialized needs or problem areas (i.e., equipment for the handicapped, needs of underdeveloped areas, etc.).

540-4 to 12 Studies in Communications Design. Concerned with the over-all systems of human communications, including visual and graphic media.

545-4 to 12 Research in Communications Design. Specialized areas of visual and graphic communication extended through various technical systems. Development of related systems involving the whole range of communications included.

550-2 to 16 Field Study in Design. Design activity (local, national, or international) carried out with a designated faculty member as liaison. Written report assigned and final report required. All projects must have written approval by the chairman and the liaison faculty member.

560-4 to 12 Environmental Control. Selected studies in environ control systems, with particular reference to latest technical advances (i.e., closed ecology and autonomous systems developments) and to contributions in the study of human environment control by other disciplines.

570-4 to 12 Design Science Exploration. Procedural methodology and systems approach to comprehensive anticipatory design science.

575-4 World Ecological Studies. Review and analysis of man's present socio-economic situation in terms of scientific and technological trending-material and energy resources, human ecology networks.

576-4 to 8 Structural Evolution. Structural morphology and relational hierarchies in science and technology. Differentiation and evolution of industrial tool complex: analysis of world service industry networks.

599-2 to 9 Thesis. Minimum of 5 hours to be counted toward a master's degree.

Economics

411-4 Collective Bargaining and Dispute Settlement. Nature, issues, procedures, economic effects. Analysis of actual collective bargaining situations. Prerequisite: 310 or consent of instructor.

416-4 Money and Banking II. Emphasis upon the Federal Reserve System and other banking systems. Prerequisite: 315 or consent of instructor (C); 300 (E).

418-4 Economic History of Europe. A survey of the economic growth of Europe with emphasis upon the development of European agriculture, industry, finance, and international trade since 1750. Prerequisite: 214, or consent of instructor.

419-4 Latin American Economic Development. A survey of the resource base of Latin American economic development with special reference to the problems of transition from an export-import to an integrated industrial economy; monetary policies; problems of economic planning. Prerequisite: 214, or consent of instructor.

420-8 (4,4) Economic Development of the United States. (a) Economic Development of the U.S. to 1900. The main forces in the development of the U.S. economy from discovery to the end of the 19th century. Stresses the use of economic theory in historical analysis. (b) Recent Economic History of the U.S. Review and analysis of the chief characteristics, trends, and continuing problems of the economy of the United States in the 20th Century. Need not be taken in sequence. Prerequisite: 214 and 215, or consent of instructor.

422-4 Introduction to Economic Development. An analysis of the preconditions, processes, and problems involved in economic development. Both the theory and policy relevant to development, with special emphasis upon the "developing" or "emerging" economies, are stressed. Prerequisites: 214 and 215.

425-8 (4,4) Economics in Geography. (Same as Geography 425.) (a) Concepts, symbols, theory, language. Theory and analysis. Elementary mathematics, individual's preferences, production functions, the firm, markets, welfare economics, Pareto Optimality, and externalities. (b) Process, criteria, conditions. Certainty, uncertainty, and intertemporal criteria; public, private, and merit goods and services; multipliers; shadow prices, spatial and regional economic concepts; public expenditure criteria; free market allocation, comprehensive plans, and multiple objectives. Prerequisite: taken in a,b sequence or consent of instructor.

429-4 International Economics. Intensive treatment of the principles of international economics with special emphasis on the classical and modern theories of international trade. Income effects. Balance of payments adjustments. Prerequisites: 214 and 215, or consent of instructor.

430-4 Regional Economy. Natural economic regions, governmental action (as in the T.V.A.), local applications. Prerequisites: 215.

431-3 Public Finance II. State and local. Prerequisite: 330 or consent of the instructor.

436-4 Government and Labor. (Same as Government 436.) Labor relations and legislation considering both constitutional and economic aspects. Prerequisite: GSB 211 and GSB 212, or consent of instructor.

440-4 Intermediate Micro Theory. A more intensive treatment of price theory. Prerequisites: 215 or consent of instructor.

441-4 Intermediate Macro Theory. Basic analytical concepts of the modern theory of aggregative income determination. Prerequisites: 214 or consent of instructor.

443-4 Senior Seminar in Economics Problems and Policy. Application of the

tools of economic analysis to the study of contemporary social problems. Economics graduate students not permitted to enroll in this course. Prerequisite: 440, 441.

450-6 (3,3) History of Economic Thought. The development of economic thought. (a) Ancients to 1850; (b) 1850 to present. Must be taken in a,b sequence. Prerequisites: 214 and 215.

460-4 Russian Economy. Development of Russian trade, agriculture, industry, government, finance, and standards of living in successive periods in relation to the historical, geographic, economic, and ideological background. Prerequisite: 214 and 215, or GSB 211, or consent of instructor.

462-4 Economic Development of the Middle East. Economic structure of the countries constituting the Middle East; economic, political, social and cultural forces influencing development. Prerequisites: 214 and 215, or consent of instructor.

465-4 Mathematical Economics I. A systematic survey of mathematical economic theory. Conditions of static equilibrium (including stability conditions), dynamic models using difference equations, and linear production models of input-output analysis and activity analysis (linear programming). Prerequisite: 440 and Mathematics 140a and b, or consent of instructor.

467-4 Introduction to Econometrics. Problems in the quantification and testing of economic theories. Introduction to regression analysis. Prerequisite: 308.

471-4 Land Resource Economics. (Same as Ag. I. 471 and Forestry 471.) The use of land as an economic variable in production of goods and services; land markets; group versus individual conflicts; and land utilization as related to institutional arrangements. Prerequisite: 215 or equivalent.

479-4 Problems in Business and Economics.

481-4 Comparative Economic Systems. Capitalism, socialism, fascism, and other forms of the economy. Prerequisite: 214 and 215, or consent of instructor.

490-4 Workshop in Economic Education. (Same as Education 490.) Designed to assist elementary and secondary school teachers in promoting economic understanding in the minds of their students through the translation of economic principles and problems into classroom teaching materials.

500-4 to 8 Economics Seminar. A study of a common, general topic in the field of economics, with individual reports on special topics. Prerequisite: consent of instructor.

501-1 to 12 Economics Readings. Contemporary books and periodicals in economics. Prerequisite: consent of instructor and chairman.

502-1 to 6 Readings in Resource Economics. (Same as Forestry 520b and Agricultural Industries 520b.) Directed readings in the field of resource economics. Prerequisite: consent of instructor.

505-2 to 12 Political Economy Seminar. Cooperative teaching in the political economy area. Designed to introduce students to contemporary problems in political economy emphasizing the research interest of the faculty and students. Two hours per quarter. Prerequisite: 440 or consent of instructor.

507-1 to 12 Practicum in Undergraduate Teaching. Emphasizes teaching methods, source materials, and preparation of classroom materials. All teaching assistants must enroll. One hour of credit per quarter.

510-4 Research in Economics: Design, Methodology, and Presentation. Systematic approach to economic research. Includes research planning and design, exploration of the various sources of data, and the most frequently used methodology. The last part of the course is concentrated on techniques for communicating the results of research.

512-4 Seminar in Labor Institutions. Evaluation of theoretical, multi-disciplinary approaches to the employment relationship. Wage theory, the labor market, and collective bargaining are placed in the context of industrial relations as a separate discipline and this approach critically examined. Prerequisite: 411.

517-4 Monetary Theory and Policy. A survey of contemporary monetary theory and related policy issues. Prerequisites: 541 or consent of instructor.

518-4 Monetary Theory and Policy II. Contemporary topics in monetary theory and policy, including analysis of the roles of money in inflation and economic growth, and an appraisal of the conduct and impact of monetary policy. Prerequisite: 517 or consent of instructor.

520-8 (4,4) Economic Development Theory and Policy. (a) Classical, neoclassical, and modern contributions to the theory of development; theories of

underdevelopment. (b) Basic approaches to economic development; laissez-faire; balanced growth; unbalanced growth; role of government; methods of planning; and foreign aid. Must be taken in a,b sequence. Prerequisite: consent of instructor.

522-4 Microeconomic Foundations of Labor Markets. The approach is theoretical. Topics include the theory of wage and employment determination, labor mobility, labor market imperfections, the special problems of minority group labor, and trade union issues. Prerequisite: 308, 465.

525-4 Seminar: Economics in Geography. (Same as Geography 525.) Valuation, choice methods, and regional plans and resource systems. Location and space models, opportunity cost, market value, user expenditures, cost analysis, regional and national income and product analysis, economic base analysis, benefit-cost, budgeting, least cost ranking, joint production, and analysis of representative plans, and resource design systems. Prerequisite: 425b or consent of instructor.

526-4 Managerial Economics. (Same as Business Administration 526.) A course in the economics of the firm. Designed to develop a conceptual framework for business decision making with emphasis on demand, costs, prices, and profits. Prerequisites: 214 and 215, or consent of instructor. Credit may not be earned in both Economics 440 and this course.

530-4 Foreign Trade. Emphasis on the advanced theory of international trade, survey of significant literature in international theory. Study of more advanced tools of analysis. Prerequisite: 429 or consent of instructor.

531-4 International Finance. Application of theory to current international economic developments. Empirical studies. Prerequisite: 429 or consent of instructor.

533-4 Public Finance Theory and Practice. Historical development of public finance theories with analysis of their policy implications. Prerequisite: 330 and consent of instructor.

540-8 (4,4) Microeconomic Theory I and II. Prerequisite: to (a) 440 or consent of instructor, to (b) 540a or consent of instructor.

541-8 (4,4) Macroeconomic Theory I and II. Prerequisite: to (a) 441 or consent of instructor, to (b) 541a or consent of instructor.

552-4 Seminar in Economic Thought. An exploration of the basic philosophic assumptions which underlie the various types of economic thought with special emphasis upon the historical development of the premises of modern day economic theories. Prerequisite: 450a or b or consent of instructor.

555-4 Seminar in Economic History. An examination of the structural economic changes in various economies throughout the world. Prerequisites: consent of instructor.

562-4 Seminar in Economic Systems. A final, theoretically-oriented examination of economic systems. Includes recent theoretical models; contemporary changes in major economic systems; the emergence of mixed systems. Relates economic, social, and political systems and evaluates attempts to place economic systems within to context of general systems theory. Prerequisite: 481 or consent of instructor.

566-4 Mathematical Economics II. Linear economic models. Linear programming. Input-Output analysis and general equilibrium models. Prerequisite: 440 or 465, or consent of instructor.

567-8 (4,4) Econometrics I and II. (a) Linear regression analysis as applied to single equation economic models. Problems of least squares, maximum likelihood, and Bayesian estimation techniques in stochastic economic models. (b) Elements of asymptotic distribution theory and estimation techniques in multiple equation economic models. Prerequisite: Mathematics 410a or b, and 567a, or consent of instructor.

570-4 Seminar in Contemporary Microeconomic Theory. An investigation of recent developments and current controversies in economic theory with emphasis on microeconomic problems. Prerequisite: 540b.

571-4 Seminar in Contemporary Macroeconomic Theory. An investigation of recent developments and current controversies in economic theory with emphasis on macroeconomic problems. Prerequisite: 541b or consent of instructor.

575-4 Microeconomic Regulation. An analysis of the economic causes and effects of the regulation of agriculture, business, and labor. Prerequisite: 440 or consent of instructor.

581-4 Economics of Welfare. The application of economic theory to the quest

for economic welfare. Includes consideration of income distribution, rates of growth, the pricing system, and the role of government. Prerequisite: 440 or equivalent.

583-4 Methodological Foundations of Economics. A systematic analysis of the nature, philosophical content, premises, scope, boundaries, and characteristic methods of economics. The history of economic thought is drawn upon, but major focus is upon the contemporary state of the discipline as well as upon apparent methodological trends. Prerequisites: 440 and 441, or consent of instructor.

585-4 Seminar in Social Economy. Interrelations between economic institutions and processes within the larger societal context. Applicable economic, political and social theory, as well as empirical studies brought to bear. Prerequisite: 440 or consent of instructor.

590-1 to 6 Seminar in Contemporary Economics. Presentation and discussion of current research in Economics. All Ph.D. students must enroll. One hour credit per quarter.

599-1 to 9 Thesis. Minimum of 5 hours to be counted toward a master's degree.

600-1 to 48 Doctoral Dissertation. Hours and credit to be arranged by chairman.

Education

There is no graduate degree program offered through the following education listing. Four hundred level courses in this listing may be taken for graduate credit, however, unless otherwise indicated with the course listing in the quarterly Schedule of Classes.

400-1 to 16 Experimental Education. Offered for purposes of testing new and experimental courses and series of courses within the College of Education. Prerequisite: written consent of instructor.

500-1 to 16 Experimental Education. Offered for purposes of testing new and experimental courses and series of courses within the College of Education. Prerequisite: written consent of instructor.

Educational Administration and Foundations

421-2 to 4 Law and the Teacher. Legislative and case law as it applies to the role of the teacher.

431-4 History of Education in the United States. An historical study of the problems of American education.

432-4 Education and Social Forces. A study of the social forces that shape educational policies in the United States.

454-4 Contrasting Philosophies of Education. An examination of current educational problems and trends in the light of contrasting philosophies of education.

500-4 Research Methods. Introduction to educational research with practical training in research writing and evaluation techniques in education. Recommended or concurrent enrollment in introductory statistics.

501-12 (4,4,4) Seminar in Educational Administration. An examination of the political setting of educational administration, selected innovative practices, and methods of determining accountability in education. Open to students in approved sixth year and doctoral programs only. Must be taken in a,b,c sequence.

502-4 Seminar in Comparative Education. A general introduction to comparative and international education. Comparison of educational ideas and practices of various countries in major regions of the world.

503-4 Seminar in Philosophy of Education. An interpretation of modern educational problems and trends in the light of basic philosophical viewpoints. Excerpts from the leading philosophical writings are used. Prerequisite: consent of instructor.

504-4 Seminar in History of European Education. A survey and interpretation of education in Europe from the Greek era to the present. Stresses the relationship of European to American education.

505-4 to 8 Advanced Seminar in Comparative Education. A study of foreign educational systems in historical, cultural, political, and world perspective.

Areas of the world or specific countries are indicated by the following letters:
(e) England, (s) Soviet Union.

506-4 Seminar: Curriculum in Relation to American Culture. The effect of historical movements on curriculum in our nation at all ages and grade levels continued on a more intensive basis as applied to present-day curricular patterns. Prerequisite: 560 or consent of instructor.

507-12 (4,4,4) The Twentieth Century and Education. A study of major movements in the contemporary world in terms of their importance for American education. (a) Education and culture, (b) The American way of life, (c) Challenges of the twentieth century.

508-8 (4,4) Interdisciplinary Seminar in Educational Administration. (a) Administrative change resulting from social, cultural, and economic pressures upon educational systems. (b) Relevancy of selected concepts from the behavioral and social sciences to the field of educational administration. Prerequisite: advanced graduate standing or consent of instructor.

511-12 (4,4,4) Internship Practicum. Theory and practice in educational administration in cooperation with a work experience in an educational setting. Prerequisite: consent of student's advisor or committee and department chairman.

512-4 Workshop in Adult Education. Problems related to the adult learner, program planning, and methods and materials. For teachers and administrators in adult education programs. Prerequisite: consent of instructor.

520-8 (4,4) Legal Basis of American Education. (a) Exploration of principles of law applicable to public schools and school personnel. (b) Illinois school law. Study of the legal aspects of Illinois public education with principal emphasis on statutory law and its interpretation by the courts.

524-12 (4,4,4) School Administration. (a) Basic orientation to the field of school administration and to the legal and extra-legal forces affecting public school operations. (b) An examination of the administrative processes as an approach to viewing school administration. (c) An introduction to administrative theory. Must be taken in a,b,c sequence.

527-2 to 4 Current Issues in School Administration. A field laboratory course for principals and superintendents.

533-4 School Buildings. Various phases of physical plant design and maintenance of concern to the school administrator.

534a-4 School Finance. A study of the principles and issues of Public School Finance. Revenues, expenditures, indebtedness, and fiscal controls are dealt with.

534b-4 School Business Administration. Principles and practices governing management of business affairs of a public school system.

534c-4 Educational Application of Electronic Data Processing. Electronic data processing as related to the administrative services and instructional areas of educational institutions.

536a-4 Administrator's Workshop. A special program for the consideration of administrative problems pertinent to superintendents, high school principals, and elementary school principals.

539-4 Community Development through the School. A survey of methods and procedures utilized by school districts to further community development.

556-8 (4,4) Educational Supervision. (a) The supervisory function in the improvement of instruction. Emphasizes activities, methods and devices for improving the effectiveness of teaching. (b) Seminar in educational supervision. Special research problems in supervision for advanced graduate students. Must be taken in a,b sequence.

560-4 Curriculum. (Same as Secondary Education 561.) Modern practices and procedures in curriculum development, with attention to the professional, social, economic, and other major factors, in curriculum planning.

563-4 School Public Relations. A study of the field of public relations as a factor in successful school organization, administration and operation, teaching, support services, and personal interaction of the individual with the community.

564-4 Secondary School Principalship. (Same as Secondary Education 564.) Deals with problems met specifically by the high school principal. Emphasizes his role in relation to guidance, curriculum, schedule-making, extra-curricular activities, public relations, budgeting of time, etc. Prerequisite: consent of instructor.

575-1 to 4 Individual Research. Selection, investigation, and writing of a re-

search assignment under the personal supervision of a graduate faculty member in one of the following areas: (a) curriculum, (b) supervision, (c) buildings, (d) finance, (e) school law, (f) comparative education; (g) history of education, (h) philosophy of education, (i) sociology of education, (j) administration. Prerequisite: consent of department chairman.

576-1 to 4 Readings in Administration and Foundations. Advanced reading in a previously identified area of interest. Prerequisite: consent of department chairman.

589-2 to 12 General Graduate Seminar. Selected topics or problems in cultural foundations of education. Prerequisite: advanced standing and consent of instructor.

591-2 Doctoral Seminar in Philosophic Foundations. To be taken concurrently with Guidance 590. First course in a sequence required of all doctoral students in education. Focuses on modes of scholarly inquiry and the responsibilities of inquirers. Prerequisite: admission to a doctoral program in Education.

592-4 Doctoral Seminar in Cultural Foundations of Education. An integrated seminar in the cultural foundations of education for doctoral students in education. Prerequisite: 591 and Guidance and Educational Psychology 590.

596-5 to 9 Independent Investigation. Field study required of each student working for the sixth-year specialist certificate.

599-5 to 9 Thesis.

600-1 to 48 Dissertation. Minimum of 36 hours to be earned for the Doctor of Philosophy degree.

Elementary Education

Courses in this department may require the purchase of additional materials or supplies. Field trips are required for certain courses.

401-2 to 4 Problems in Public School Reading. Requirements: attendance at all sessions of a reading conference, preparation of a paper showing practical applications of theory to the student's own teaching situation.

410-4 Improvement of Instruction of Mathematics in the Kindergarten-Primary Grades. Recent findings, current practices and materials used in building a basis for quantitative thinking in early childhood education. Will involve work with young children. Prerequisite: 310.

411-4 Seminar in Instruction. To assist student teachers and in-service teachers in solving classroom problems. Involves clinical study and discussion of behavioral and learning situations, with special attention to the development of characteristics and needs of students.

413-4 Children's Literature. Emphasizes types of literature, analysis of literary qualities, selection and presentation of literature for children. Not for students who have had English 213. Prerequisite: Guidance 305.

415-4 Improvement of Instruction of Mathematics in the Upper Elementary School. The grade placement of content, newer instructional practices, materials of instruction, and means of evaluation. Will involve work with elementary students. Prerequisite: 310 or consent of instructor.

423-4 Teaching Elementary School English Language Arts. Oral and written communication processes, with emphasis on the structure and process of the English language arts. Specific attention to the fundamentals of speaking English, writing, spelling, and listening. Study of learning materials, specialized equipment, and resources. Prerequisite: 314 and 337, or 316 and 337.

424-4 Teaching Elementary School Social Studies. Emphasis on the structure and process of social studies. Specific attention to developing social studies objectives, planning units, developing a general teaching model, organizing the curriculum, and evaluating behavioral change. Study of learning materials, specialized equipment, and resources. Prerequisite: 314 or 316.

430-3 Workshop in Creative Writing for the Elementary School. Techniques of encouraging creative writing in the elementary school.

431-4 Education for the Disadvantaged Child. An understanding of culturally disadvantaged children with emphasis on the nonurban poor. Discussion of necessary adjustments of school programs emphasizing early school admission, experimental background, self-concept, language development, and learning style. Prerequisite: 337.

433-4 Workshop in Kindergarten-Primary Education. Meets needs of in-service teachers in such areas as curriculum adjustment, remedial teaching, child

development, and early childhood education. Prerequisite: student teaching or teaching experience.

437-4 Corrective Reading Techniques for the Classroom Teacher. A discussion of individualized reading instruction based upon diagnostic testing procedures. Remediation of difficulties, grouping strategies, techniques and materials for the slow learner in the regular classroom will be emphasized. Prerequisite: 337 or equivalent, or consent of instructor.

441-4 An Introduction to Teaching Elementary School Science. Study of content and methods of elementary school science, grades K-8. Emphasis on the materials and strategies for using both traditional and modern techniques of science education. One or more field trips. Prerequisite: 314.

442-4 Analysis and Design of Elementary Science Curricula and Instructional Strategies. Analysis of existing science materials with reference to educational philosophy, learning theory, and instructional design. Emphasis on student development of instructional designs and seminars to critique prepared materials. Field trips. Prerequisite: 441 or consent of instructor.

443-4 Workshop in Social Studies. Material on critical areas of the world not commonly emphasized in elementary social studies. Areas considered: significant geographical concepts, Asia, Africa, Russia, and Eastern Europe. Outstanding specialists in social science present their specialties.

445-4 Parent Involvement in Education. Materials, techniques, and resources suitable for use by teachers in helping parents and teachers to understand how they can help each other in the partnership responsibilities of the education of children from a variety of backgrounds. Prerequisite: student teaching or consent of instructor.

465-4 Seminar in Psychology of Elementary School Subjects. Psychological principles of learning applied to the mastery of materials used in elementary school subjects. Prerequisites: 314, Guidance 305.

475-2 to 8 Workshop in Elementary Education. Critical evaluation of innovative programs and practices. Acquaints teachers within a single school system, or a closely associated cluster of school systems, with the philosophical and psychological considerations and methods of implementation of new programs and practices in one of the following areas: (a) curriculum, (b) supervision, (c) language arts, (d) science, (e) reading, (f) social studies, (g) problems in elementary education, (h) arithmetic, (j) kindergarten-primary, (k) administration and supervision. Field trips may be required. Prerequisite: 314.

490-2 to 3 Workshop in Economic Education in Elementary Schools. A study of newer programs stressing economic understandings of the social studies in the elementary school.

503-9 NDEA Institute in Reading. Emphasizes newer methods and techniques in teaching reading, research findings and applications, adaptation of methods and techniques to various types of pupils. Critical evaluation of new approaches. Prerequisite: students must be selected in advance.

505-4 Readings in the Elementary School. First course in the reading sequence. Survey of reading problems, aspects of the reading process, modern practices in teaching reading.

507-2 to 4 Independent Readings. Acquaintanceship with the literature and research, under the direction of a member of the departmental graduate staff, in one of the following areas: (a) curriculum, (b) supervision, (c) language arts, (d) science, (e) reading, (f) social studies, (g) problems in elementary education, (h) mathematics, (j) early childhood education, (k) elementary education administration and supervision. Prerequisite: consent of the instructor.

509-4 to 12 Practicum. For advanced students: professional consultation, teaching demonstration, practical application of advanced theory-work with clinical cases, or program development, implementation and evaluation in school systems or university. Readings and research related to special problems involved in on-site situations in the following areas: (a) curriculum, (b) supervision, (c) language arts, (d) science, (e) reading, (f) social studies, (h) mathematics, (j) early childhood education, (k) elementary education administration and supervision. Prerequisite: consent of instructor.

510-4 to 8 Seminar: Problems in Reading. Major field content seminar: Problems and practices; comprehensive review and evaluation of research and literature. Each student pursues a problem of his own interest.

514-4 Organization and Administration of Reading Programs. For reading

specialists, principals, supervisors, consultants. Recent trends in elementary and high school reading programs, providing reading instruction for total school population, materials and equipment, in-service training, role of the reading specialist. Problems of class members are studied and discussed. Prerequisites: 461 and 505.

515-4 Special Problems in the Teaching of Arithmetic in the Elementary School. A seminar course which covers important problems in arithmetic in the elementary school. Variable content. Prerequisite: 415 or consent of instructor.

516-4 to 12 Internship in Reading. Culminating experience for doctoral candidates. Each student supervises reading services in his own or cooperating school. Conference periods. Prerequisites: 521a,b,c and consent of instructor.

518-4 Supervision of Professional Education Experiences. The role and responsibility of the cooperating public school teacher in the supervision of teacher education students involved in various field experiences. Attention is given to the joint responsibilities of the university and the public school in this cooperative venture. A course for present and prospective teachers who wish to effectively deal with students in the various professional education experiences.

519-2 to 4 Readings in Research—Elementary Mathematics. Independent readings. Acquaintance with the research literature in elementary mathematics. Conference periods. Prerequisites: 415, 515.

520-4 Diagnosis and Correction of Elementary Mathematics Disabilities. Causes of mathematical difficulties, observation and instrument procedures, experience in preparing materials for diagnosis and for corrective purposes. Prerequisite: 515 or concurrent registration.

521-12 (4,4,4) Diagnosis and Correction of Reading Disabilities. Causes of reading difficulties; observation and interview procedures; standardized tests, instruments, and informal inventories; analysis techniques; experiences in preparing materials for corrective purposes. Each student diagnoses and treats a reading disability case under supervision. Prerequisites: 505, or concurrent registration with 505, and teaching experience.

525-4 Specialty Area Seminar. Exploration of research literature in one of the specialty areas listed. For advanced students only. One of the following areas: (a) curriculum, (b) supervision, (c) language arts, (d) science, (e) reading, (f) social studies, (h) mathematics, (j) early childhood education, (k) elementary education administration and supervision. Prerequisite: consent of the instructor.

531-4 Disadvantaged Schools: Research & Teaching. The focus of this doctoral level course would be on research in the various areas within the total context of urban and rural disadvantaged schools. Within a seminar context such issues as problems of administration, research on teaching and curriculum problems, research from the social sciences as it bears on the disadvantaged school-community, and research on the various subject matter areas as related to the disadvantaged school-community. Prerequisite: advanced studies.

537-4 Kindergarten-Primary Reading. A survey of problems in the developmental reading program for the primary grades, followed by extensive study of selected problems. Prerequisite: 337 or consent of instructor.

541-4 Problems, Trends, and Research in Elementary School Science. Emphasis upon identifying problems and trends within elementary school science education and planning for research in this field. Prerequisite: 441 or 442 or consent of instructor.

542-1 to 4 Language Arts in the Elementary School. The practical bearing of investigation and theory on the improvement of current practices in the teaching of the language arts other than reading. Attention given to evaluation of teaching materials in these areas.

543-4 Teaching the Social Studies in the Elementary School. Organization of material for teaching purposes, techniques of classroom presentation, bibliographies or materials, use of audio and visual aids to instruction, and techniques for evaluating student progress. Readings, lectures, and discussions related to required teaching experience.

557-4 The Elementary Principalship. Designed to meet many of the particular needs of persons interested in qualifying for appointments as elementary school principals. Other than the administrative responsibilities of the elementary principal, such topics as the grouping of pupils, the elementary school's program, and personnel are studied.

558-3 to 4 Leadership in Elementary Education. A study of some newer developments in the organization and instruction of the elementary school. Team teaching, a non-graded school, grouping and the impact of newer curricular developments.

559-3 Workshop in Instructional Leadership.

560-4 Kindergarten-Primary Education. A survey of current problems and practices in early childhood education for children from four to eight years of age, with emphasis on wide reading in current research literature. Prerequisite: consent of instructor.

561-4 The Elementary School Curriculum. A critical study of the reorganization, construction, and administration of the elementary school curriculum, and the installation, adaptation, and administration of the revised curriculum.

563-4 Organization of the Elementary School. An analysis of types of elementary school organization with special attention to influence of school organization upon the educational program. Application of research findings to selection and use of materials of instruction. Special consideration to student's professional problems.

564-4 to 12 Internship. Culminating experience for advanced students. Each student engages in specialized service areas either in his own or cooperating school or school system or university. Weekly on-campus or on-site seminar will be held with the intern supervisor. Internship areas are: (a) curriculum, (b) supervision, (c) language arts, (d) science, (e) reading, (f) social studies, (h) mathematics, (j) early childhood education, (k) elementary education administration and supervision. Prerequisite: consent of the instructor.

570-4 Seminar, Research in Elementary Education. Critical analysis of the most significant research studies in organization, learning, teaching, and curriculum in the elementary education.

575-2 to 4 Individual Research. The selection, investigation, and writing of a research topic, under the personal supervision of a member of the departmental graduate staff, in one of the following areas: (a) curriculum, (b) supervision, (c) language arts, (d) science, (e) reading, (f) social studies, (g) problems in elementary education, (h) arithmetic, (j) problems in kindergarten-primary, (k) elementary education administration and supervision.

596-5 to 9 Independent Investigation. Field study required of each student working for the sixth year specialist certificate. The work should be done in the setting of a school system where the student is employed or where full cooperation is extended. The study involves selecting of the problem, survey of pertinent literature, recording of results, and appropriate interpretations and summarizations.

599-3 to 9 Thesis. Minimum of 5 hours to be counted toward a master's degree.

600-1 to 48 Dissertation. Minimum of 36 hours for the Doctor of Philosophy degree.

Engineering

Safety glasses are required for some of the courses in this subject matter area.

402-12 (4,4,4) X-Ray Crystallography. (a) Introductory Crystallography. Lattice theory of the crystal. Miller indices. Crystal zones. The Bravais lattices. Symmetry elements. Proper and improper rotations. Point groups: crystal classes. Operators involving translation. Space groups. Elements of crystal structure. Coordination. Structure types. (b) X-Ray Diffraction Techniques. X-Ray diffraction by single crystals: fundamental equations. Reciprocal lattice and Ewald sphere. Optical analog: The optical diffractometer. Single crystal photographic methods: the Laue method: rotating and oscillation, Weissenberg, Buerger-precession and Jong-Bourman. Divergent and convergent-beam techniques. Interpretation of the x-ray diagrams. Diffractometric methods; fundamentals. Identification of polycrystalline materials with x-ray diffractometer (power method). Single crystals diffractometry. Absolute intensity measurements. (c) Crystal Structure Analysis. Fundamental diffraction relations. Determination of the cell size, chemical formula, symmetry and space group. Measurement of intensities: geometrical and physical factors affecting intensities. The structure factor; phase of the structure factor. The anisotropic temperature factor. Fourier synthesis. Electron-density projections. The phase problem. Utilization of anomalous dispersion. Direct determination. The Pat-

terson method. Refinement of the structure with high speed computers. (This was APS 401-12).

403-4 Statistical Thermodynamics for Engineers. Principles of kinetic theory and classical statistical mechanics as applied to thermodynamic systems. Discussion of the equilibrium state and laws and properties of thermodynamics with applications to engineering systems. Prerequisite: 300c.

407-4 Thermal Pollution and Waste Heat Management. Physical, chemical, and biological aspects of thermal pollution. Methods of waste heat disposal from power plants. Management of heated effluents. Prerequisite: senior standing.

408-3 Bioenvironmental Engineering. The application of microbiological and biochemical principles to various phases of bio-engineering, sanitary engineering, and analysis and design of bioprocesses.

409-3 Engineering Hydrology. Hydrologic cycle and analyses. Infiltration studies, groundwater exploration. Statistical analyses, flood routings. Mechanics of entrainment, movement and deposition of sediment material by moving fluids. Analysis of roughness and sediment transport rate in rivers. Prerequisites: 313b or consent of instructor.

410-8 (4,4) Electronics and Instrumentation for the Life Sciences. (a) Review of electrical theory and electrical aspects of biological systems; introduction to circuit analysis; fundamentals of instrumentation, primarily electronic; laboratory. (b) Transducers and characteristics of instruments used in biological research; basic computer and data-system theory and applications; analysis of biological waveforms; simulation of biological systems; laboratory. Only the b course may be taken for credit in engineering. (This was APS 410-8).

411-3 Design of Engineering Experiments. Engineering data evaluation by application of statistical techniques. Design of engineering experiments. Prerequisite: 222, Mathematics 252a.

412-3 Engineering Practice: Legal Considerations. Legal responsibilities of the professional engineer. The law of contracts with enough emphasis on legal procedure to enable students to understand decided cases. Practice in applying some of the principles through written communications. Prerequisite: senior standing.

413-6 (3,3) Intermediate Mechanics of Fluids. (a) Application of the basic laws of nature to the theory of fluids using the continuum approach. Kinematics of fluid motion using various coordinate systems; the continuity equation. Dynamics of viscous fluid motion; the Navier-Stokes and Energy equations. Solutions to the fundamental system of equations. Introduction to magnetofluid mechanics. (b) Dimensional analysis. Incompressible irrotational flows. Fundamentals of compressible fluid and isentropic flows, normal and oblique shocks, and Prandtl-Meyer expansions. Turbulence. The application of the equations of motion to turbulent flow fields. Reynolds equations. Production, convection, and dissipation of turbulence. Prerequisite: 313b and Mathematics 305a.

414-3 Mechanics of Soils. Fundamental theories of soil behavior and their application in engineering. Laboratory. Soil-water systems and interactive forces; stress-deformation characteristics; ultimate strength; theory of consolidation; methods for estimating soil deformation. Applications of soil engineering in earth dams, retaining walls, foundations, piles, and underground conduits. Prerequisites: 311a, 313a.

415-9 (3,3,3) Principles of Water Quality Control. (a) Characteristics of water quality, natural and man-made; relationship of quality to use; unit operations of water quality control for municipal and industrial use. (b) Characteristics of waste waters; biological and chemical processes for treatment of sewage and industrial wastes; water quality criteria in stream pollution control. (c) Application of physical, chemical, and biological unit operations and processes to design of waste treatment facilities. Laboratory. Safety glasses are required at an approximate cost of \$4.50. Prerequisite: 300a or consent of instructor.

416-8 (4,4) Air Pollution Control. (a) Introduction to emission sources, transport/diffusion, and effect of air pollution. Aspects of social, meteorological, biological, physiological, and chemical relationships plus control methods and economics included. Laboratory. Prerequisite: senior or graduate standing. (b) Engineering control theory, procedures, and equipment related to particulate and gaseous emissions control. Source and atmospheric sampling, and analytical techniques covered. Laboratory. Must be taken in a,b sequence. Safety glasses are required at an approximate cost of \$4.50.

417-3 Fundamental Compressible Fluid Flow. Principles of fluid flow. Wave propagation in compressible media, isentropic flow of a perfect gas, normal and oblique shock waves, Prandtl-Meyer expansions, and supersonic aerodynamics. Prerequisite: 313b.

418-3 Digital Computers in Research. Computational techniques for matrix inversion, solution of linear equations, and characteristic roots and vectors; least squares analysis, curve-fitting, and regression; design of experiment; solution of nonlinear equations; min-max functional approximation techniques; generation of approximate solutions, Monte Carlo techniques. Prerequisite: 222 and Mathematics 150a.

420-6 (3,3) Transport Phenomena. (a) Mechanism of heat, mass, and momentum transport on both molecular and continuum basis. Estimation of transport properties. Generalized transport equations in one or three-dimensional system. (b) Analogy of mass, heat, and momentum transfer. Macroscopic balances, operations, penetration theory, simultaneous mass and heat transfer, equilibrium operations. Prerequisite: 302 and 313b.

421-3 Introduction to Systems Theory. An introduction to the description of engineering systems by the means of a general systems theory. Prerequisite: Mathematics 305a.

422-4 Operations Research and Mathematical Model Formulation. Applications of digital computers to the mathematical modelling of physical systems with particular emphasis on the simulation and problem solving techniques of operations research. Dynamic models of transportation, allocation, and replacement. Physical applications and computation techniques related to the theory of games. Prerequisites: 222 and Mathematics 221 or consent of instructor.

423-3 Hybrid Computation. The simultaneous use of the analog and the digital computer for the solution of engineering problems. Scaling of problems. Block diagrams and logic are stressed. Linear and nonlinear differential equations. Simulation as well as iterative analog computation are covered. Supplementary text required. Prerequisite: 222, 432 or equivalent.

426-3 Communications Theory. Basic information theory, Fourier series and transform, sampling theory, modulation, and signal to noise ratio. Prerequisite: 439a.

428-1 Water Quality Laboratory. Measurements of water quality parameters performed. Use of modern instrumental techniques demonstrated. Safety glasses are required at an approximate cost of \$4.50. Prerequisite: 415a.

430-1 to 8. Special Problems in Engineering. Consists of topics and problems selected either by the instructor or by the student with the approval of the instructor. Prerequisite: senior standing in engineering and consent of the instructor.

431-6 (3,3) Analog and Digital Computer Design. Introduction to the design of analog and digital computers. Subject includes: operational amplifiers, multiplying circuits, regulated power supplies, 3 column algebra, switching circuits, memory devices. Not a course in programming. Prerequisite: 336.

432-3 Analog Computation in Engineering Design. An introduction to the theory and operation of an analog computer. Applications to engineering design, simulation, and optimization. Laboratory. Prerequisite: Mathematics 305a.

434-4 Electronic Design. Application of electronic device and linear network theory to the design of practical electronic circuits. Design of oscillators; audio, video, and RF tuned amplifiers; feedback circuits. Extensive use of ECAP and other computer-aided design techniques. Laboratory. Prerequisite: 336 and 439a.

436-3 Control Theory. Feedback concepts, signal flow graphs, s-plane analysis, frequency domain analysis, root locus, stability conditions, and compensation techniques. Prerequisite: 439a.

437-4 Microwave Theory and Measurements. Theory of passive microwave devices for guiding, storing, coupling, or radiating electromagnetic energy. Theory of active and non-linear devices including klystrons, circulators, and isolators. Microwave measurements. Laboratory. Prerequisite: 338.

438-3 Electronic Devices. Semiconductor, magnetic, dielectric, and vacuum devices with wide range of engineering applications. Develop understanding of the mechanisms of operation. Prerequisite: 311c, 336.

439-6 (3,3) Transient Analysis and Network Theory. (a) Transient analysis of linear electrical networks and analogous systems by classical techniques and the Laplace transform. (b) One- and two-port networks, Foster and Cauer

forms, and image parameter filter theory. Must be taken in a,b sequence. Prerequisite: 335 and Mathematics 305a.

440-6 (3,3) Structures. (a) Analysis of statically determinate and statically indeterminate structures. Deflections. Slope deflection. Moment distribution. (b) Principles of structural design. Loads. Influence diagrams. Structural materials. Types of structures and their behavior. Safety. Social and environmental conditions. Prerequisite: 311a.

441-3 Intermediate Mechanics of Vibrations. Equations of motion applied to systems with free and forced vibrations, damping, and multiple-degrees of freedom; Euler equations; introduction to Lagrange's equations and orbital mechanics.

442-4 Structural Design-Metal. Rational, empirical, and practical basis for design of metal structures with emphasis on structural steel and aluminum. Behavior of members and their connections. Prerequisite: 440a or consent of instructor.

443-6 (3,3) Engineering Design. Projects. Student selects a problem, defines and designs the various subsystems and interface requirements, integrates the subsystems into the final design, and documents the design effort. Laboratory. Must be taken in a,b sequence. Prerequisite: senior standing in engineering.

444-4 Design of Reinforced Concrete. Ultimate strength and behavior of reinforced concrete members. Shear. Bond. Continuity. Compression Numbers. Prerequisite: 311a.

446-3 Electromechanical Energy Conversion. Electromagnetics. Theory and basic concepts of rotating electrical machines. Application of principles to d.c., synchronous, and polyphase induction machines. Prerequisite: 335 and 338.

447-3 Intermediate Mechanics of Materials and Structures. Stress and strain at a point in three dimensions. Theory of elasticity. Shear center; unsymmetrical bending; curved beams; elastic foundations; thick walled cylinders; theory of failures; energy methods. Prerequisite: 311a.

448-4 Experimental Stress Analysis. Theoretical and experimental methods of determining stresses and strains; use of optical, electrical, and mechanical instrumentation; relation of modeling and prototype; brittle coating; electrical resistance gages; photo-elasticity. Prerequisite: 311a.

449-3 Intermediate Dynamics. Kinematics and kinetics of three-dimensional motion; Coriolis' acceleration' rigid body motion; Euler's equations; work and energy; gyrostatics; generalized coordinates; impulse-momentum principle; vibrations; computer applications. Prerequisites: 260c and Mathematics 305a.

451-3 Numerical Methods in Mechanics. Application of numerical techniques to problems encountered in engineering mechanics. Prerequisite: 222, 311a, 313b (or concurrent enrollment), and Mathematics 305a or consent of instructor.

454-16 (4,4,4,4) Materials Science. (a) Crystal structure of materials. Concepts of ionic, metallic, van der Waals, and covalent bond; hydrogen bond; solid solutions; interstitial phases. Coordination structures. Radicals in crystal structures. Long chain molecular crystals. Clathrate and molecular complexes. The structure of polymers, glass, and liquids. (b) Crystalline materials preparation. Phase rule. Crystal growth. Homogeneous and heterogeneous nucleation. Absorption. Impurities. Rate of crystallization. Preparative crystallization. Twinning. Spiral growth theory. Recrystallization. (c) Perfection of crystalline materials. The solid as an imperfect body. Isomorphic substitution. Composition disorder. Electron holes and traps. Diffusion. The role of imperfections. (d) Thermodynamics of solids. Potential energy of ionic and molecular crystals. Band theory. Stability of solid phases. Equilibrium diagrams. Influence of temperature, pressure, and composition. Polymorphism: role of crystal structure. The thermodynamics of the imperfect crystal. (This was APS 444-16).

455-3 Engineering Geology. (Same as Geology 455) An examination of problems posed by geology in the design, construction, and maintenance of engineering works. Topics studied include groundwater, land subsidence, earthquakes, and rock and soil mechanics. Two term papers and a field trip required. Prerequisite: Geology 220 or consent.

458-3 Photoelasticity. Optics related to photoelasticity, theory of photoelasticity, photoelastic model materials, analysis techniques, three-dimensional photoelasticity, birefringent coatings, application of photoelasticity methods. Prerequisite: 448 or consent of instructor.

462-6 (3,3) Matrix Methods in Structural Analysis. (a) Review of matrix

algebra. Displacement method of analyzing trusses, continuous beams, and rigid frames with and without sidesway. (b) Force method of analysis. Direct element method of analyzing trusses, rigid frames, and plane grids. Prerequisite: 311a.

463-6 (3,3) Introductory Instrumentation. (a) Characteristics and techniques in analog and digital instrumentation; transducers; signal conditioners; output and display systems; recorders. Laboratory. (b) Ultrasonic techniques; fringe patterns, Fresnel and Schlieren lenses, Moire patterns, pattern enhancement methods, optical systems. Laboratory. Must be taken in a,b sequence. Prerequisite: 336.

464-3 Intermediate Materials Science. Internal structure, treatment, and properties of metals and intermetallic compounds. Theory of dislocations in metals. Plastic flow, phase transformations, martensitic transformation, and X-ray diffraction identification of metallic phases. Prerequisite: 311b.

466-4 Prestressed Concrete. Theory and design of prestressed concrete simple beams, continuous beams and shells. Deflections. Behavior. Prerequisite: 311a.

470-6 (3,3) Engineering Analysis. (a) Basic vector field theory; transformation theorems. Methods of solution for basic ordinary differential equations with applications to engineering system. Prerequisite: Mathematics 252b. (b) Basic methods of solution for partial differential equations with emphasis on applications of the Laplace. Poisson and heat equations to engineering problems. Basic complex variables, matrix theory, numerical analysis and simulation techniques applied to engineering systems. Prerequisite: 470a or Mathematics 305a. (This was APS 470-6).

480-9 (3,3,3) Engineering Process Design. (a) Application of the fundamentals of conduction, convection, and radiation heat transfer. Combined mode and transient heat transfer. Design of equipment using simultaneous heat and mass transfer. (b) Applications of the fundamentals of mass transfer. Consideration of rate controlled, equilibrium, and mass transfer operations. (c) Original design of a process and determination of process variables and equipment. Analysis of construction cost. Prerequisite: 300c, 302.

485-4 Power Systems Analysis. Modeling of power system components. Power system configuration. Control of power and frequency, control of voltage and reactive power, and load flow analysis. Prerequisite: 446.

486-3 Electric Energy Sources. Sources of energy. Study of the principles and utilization of fuel cells and thermoelectric, thermionic, photovoltaic, and magnetohydrodynamic generators. Prerequisite: senior standing.

500-3 Convection Heat Transfer. Forced convection momentum and heat transfer in tubes and over external surfaces. Laminar flow and turbulent flow. Prerequisite: 420a, 431a, or consent of instructor.

501-3 Radiation Heat Transfer. Fundamentals of thermal radiation for diffuse and specular-diffuse systems. Applications to engineering systems. Prerequisite: 302 and, Mathematics 305, or consent of instructor.

502-3 Conduction Heat Transfer. Principles of conduction heat transfer with emphasis on applications to engineering systems. Steady state and transient conduction using classical methods and numerical and analog computation. Prerequisite: 302 or consent of instructor.

503-6 (3,3) Heating and Cooling Systems. (a) The applications of heating and cooling to engineering systems. (b) The design of various systems, including automatic controls. May be taken in any sequence.

504-12 (4,4,4) X-Ray Diffraction and the Solid State. (Same as Physics 504.)

(a) Diffraction by an arbitrary object in Fourier transform formulation, symmetry properties of scattering functions, the convolution theorem, the Q function or autoconvolution, the two repeated Fourier transformations, X-ray diffraction by an atom, by a molecule, by an ideal crystal and by a finite crystal. Optical transforms: Fraunhofer diffraction of a circular aperture, of a molecule and of a crystal of disc like atoms. The Fourier synthesis and the Patterson synthesis. The inverse Fourier syntheses. High speed computations of Fourier transforms and of Fourier series. (b) The Born-Laval theory of temperature diffuse scattering of x-rays: Determination of elastic constants, dispersion relations of frequencies and velocities, interatomic force constants and elastic vibrational spectrum. Determination of Debye characteristic temperatures from the inversion phenomenon of one-phonon scattering. The Difference Fourier Transform approach. The use of optical diffractometry and optical convolution in the interpretation of imperfect crystals. (This was APS 504-12).

505-12 (4,4,4) Physical Properties of Crystalline Materials. (a) In Relation to its Symmetry, General principles: The groundwork of crystal physics. Trans-

formations and second-rank tensors. Equilibrium properties: The stress tensor. The strain tensor and thermal expansion. Piezoelectricity; Third-rank tensors. Elasticity: Fourth-rank tensors. The matrix method. Thermodynamics of equilibrium properties of crystals. Transport properties; Thermal and electrical conductivity. Thermoelectricity. Crystal Optics: Natural and artificial double refraction; second order effects. Optical activity. (b) In Relation to Its Structure I. Thermal expansion in relation to crystal structure. Compressibility in relation to crystal structure. Influence of temperature. Magnetic and electrical properties in relation to crystal structure. Piroelectricity and piromagnetism. Ferroelectricity and ferroelectrics. Antiferroelectrics. Ferrielectrics. Ferromagnetic crystals. Antiferromagnetics. Domain structures. Phase transitions. (c) In Relation to Its Structure II. Ionic polarizabilities. Influence of temperature. Influence of structure in crystal optics. Molecular refractivity. Structural theory of optical activity. Elasticity and crystal structure. Piezoelectricity. Plastic deformation. Slip. Creep. Cleavage. (This was APS 503-12.)

508-3 Industrial Waste Treatment. Theories and methods of treating and reducing industrial wastes. Case studies of major industrial waste problems and their solutions. Prerequisite: 415b.

509-3 Advanced Biological Waste Treatment. Investigation of the traditional biological treatment processes utilized in the treatment of municipal and industrial wastes. Prerequisite: 415b or consent of instructor.

510-9 (3,3,3) Electromagnetic Fields. Static boundary value problems; conformal transformation; Schwartz-Christoffel transformation; harmonics; application of Maxwell's equations to plane waves in dielectrics and conductors, antennas, and radiation. Prerequisite: consent of instructor.

511-6 (3,3) Quantum Electronics. An introduction to quantum theory with applications taken from the field of electronics. A study of plasmas, fusion, atomic structure, superconductivity from a theoretical engineering view. Prerequisite: consent of instructor.

512-8 (4,4) Continuum Mechanics. (a) Definition of a tensor. Tensor algebra, special tensors, tensor derivatives, differential geometry, kinematics and dynamics. Tensor quantities in continuum mechanics, stress, strain. (b) Measures of stress and strain. Equations of equilibrium, constitutive equations, compatibility equations. Strain energy functions, linear theory of classical elasticity, special examples, stress functions and general four-function method. Prerequisite: Mathematics 305.

513-3 Mechanics of Viscous Fluids. The complete system of equations for laminar flow of a viscous fluid using the continuum approach, the stress and rates-of-deformation tensors, exact solutions to various boundary value problems, creeping motion, boundary layer theory, introduction to hydrodynamic stability, Orr-Sommerfeld equations, statistical theories of turbulence. Prerequisite: 413b or consent of instructor.

514-3 Mechanics of Inviscid Fluids. A study of stream functions, the velocity potential, Euler equations, Bernoulli equations, various solutions to Laplace's equation, added masses, Taylor theorem, Blasius and Kutta theorems, two-dimensional irrotational flows, Cauchy-Riemann equations, conformal mapping, vortex flow, thin airfoil theory, and free-streamline flows. Prerequisite: 413b or consent of instructor.

515-3 Wave Motion. Wave motion in strings and bars. Surface waves in liquids and solids. Sound waves, seismic waves. Method of characteristics and Fourier methods. Prerequisites: 413b and 447, or consent of instructor.

516-4 Water Resources Development. (a) Engineering aspects of porous reservoir systems. Solid reservoir structure. Porous medium physics. Description of reservoirs. Reservoir fluids including physics and chemistry of water and hydrocarbons.

517-12 (4,4,4) Analysis and Design of Engineering Systems. (a) Application of general system concepts to a wide range of engineering systems. Systematic study of relations and interactions in terms of block diagrams, signal flow graphs, as well as logical, discrete, and continuous mathematical models. Prerequisite: graduate standing and consent of instructor. (b) Emphasis on the analysis and design of systems through the use of analog and digital computers to simulate the operation of various system designs. Prerequisite: 423 and 517a, or consent of instructor. (c) Study of certain gross properties of large, complex engineering systems—properties such as stability, controllability, and identification—by means of general systems theory. Prerequisite: 421 and 517b or consent of instructor.

518-3 Introduction to Turbulence. Application of the basic equations of mo-

tion to turbulent flow problems. Introduction of the correlation concept along with the macro- and micro-scale of turbulence. Isotropic turbulence. Methods and techniques used in the experimental study of turbulence. Prerequisite: 413b or consent of instructor.

519-3 Boundary Layer Theory. Boundary layer equations. Laminar and turbulent boundary layers. Classical turbulent flow theories. Two and three dimensional wake and jet flows. Prerequisite: 413b or consent of instructor.

520-6 (3,3) Reaction Engineering and Rate Processes. (a) Chemical kinetics of homogeneous and heterogeneous reactions. Kinetic theories, mechanism and mathematical modeling. Interpretation of kinetic data. (b) Introduction of reactor design. Ideal reactors for batch and flow system. Design for multiple reactions. Temperature and pressure effects. Nonisothermal and nonadiabatic processes. Prerequisite: 420 or consent of instructor.

521-3 Solid Waste Collection and Disposal. Basic concepts and theory of solid waste collection and disposal systems. Prerequisite: graduate standing.

522-3 Advanced Topics in Operations Research. Linear programming computational techniques and their applicability to particular operations research models. Topics include the approximation methods, forecasting and optimization techniques, constrained and bounded problems. Problem solution by use of a digital computer is emphasized. Prerequisite: 422.

525-3 Small Particle Phenomena. Small particle formation, behavior, properties, emission, collection, and analysis. Includes atomization, combustion, transport of suspensions, filtration, light scattering. Prerequisite: graduate standing.

530-6 (3,3) Separation Processes and Equilibrium Operations. (a) Phase equilibrium, multistage calculations in concurrent and counter-current operations, graphical methods, unsteady state stagewise operations. (b) Multi-component systems, solution chemistry, nonideality in phase equilibrium, rate separation processes, applications in processing industry. Prerequisite: consent of instructor.

535-6 (3,3) Network Analysis and Synthesis. (a) Passive network theory; positive real functions, Foster and Cauer forms, Brune's method, and approximation techniques. (b) Active network synthesis; negative resistance, impedance converters and inverters, theorems of polynomial decomposition, gyrators, and operational amplifiers. Must be taken in sequence. Prerequisite: 439a.

540-3 Elastic Stability. Bending of bars under simultaneous action of axial and lateral loads; buckling of compressed bars, frames, rings, and tubes; lateral buckling of beams; torsion of I beams; buckling of thin plates. Prerequisite: Mathematics 305b, or consent of instructor.

542-3 Theory of Plates. Analysis of bending, buckling, and vibration of plates of various shapes; slabs and membranes; complex variables method; linear and non-linear behavior; refined theories; theory of bending of anisotropic and nonhomogeneous plates. Prerequisite: Mathematics 305b, or consent of instructor.

544-4 Plastic Analysis of Structures. Methods of analysis, elastic-plastic deformations, general loading, and direct procedures of design of beams and framed structures. Prerequisite: consent of instructor.

550-3 Advanced Compressible Fluid Flow. Compressible fluid flow in topics such as: supersonic aerodynamics; flow with friction; heat addition or heat loss; real gas effects; method of characteristics; rarefied gas dynamics; and multidimensional flow.

561-3 Advanced Vibrations. Emphasis on nonlinear vibrations. Topics to include phase plane, nonlinear conservative systems, problem of rotating pendulum limit cycles of Poincare, van der Pohl equation, method of isoclines. Prerequisite: Engineering 441, Mathematics 305b.

570-2 to 6 Special Investigations in Engineering. Advanced engineering topics or problems. Prerequisite: graduate standing in engineering.

580-1 to 9 Seminar. Collective and individual study of selected issues and problems relating to various engineering areas.

599-1 to 9 Thesis.

Engineering Technology

There is no graduate degree program offered through engineering technology. Four hundred level courses in this listing may be taken for grad-

uate credit, however, unless otherwise indicated in the courses description.

The student is required to purchase photos and maps for certain courses, and a suitable slide rule is strongly recommended for most of the course. Cost: approximately \$10.00–\$25.00.

403-12 (4,4,4) Electronics Technology. Characteristics and applications of semiconductor devices. (a) Fundamental theory and operation of semiconductor diodes and bipolar transistors, incremental models for transistors, biasing, stability, and feedback of single and multistage amplifiers. (b) Parameters and applications of field effect transistors, optoelectronic devices, thyristors, uni-junction transistors, and amorphous semiconductors. (c) Parameters and applications of operational amplifiers, linear integrated circuits, monolithic voltage regulators, and digital integrated circuits. Laboratory. Prerequisite: 304.

415-3 Basics of Concrete Structural Design. Analysis and design of basic reinforced concrete structural elements using ACI design handbooks. Consideration of working stress and ultimate strength design. Not for graduate credit. Prerequisite: 311b, 315.

416-3 Basics of Structural Steel Design. Analysis and design of simple structural elements and connections for steel buildings and bridges. Use of AISC code. Laboratory. Not for graduate credit. Prerequisite: 311b, 315.

424-9 (3,3,3) Power Systems Technology. (a) Energy sources; fuels and combustion; pollution control in power plants; and the various types of power plants. (b) Steam and gas turbine power cycles; performance and construction details of turbines. Heat balances on power plants. (c) Power plant auxiliaries including condensers, feedwater heaters, blowers; construction details of auxiliary equipment. Not for graduate credit. Prerequisite: 313b or concurrent.

426-9 (3,3,3) Photogrammetry. (a) Cameras and photography; flight planning; mathematical principles of vertical and tilted aerial photographs; ground control methods; extension of control; stereoscopy and parallax; basic instruments, stereo plotters, and latest developments. (b) Rectification of tilted photographs; stereoscopic plotting instruments; principles and use of oblique photography; analytic photogrammetry and new concepts. (c) Analysis of aerial photographs to determine soil and rock formations and their properties; interpretations for engineering and regional planning purposes. Laboratory. May be taken in a,b or a,c or a,b,c sequence. Photos and maps required for each course. Cost: approximately \$3.00. Prerequisite: 363a or consent of instructor.

430-1 to 8 Special Problems in Industry and Technology. Special opportunity for students to obtain assistance and guidance in the investigation and solution of selected technical problems. Prerequisite: consent of instructor.

437-9 (3,3,3) Communications Systems Technology. (a) Two-port networks and transmission lines. Simulated LF and UHF transmission lines demonstrate traveling wave phenomena. (b) Microwave devices and transmission through waveguides. Microwave laboratory. (c) Design of communication subsystems, signal analysis, bandwidth, and Fourier Series covered. Laboratory includes design and construction of circuits used in communication systems. Prerequisite: 304.

438-11 (4,4,3) Design of Control and Digital Systems. (a) Fundamentals of control systems: equations of electrical, mechanical, hydraulic, and thermal systems; applications of Laplace transforms, transfer functions, block diagrams, and flowgraphs. Analog computation laboratory. Prerequisite: 304c. (b) Basic graphical design methods: root locus, frequency response, Nyquist diagrams, and compensator design. Control systems laboratory. Prerequisite: 438a. (c) Design of digital systems: logic operations, number systems, and applications. Prerequisite: 304a or concurrent enrollment.

English

400-4 Introduction to English Linguistics. Methods of structuralizing: phonetics, phonemics, morphemics, syntax. Especially recommended for students preparing to teach English to native speakers.

402-4 Old English Literature in Translation. A study of prose selections from Bede, Aelfric, and other writers, and of poetry from the simplest riddles and gnomic verses to the complex forms of the Caedmonic and Cynewulfian schools, the elegaic poems, and *Beowulf*. Emphasis is on the literary and cultural significance of works studied.

403-4 History of the English Language. A survey of the development of the language from Indo-European to modern English with special emphasis on Middle and Early Modern English changes.

404-12 (4,4,4) Middle English Literature. (a) Middle English literature excluding Chaucer; (b) Chaucer: early poems and *Troilus*; (c) Chaucer: *Canterbury Tales*. May be taken singly.

410-4 Literature for the Adolescent. Criteria for evaluation of literary materials for junior and senior high school, with emphasis on critical approaches in selection of literature.

412-20 (4,4,4,4,4) English Nondramatic Literature. (a) 16th century. (b) 17th century. (c) The age of Dryden. (d) The age of Pope. (e) The age of Johnson. May be taken singly.

417-4 Black Literature. Studies in American and African Black literature, with major emphasis upon contemporary Black expression.

418-4 English Literature, 1885-1914. Poetry, drama and fiction of the later Victorian and early modern period.

420-8 (4,4) American Poetry. (a) Trends in American poetry to 1900 with a critical analysis of the achievement of the important poets, (b) the important poets since 1900. May be taken singly.

421-16 (4,4,4,4) English Poetry. (a) Early Romantics: major emphasis on general background and on Blake, Coleridge, and Wordsworth; (b) later Romantics: emphasis on Byron, Shelley, and Keats, the minor figures; (c) Victorian poets: Tennyson, Browning, Arnold, and other poets of England, 1830-1900; (d) modern British poets. May be taken singly.

425-4 Modern Continental Poetry. Representative poems by the major 20th century poets of France, Italy, Germany, Spain, Russia, and Greece.

431-12 (4,4,4) Major American Writers. Significant writers of fiction and nonfictional prose from the Puritans to the 20th century: (a) 1620-1800, (b) 1800-1865, (c) 1865-1915. May be taken singly.

438-4 Intellectual Backgrounds of American Literature. The relationship of basic ideas in America to American literature.

442-4 Romantic Prose. Fiction of Austen Scott, Mary Shelley, Peacock, the Gothic novelists; prose of Lamb, Landor, Hazlitt, DeQuincey; criticism, journals and letters.

443-4 Victorian Prose. The chief writers of nonfiction from the late romantics to 1880.

454-12 (4,4,4) English Fiction. (a) 18th century: Defoe through Jane Austen, (b) Victorian novel: 1830-1880, (c) 20th century. May be taken singly.

456-4 Modern Continental Fiction. Selected major works of European authors such as Mann, Silone, Camus, Kafka, Malraux, Hesse.

458-8 (4,4) American Fiction. (a) The novel in America from its beginning to the early 20th century, (b) trends and techniques in the American novel and short story since 1914. May be taken singly.

460-16 (4,4,4,4) British Drama. (a) Elizabethan drama excluding Shakespeare: from the beginning of the drama in late Middle Ages through its flowering in such Elizabethan playwrights as Greene, Peele, Kyd, Marlowe, Heywood, Dekker; (b) Jacobean drama: the Jacobean and Caroline playwrights: Jonson, Webster, Marston, Middleton, Beaumont and Fletcher, Massinger, Ford Shirley; (c) Restoration and eighteenth century drama: after 1660, representative types of plays from Dryden to Sheridan; (d) modern British drama. May be taken singly.

464-4 Modern Continental Drama. The continental drama of Europe since 1870; representative plays of Scandinavia, Russia, Germany, France, Italy, Spain, and Portugal.

468-4 American Drama. The rise of the theater in America; with readings of plays, chiefly modern.

471-8 (4,4) Shakespeare. (a) The plays before 1600. (b) The plays of 1600 and later. Readings on the life of Shakespeare, the theater, and the acting companies. May be taken singly.

473-4 Milton. A reading of a selection of the minor poems, of *Paradise Lost*, *Paradise Regained*, *Samson Agonistes*, and the major treatises.

485-4 Problems in the Teaching of High School English. Aims, methods, materials, tests, programs, and other aspects of English instruction in the high school.

486-2 to 8 Workshop in High School English. Intensive study in lectures, laboratory, and conferences, on the teaching of English in high school. Curriculum, materials, methods, aims.

487-2 to 8 Workshop in Junior High School English. Intensive workshop study in lectures, laboratory, conferences on the teaching of English in junior high school. Curriculum, materials, methods, and aims. Directed by competent authorities in the field.

491-4 Expository-Technical Writing. An all-university course designed to teach advanced academic and professional (non-fictional) writing skills. Prerequisite: GSD 102.

492-8 (4,4) Professional Writing II. Advanced creative writing. Prerequisite: 392 or consent of instructor.

493-4 Special Problems in English. Topics vary and are announced in advance; both students and faculty suggest ideas. May be repeated for a maximum of eight quarter hours provided registrations cover different topics. Prerequisite: consent of instructor.

494-4 Literature in Society. An analysis of the structure and function of literature as a social institution.

495-8 (4,4) Literary Criticism. (a) History of criticism: ideas and techniques from Aristotle to the end of the 19th century, (b) modern criticism: recent critics and critical attitudes, and practice in writing criticism. Open only to seniors and graduate students.

497-12 (4,4,4) Senior Honors Seminars. (a,b) Topics vary yearly. (c) Honors readings. Prerequisite: undergraduate status and departmental approval.

499-2 to 8 Readings in English. For English majors only. Departmental approval required. No more than four hours may be taken in any one quarter.

500-2 Materials and Methods of Research in English. The principal tools of literary scholarship and the more important studies and journals. Practice in the preparation of selective bibliographies and scholarly reports.

501-4 Old English Grammar. The development of the forms, the grammar, and readings.

502-4 Beowulf. Readings of the poem and study of its form, language, and history. Prerequisite: 501.

506-4 Old Norse.

508-4 to 12 Studies in Chaucer. Prerequisite: consent of department.

509-4 to 12 Studies in Middle English Literature. Prerequisite: consent of department.

511-4 to 12 Studies in the Renaissance. Prerequisite: consent of department.

513-4 to 12 Studies in 17th Century Literature. Prerequisite: consent of department.

514-12 to 24 Studies in Restoration and 18th Century Literature. (a) Restoration literature. (b) Early 18th century literature. (c) Later 18th century literature. Prerequisite: consent of department.

518-4 to 12 Studies in English Literature, 1885-1914. Prerequisite: consent of department.

519-4 to 12 Studies in Contemporary British Literature. Prerequisite: consent of department.

520-4 to 12 Studies in Romantic Writers. Prerequisite: consent of department.

521-4 to 12 Studies in Victorian Poetry. Prerequisite: consent of department.

524-4 to 12 Studies in the Metaphysical Poets. Prerequisite: consent of department.

532-4 to 12 Studies in American Transcendentalism. Prerequisite: consent of department.

534-4 to 12 Studies in Early 19th Century American Writers. Prerequisite: consent of department.

536-4 to 12 Studies in Later 19th Century American Writers. Prerequisite: consent of department.

537-4 to 12 Studies in 20th Century American Writers. Prerequisite: consent of department.

538-4 to 12 Problems in American Literature. Prerequisite: consent of department.

543-4 to 12 Studies in Victorian Nonfiction Prose. Prerequisite: consent of department.

555-4 to 12 Studies in the Victorian Novel. Prerequisite: consent of department.

560-4 to 12 Studies in Renaissance Drama. Prerequisite: consent of department.

566-4 to 12 Studies in Shakespeare. Prerequisite: consent of department.

579-4 to 16 Studies in Modern Literature. Prerequisite: consent of department.

- 580-4 Traditional Themes.** Persistent themes and legends in literature—King Arthur, Faust, Utopia, and the like. Prerequisite: consent of department.
- 581-12 (4,4,4) Problems in Teaching English.** (a) Composition. (b) Linguistics. (c) Literature. Prerequisite: consent of department.
- 585-2 Teaching College Composition.** Objectives, methods, and materials for the course; observation; and practice under supervision. Prerequisite: consent of department. Now graded S/U only.
- 593-4 Special Problems in English.** Topics vary and are announced in advance; both students and faculty suggest ideas. May be repeated for a maximum of twelve quarter hours provided registrations cover different topics. Prerequisite: consent of instructor.
- 594-8 (4,4) Studies in Literary Form and Symbolic Action.** Prerequisite: consent of department.
- 595-1 to 10 Independent Readings.** Preparatory for preliminary examinations for doctoral students in English. May be taken once only, grade of S/U, according to the result of the preliminary examination. Prerequisite: forty classroom credit hours beyond the M.A., exclusive of audits and readings.
- 596-4 Stylistics.** Defines style and its workings throughout literary history, applies the methods of modern analyses to literary works in English, shows how natural and artificial modes (genre and period definitions, metre, etc.) relate to literary artifacts and to the situation of the work of art vis a vis the civilization that engendered it.
- 598-1 to 6 (1 to 3, 1 to 3) Review of English and American Literature.** Restricted to master's degree students. Now graded S/U only.
- 600-1 to 48 Dissertation.**

Family Economics and Management

Graduate work in the Department of Family Economics and Management is offered toward a concentration for the M.S. degree in home economics.

407-2 to 8 Workshop. Designed to aid workers in professions related to use of family resources; emphasis for each workshop will be stated in course announcement.

423-3 Housing Alternatives. Selected aspects of the housing market and their relationship to changing life styles of households. Structure, operations and performance of the housing market and home building industry, housing finance, and contemporary housing problems and issues are considered. Prerequisite: 323, equivalent, or consent of instructor.

424-4 Trends in Household Equipment. Design, function, principles of operation, current trends and ecological problems related to equipment use in the home. Prerequisite: 324, or consent of instructor.

430-4 Family Financial Management. Developments in family financial management and evaluation of methods and procedures for helping families, with emphasis on the role of the consultant. Case studies and simulation, as well as a field problem, are included. Prerequisite: 331 and 341, equivalent, or consent of instructor.

435-4 Household Activity Analysis. Work methods, work place, and characteristics of the worker in relation to solving work problems of employed, full-time, and handicapped home managers.

471-2 to 6 Field Experience. Supervised learning experiences in an acceptable employment area. Prerequisite: consent of department chairman.

481-2 to 6 Readings. Supervised readings on selected equipment, family or consumer economics, housing, or management topics. Prerequisite: 8 hours in FE & M, and consent of department chairman.

500-4 Research Methods. Review of basic scientific methods of research applicable to family economics, management, housing, and equipment. Statement of research problems, collection, analysis, and interpretation of data are included. Prerequisite: Guidance and Educational Psychology 505.

520-3 Societal Factors in Housing. An analysis of housing as it relates to levels of living in contemporary households. Cultural determinants, community development, governmental policies and programs, and personal and social organization are considered as they relate to family housing. Prerequisite: 423, or consent of instructor.

540-4 Consumption Trends. Contemporary trends and issues in family income and consumption are evaluated. Prerequisite: 341, or equivalent.

550-4 Advanced Home Management. Readings, observations, projects, and discussions are used in evaluation of current research trends and issues in home management as they reflect family management processes. Prerequisite: 331, or equivalent.

571-4 Seminar in Family Economics and Management. Review and analysis of research in family economics, management, housing and equipment. Implementation and organization of programs to help families is emphasized.

572-2 to 8 Special Problems. Selection and investigation of a special problem under personal supervision of graduate faculty, approved by chairman and instructor. Prerequisite: 6 hours in FE & M, and consent of department chairman.

599-2 to 9 Thesis.

600-3 to 48 Dissertation. Minimum of 36 hours to be earned for the Doctor of Philosophy degree.

Food and Nutrition

Graduate work in the Department of Food and Nutrition is offered toward a concentration for the M.S. degree in home economics.

420-3 Recent Developments in Nutrition. Critical study of current scientific literature in nutrition. Prerequisite: 320 or equivalent. Offered alternate years.

421-3 Recent Trends in Food. Critical study of current scientific literature in food. Prerequisite: 320 or equivalent. Offered alternate years.

481-2 to 4 Readings. Supervised readings for qualified students. Prerequisites: 320 or consent of instructor and department chairman.

490-3 Nutrition and Growth. Lectures, readings, and discussion on nutrition in relation to human growth. Prerequisite: 320 or equivalent. Offered alternate years.

500-4 Research Methods. Study of methods employed in research in food and nutrition. The development of a research design selected on the basis of the interest and need of the student. Field trip. Prerequisites: 420, 421, or equivalent and statistics. Offered alternate years.

515-1 to 6 Seminar. Participation of staff and students in reporting and discussing research papers, research in progress, and current professional meetings. Required for all graduate majors in Food and Nutrition, one credit per quarter. Prerequisite: 420 or 421.

520-3 Advanced Nutrition. The biochemical and physiological basis of the metabolism of nutrients; current concepts. Prerequisite: 420 or equivalent. Offered alternate years.

556-4 Advanced Experimental Foods. Individual problems in food research and interpretation of pertinent literature. Prerequisite: 356, or 500, or equivalent. Offered alternate years.

572-2 to 8 Special Problems. For students recommended by their adviser and approved by the head of the department and the instructor in charge for independent work in directed study.

599-1 to 9 Thesis. Minimum of 5 hours to be counted toward a master's degree. Registration with approval of instructor.

Foreign Languages

The purpose of the courses numbered 288 is to help graduate students prepare for proficiency examination as required by certain departments for the Doctor of Philosophy degree. No prerequisite. Students must register for these courses and are advised to take them as a part of, and not in addition to, their graduate program.

The following courses do not fall within the normal pattern of courses leading to advanced degrees:

FR 288-9 (3,3,3) French as a Research Tool. Reading of French texts with emphasis on grammar as a tool for reading comprehension; development of reading skills in various fields; humanities, social studies, science; development of interpretative and translation skills in student's own discipline.

GER 288-9 (3,3,3) German as a Research Tool. (a), (b) Emphasizes basic grammatical structure and building of vocabulary necessary to a reading knowledge. (c) Finalizes translation skills in the student's particular discipline. With consent of student's department satisfactory completion of 288c satisfies the

Graduate School foreign language as a research tool requirement. Advanced placement in the courses determined by diagnostic tests.

RUSS 288-9 (3,3,3) Russian as a Research Tool. (a), (b) Emphasizes basic grammatical structure and building of vocabulary necessary to a reading knowledge. (c) Finalizes translation skills in the student's particular discipline. With consent of student's department satisfactory completion of 288c satisfies the Graduate School foreign language as a research tool requirement. Advanced placement in the courses determined by diagnostic tests.

SPAN 288-9 (3,3,3) Spanish as a Research Tool. (a), (b) Emphasizes basic grammatical structure and building of vocabulary necessary to a reading knowledge. (c) Finalizes translation skills in the student's particular discipline. With consent of student's department satisfactory completion of 288c satisfies the Graduate School foreign language as a research tool requirement. Advanced placement in the courses determined by diagnostic tests.

420-4 Modern Vietnamese Theater or Drama. Hat Boi (VN Opera), Hat Cheo (Popular Theater from North VN), Cai Luong (Modernized Opera and Musical), Thoai Kich (Modern Theater), and Kich Tho (Lyric Theater). Emphasis on the main plays, the stage techniques, and the literary and social meaning of those various forms of VN theater. Prerequisite: Linguistics 420 or consent of instructor.

430-3 Vietnamese Poetry. Classical and modern poetry. Emphasis on masterpieces and leading figures such as Ng Trae, Ng B Khiem, the authors of Chinh Phu Ngam and Cung Oan, Ng Huy Tu, Ng Du and the Kim Van Lieu, Ng Cong Tru, and the new poetry with the impact foreign poetry had on it. Prerequisite: Linguistics 420.

453-4 Methods in Teaching Modern Foreign Languages. Survey of general principles of second-language teaching, based upon insights of modern linguistics and learning-psychology. Intensive practical work in classroom and language laboratory with teachers experienced in the student's specific language field. Required of prospective teachers of modern foreign languages in the secondary schools. Prerequisite: concurrent or prior enrollment in a 300 level foreign language course.

477-3 Contemporary Vietnamese Prose. Open to advanced students. Short stories, novels, and essays (main trends and evolution). Emphasis on works of prominent authors since 1920, such as Nguyen V. Vinh, Pham Quynh, H. N. Phach, Ng. Tr. Thuat, P. K. Binh, Khai Hung, and the recent generation. Prerequisite: Linguistics 410.

497-9 (3,3,3) Survey of Vietnamese Literature. Readings and analysis of selected works of Vietnamese literature from the beginning to the present time. Knowledge of Chinese characters and demotic characters not necessary, since all texts will be in Roman script. Presented in Vietnamese. Prerequisite: equivalent of two years of Vietnamese.

543-1 to 6 Research Problems. Individual research on a literary or linguistic problem involving original investigation in areas not covered by seminars or thesis. Two hours may be used for a research paper for non-thesis programs. (a) German; (b) French; (c) Spanish; (d) Russian.

560-3 to 4 Bibliography and Research Techniques in Foreign Language Areas. Bibliography and research methods in the target language and its culture. Introduction to the use of the chief reference works in the humanities and social sciences as they deal with areas in which the target language is spoken. (a) German, 3 cr. (b) French, 3 cr. (c) Spanish, 4 cr. (d) Russian, 3 cr.

CLASSICAL STUDIES

The classical studies section does not offer a major concentration in the program leading to the Master of Arts in Foreign Languages degree. Four hundred level courses in the classical studies section may be taken for graduate credit, however, unless otherwise indicated in the course description.

420-3 Greek Literature in Translation. A study of woman and man in the masterpieces of ancient Greek literature in translation. Not for graduate credit.

431-3 Latin Literature in Translation. A reading and discussion of the great works of Roman literature—history, satire, epic, love, poetry, elegy, lyric, and drama—with some attention to their influence on modern literature and culture. Students will have the opportunity to study one author in some depth. Not for graduate credit.

FRENCH

- 401-9 (3,3,3) French Literature of the 17th Century.** (a) Tragedy: Corneille and Racine. (b) Comedy: Moliere. (c) Philosophy, fiction and fable: Descartes, Pascal, La Rochefoucauld, La Bruyere, Mme. de Lafayette, La Fontaine and others. Prerequisite: 354, 397, or consent of instructor.
- 402-6 (3,3) Contemporary French Novel and Theater.** (a) Major themes, forms, and techniques in the novel with particular emphasis on Gide, Proust, Malraux, Sartre, Camus, and Robbe-Gillet. (b) A study of the dramatic masterpieces of Girandoux, Claudel, Anouilh, Sartre, Camus, Ionesco, and Beckett with respect to structure, technique, themes, and language. May be taken out of sequence. Prerequisite: 354, 397, or consent of instructor.
- 403-9 (3,3,3) French Literature of the 18th Century.** (a) Theater. (b) Novel. (c) Philosophic and Didactic Literature. Prerequisite: 354, 397, or consent of instructor.
- 408-4 French Civilization.** Society, culture, social institutions, and the arts of contemporary France. Lectures, slides, discussions. Prerequisite: 350, or consent of instructor.
- 409-3 French Romanticism in the Drama, Novel, and Poetry.** Prerequisite: 354, 397, or consent of instructor.
- 419-3 French Poetry from Nerval through Symbolism.** Prerequisite: 354, 397, or consent of instructor.
- 429-6 (3,3) French Novel and Theatre, 1850-1930.** (a) Realism, naturalism, and the reaction to these in the novel, from Flaubert through Barres. (b) Realism, naturalism, and symbolism in the theatre from mid-19th Century to 1930. Prerequisite: 354, 397, or consent of instructor.
- 430-2 to 6 Travel-Study in France.** Comprises part of the travel-study program in France. Prerequisite: participation in the French travel-study program.
- 461-4 French Stylistics.** A practical study of the aesthetics and theory of French literary expression through examination of various stylistics methods and through stylistic analyses of excerpts from representative works of great French authors. Prerequisite: 350, 354 or consent of instructor.
- 498-3 Honors Seminar.** Study of an author or a special topic. Restricted to undergraduates. Prerequisite: consent of department.
- 499-4 Honors Essay.** Individual exploration of some question, author, or theme of significance within the field of French literature or language. Restricted to undergraduates. Prerequisite: 498 and consent of department.
- 501-2 to 6 Seminar on a Selected French Author.** Intensive study of one author. May be taken a maximum of 3 times.
- 509-2 to 6 Studies in 19th Century French Literature.** Selected topics, movements, or authors.
- 515-6 (3,3) Old French.** (a) Intensive reading and interpretation of the *Chanson de Roland*. (b) Linguistic and literary analysis of one or several romances by Chretien de Troyes.
- 520-4 Graduate Composition.** Composition based on study of contemporary French; translation, imitation, writing in various styles.
- 522-2 to 6 Studies in 20th Century French Literature.** Selected topics, movements, or authors.
- 523-2 to 6 Studies in Medieval French Literature.** Study of two typical genres of medieval literature—the *chanson de geste* and courtly romance. Special emphasis on the *Chanson de Roland*, *Tristan et Iseult*, and Chretien de Troyes' *Perceval*. Other forms of medieval literature will be treated briefly.
- 524-2 to 6 Studies in French Literature of the Renaissance.** Readings of the works of Rabelais and Montaigne or a study of Ronsard and the other Pleiade poets.
- 526-2 to 6 Studies in 18th Century French Literature.** Topics, movements, or authors in the literature of the 18th century.
- 536-3 (1,1,1) Teaching French at the College Level.** Prepares graduates students in French for teaching at the university level. Required of all teaching assistants in French. May not be counted to satisfy secondary certification requirements.
- 599-2 to 9 Thesis.** Minimum of 5 hours to be counted toward a master's degree.

GERMAN

- 401-4 (2,2) Goethe's Faust.** (a) The Faust legend and early Faust books and

plays; the genesis of Goethe's *Faust*: reading of Part I. (b) Reading of Part II; study of the symbolism used such as the blending of paganism with Christianity, ancient Greek culture with Germanic culture. Must be taken in a,b sequence.

402-3 Advanced German Syntax. Descriptive and contrastive study of German syntax, with particular attention to the needs of prospective teachers.

403-3 German Ballads and Lyrics. A selective study of the foremost examples of German balladry and lyric poetry, ranging from the poetry of Klopstock and Buerger to that of Hesse, Benn, etc. Lectures, recitations.

404-4 Weimar and Its Aftermath. German writings from the inception of the Weimar Republic to the end of World War II, with special reference to the correlation existing between literary expression and social, economic, and political conditions.

406-3 The German Comedy. Comic and satirical works in German Literature, with special emphasis on the "Lustspiel" since 1800; lectures, reports.

408-4 German Civilization. Intensive study of the German speaking areas of the world, with emphasis on the anthropological and sociological aspects of their respective cultures (Austrian, German, Swiss, "Reichs-deutsch," etc.); lectures, reports.

411-6 (3,3) Middle High German. (a) Grammar, and selective readings in both MHG originals and NHG translations of such epics as the *Nibelungenlied* and *Gudrun*. (b) The courtly epic poetry of such authors as Wolfram von Eschenbach, Gottfried von Strassburg, Hartmann von Aue, the lyric poetry of Walther von der Vogelweide, and didactic prose.

412-2 Contrastive Phonetics: English and German. Study and comparison of the speech sounds of English and German. Provides prospective teachers of German with the skills requisite for helping students to develop adequate pronunciation habits in German.

413-3 History of the German Language. Survey of the development of German through the Old-, Middle-, and New-High-German periods; lectures, readings, reports. Prerequisite: 412.

417-3 The German Drama of the 20th Century. Reading and interpretation of the dramas of Brecht, Durrenmatt, Frisch, and others; lectures, discussions, and reports.

497-1 to 2 Readings in 18th Century German Literature. Departmental approval required.

498-1 to 2 Readings in 19th Century German Literature. Departmental approval required.

499-1 to 2 Readings in 20th Century German Literature. Departmental approval required.

500-2 Seminar in Contemporary Literature. Intensive study of the works of representative German authors, with special reference to the correlation existing between literary expression and social, economic, and political conditions since 1900. Lectures, outside readings, reports.

501-2 to 6 Seminar on a Selected German Author. Intensive study of one author—his life, his work, and his place in the literary and cultural development of civilization. Lectures, outside readings, reports.

503-3 Introduction to Germanic Linguistics. Introduction to comparative Germanic linguistics, tracing relationships among Germanic languages on the basis of phonology, morphology, and syntax. Prerequisite: 412.

506-2 Romanticism I. Study of the forerunners of German Romanticism: Holderlin, Jean Paul; and the authors of Early Romanticism: the writers of the so-called "Berlin School," with special attention to their involvement and reaction to 18th century thought. Lectures, reports.

507-2 Romanticism II. Study of Patriotic Romanticism: Kleist, Arndt, Korner, Uhland, etc. and Late Romanticism: Eichendorff, Lenau, Grillparzer, Heine, Morike, etc. Lectures, reports.

509-4 (2,2) Old High German. (a) Phonology, morphology, etymology, and syntax. (b) Continued study of grammar and reading of Franconian, Bavarian, and Alemannic texts.

512-3 19th Century German Novel. German literature from the decline of Romanticism to the end of the century. A study of trends and representative works of such authors as Keller, Fontane, Raabe, etc. Lectures, reports.

513-3 20th Century German Novel. Continuation of 512. Study of representative writers of expressionism, "Neue Sachlichkeit," etc. Lectures, reports.

514-3 Seminar in Folklore. Study of German folk literature, with emphasis on folk tales (such as Grimms' Household Tales, regional sagas, etc.), chap-

books (such as Dr. Faust, Till Eulenspiegel, etc.), folksongs (Des Knaben Wunderhorn), and folk drama. Lectures, reports.

533-3 Gothic. Historical setting and significance of Gothic; phonology, morphology and syntax; selected readings from Wulfila.

536-3 (1,1,1) Teaching German at the College Level. Prepares graduate students in German for teaching at the university level. Required of all teaching assistants in German. May not be counted to satisfy secondary certification requirements.

554-3 German Classicism. Analysis of philosophical influences (Herder, Kant) in the classical period and intensive reading of major works of Goethe, Schiller, Kleist, and Jean Paul. Lectures, discussions, and reports. Prerequisite: graduate standing.

599-2 to 9 Thesis.

GREEK

The Greek section does not offer a major concentration in the program leading to the M.A. in Foreign Languages degree. Four hundred level courses may be taken for graduate credit, however, unless otherwise indicated in the course description.

415-2 to 8 Readings from Greek Authors. Flexible reading program of works not included in other courses. By special permission only. Not for graduate credit.

LATIN

The Latin section does not offer a major concentration in the program leading to the M.A. in Foreign Languages degree. Four hundred level courses in the Latin section may be taken for graduate credit, however, unless otherwise indicated in the course description.

415-2 to 8 Readings from Latin Authors. Flexible reading program of works not included in other courses. By special permission only. Not for graduate credit.

ROMANCE PHILOLOGY

The Romance Philology section does not offer a major concentration in the program leading to the M.A. in foreign languages degree. Four hundred level courses in the Romance Philology section may be taken for graduate credit unless otherwise indicated in the course description.

410-4 Romance Philology I. Survey of phonology, morphology, and syntax changes in Romance languages in general; special attention to the developments in French and Spanish for majors in these fields.

RUSSIAN

The Russian section does not offer a major concentration in the program leading to the M.A. in Foreign Language degree. See Chapter 2 regarding a concentration in Russian for the Master of Science in Education degree in secondary education or higher education.

400-4 Travel-Study in USSR. Specialized course comprising part of the travel-study program in the Union of Soviet Socialistic Republics. Prerequisite: 201c or equivalent.

405-4 Translation Techniques. Translation of material from humanities, social sciences and sciences; discussion of techniques, procedures, methodology, and art of translation. The course is also designed for students majoring in fields other than Russian. In addition, students will spend several hours weekly in a workshop translating individually supervised projects. Prerequisite: 201c or consent of the department.

408-4 Soviet Civilization. A study of present-day political, economic, and social institutions of the Soviet Union. Reading and translation from contemporary news media. Prerequisite: 201c or consent of department.

412-4 Russian Realism. Authors in the 19th century Russian literature. Special attention to stylistic devices. Lectures, readings, and individual class reports. Prerequisite: 308b or consent of department.

- 413-4 Russian Drama in the Nineteenth Century.** Griboyedov, Gogol, Pushkin, and minor dramatists. Prerequisite: 308b or consent of department.
- 414-3 Russian Poetry from Zhukovsky to 1920.** A study of Russian Poetry from Sentimentalism through Symbolism. Prerequisite: 308b or consent of department.
- 415-3 Russian Phonetics.** Analysis of the sounds of Russian and their manner of production; intonation and stress; levels of speech, oral practice. Prerequisite: 201c.
- 416-4 Russian Poetry Since 1920.** Literary trends and representative works of Russian poets such as Mayakovsky, Yevtushenko, Voznesensky, and others. Prerequisite: 308b or consent of department.
- 425-3 Soviet Russian Literature.** Major fiction writers and literary trends since 1917. Lectures, readings, and reports. Prerequisite: 308b or consent of department.
- 452-4 Advanced Composition and Conversation.** Oral and written composition of a practical nature for advanced students; emphasis on study of idiomatic expressions and current usage.
- 462-4 Russian Stylistics.** Writing style in Russian and its application to the development of skill in written expression. Advanced work in the principles of Russian grammar and composition. Prerequisite: 308b or consent of department.
- 500-2 Seminar in Contemporary Russian Literature.** Intensive study of the works of representative Russian authors, with special reference to the correlation existing between literary expression and social, economic, and political conditions since the Revolution. Lectures, outside readings, reports are required.
- 501-2 Seminar on a Selected Russian Author.** Intensive study of one author, his life, his work, and his place in the literary and cultural development of civilization.
- 503-2 Seminar on 19th Century Russian Literature.** Intensive study of the modern Russian novel as an expression of social and cultural movements. Outside readings and class discussions.
- 510-3 Russian Literature of the 18th Century.** The Baroque period, classicism and sentimentalism. Emphasis on the classical period of the 18th century. Analysis of texts and reports.
- 514-6 (3,3) History of the Russian Language.** A survey of the phonological, morphological, and syntactical changes from the period of the common Slavic to the present Russian literary language.
- 520-4 Russian Linguistic Structure.** Structural analysis of present-day Russian with special attention to morphology and syntax.
- 525-4 Comparative Slavic Phonology and Morphology.** Contemporary comparative Slavic languages. Emphasizes phonology, morphology, and syntax.
- 599-2 to 9 Thesis.**

SPANISH (Iberian)

- 400-4 Travel-Study in Spain.** Course taught as part of the travel-study tour in Spain. Usually given in the summer. Prerequisite: participation in travel-study tour in Spain.
- 401-3 Spanish Novel of the 19th Century.** Study of representative novels of Fernan Caballero, Valera, Pereda, Galdos, etc.
- 402-3 Spanish Drama of the 18th and 19th Centuries.** Reading of representative plays of the chief dramatists from Moratin to the Generation of 1898.
- 403-3 Spanish Poetry.** General survey of Spanish poetry from its beginnings to 1900.
- 404-6 (3,3) Spanish Literature of the Twentieth Century.** (a) The Generation of 1898. (b) Contemporary Novel and Essay. Main trends of the Spanish novel and essay since 1900.
- 415-4 The Linguistic Structure of Spanish.** Phonology and grammatical structure of Spanish. Examination of the features of the principal dialects. Required of all majors.
- 425-4 History of the Spanish Language.** Survey of development from the Middle Ages to the present.
- 440-6 (3,3) The Golden Age: Drama.** Plays of Lope de Vega, Calderon, Tirso de Molina, Ruiz de Alarcon, and others.
- 445-4 Cervantes.** Don Quixote; Other works assigned as collateral readings.
- 490-1 to 6 Readings in Spanish.** Directed independent readings in a selected area. Prerequisite: consent of department.

501-2 to 6 (2 per quarter) Seminar on a Selected Spanish Author. Study of one author—his life, his works, and his relationships to the literary and social currents of his time.

502-3 Seminar in Hispanic Linguistics. Intensive study of a selected topic to be announced each quarter. May be repeated for different topics. (Suggested topics: semantics, meta-linguistics, problems in translation, Hispanic dialectology, etc.)

515-6 (3,3) Old Spanish. (a) Intensive reading and interpretation of the *Poema de Mio Cid*. (b) Reading of various medieval works with linguistic analysis.

520-3 Seminar in Syntax. Stylistics and grammatical analysis.

536-3 (1,1,1) Teaching Spanish at the College Level. Prepares graduate students in Spanish for teaching at the university level. Required of all teaching assistants in Spanish. Does not satisfy secondary certification requirements.

590-1 to 4 Readings in Spanish. Directed independent readings in a selected area.

599-2 to 9 Thesis. Minimum of five hours to be counted toward a master's degree.

SPANISH (American)

400-4 Travel-Study in Spain. Course taught as part of the travel-study tour in Spain. Usually given in the summer. Prerequisite: participation in travel-study tour in Spain.

421-3 Survey of Modernism in Spanish American Poetry. Study of its origins, characteristics and achievements.

422-3 Contemporary Spanish American Poetry. Spanish American poetry since modernism.

423-3 The Mexican Novel of the 20th Century. Emphasis on fiction dealing with the Revolution and related social problems.

424-3 Gaucho Literature. Study of the Gaucho as a social class and of the types of literature developed to portray and symbolize his way of life, attitudes, and values.

426-3 The Mexican Short Story. Survey of the Mexican short story from pre-Conquest to the present.

427-3 Spanish American Drama. Study of representative works of Florencio Sanchez, Rodolfo Usigli, Armando Mooock, Samuel Eichelbaum, Xavier Villarrutia, and others.

428-3 Colonial Literature. Study of the literature of Latin America before 1800.

429-6 (3,3) The Latin American Novel. Survey of the genre in Latin America: (a) From the beginnings to 1940; (b) From 1940 to the present.

478-4 Seminar in Latin American Thought. (See Philosophy 478.)

500-2 to 6 (2 per quarter) Seminar in Latin American Fiction. The works of a specific novelist or group of novels on a similar theme studied as a reflection of social and cultural conditions in a country or geographical area.

536-3 (1,1,1) Teaching Spanish at the College Level. Prepares graduate students in Spanish for teaching at the university level. Required of all teaching assistants in Spanish. Does not satisfy secondary certification requirements.

590-1 to 4 Readings in Spanish. (See Spanish-Iberian.)

599-2 to 9 Thesis.

Forestry

Courses in this department may require the purchase of supplemental materials. Field trips are required for certain courses.

401-3 Advanced Forest Mensuration. Theory and practical problems in biometrics to obtain estimates of forest populations. Use of computers and other advanced techniques. Prerequisite: 363a,b, 369.

410-3 Forest Management for Wildlife. Interrelations between forest practices and game. Forest protection from mammals and birds. Emphasis is on treatment of the forest. Prerequisite: forestry major, or consent of instructor.

420-4 Advanced Wood Technology. The study of wood as an industrial and structural material; the botanical, physical, chemical, and mechanical properties are discussed. The advantages and disadvantages of wood as a raw material are analyzed. Prerequisite: 320, Mathematics 111a,b or equivalent.

433-4 Forest Products Industries. Raw material requirements, the processes and the products of forest industries. The past, present, and future economic status of each industry is briefly examined. Requires field trips.

440a-4 Ecology of Grasses and Grasslands. (See Botany 440a.)

450-4 Forest and Park Management. Fundamentals of management and administration of recreation forests. Development of forests and suburban parks under a forest environment. Review of current local, state and Federal legislation applicable to forest recreation. Prerequisite: 350b or 460 or consent of instructor.

451A-3 Forest Park Plans. Fundamental and applied principles and elements involved in site, master, and comprehensive planning for outdoor recreation at the state, metropolitan, and federal level. Requires field trips. Prerequisite: 450 or consent of instructor.

451B-4 Forest and Park Planning and Development. Basic planning and design principles of space, scale and circulation applied to park and recreation areas at the state, metropolitan, and federal levels. Basic elements in park and recreation area site planning selection, and development. Requires field trips. Prerequisite: 451A.

460-3 Forest Park Field Studies. Park conditions, visitors, and management practices in different county, state, and federal park systems in the United States. Requires field trip. Prerequisite: 350a, or b or consent of instructor.

463-3 Regional Silviculture. Applied systems of silviculture to commercially important timber species and types in U.S. Prerequisite: 365b.

466-3 Forest Watershed Management. Effects of treatment of forested watersheds on quality and quantity of water yield. Consideration of alternative in water use and flood control. Prerequisites: 365a, Plant Industries 301, GSA 330, or consent of instructor.

470-8 (4,4) Economics of Forestry. (a) Introduction to forest economics; forestry production and investment. (b) Forestry marketing, macro-economics and planning. Taken in a,b sequence. Prerequisite: Agricultural Industries 204, or Economics 215, or equivalent.

471-4 Land Resource Economics. (See Agricultural Industries 471 or Economics 471.)

475-4 Forest Management. The application of business procedures and technical forestry principles to manage forest properties for their resources and benefits. Requires field trips. Prerequisite: 340, 363a,b; 365a,b; 470.

483-4 Urban Forest Management. Evaluation of urban forests, city forest preserves, and city watersheds. Emphasis on urban environment (soil, water, atmosphere) and tree species adapted to it. Administrative and legislative problems and forestry practices considered. Expenses required for 3-day field trips. Prerequisite: 221 or knowledge of plant materials.

490-4 to 16 Practicum. Supervised practicum experience in a professional setting. Emphasis on administration, supervision, teaching, and program leadership in community, school, park and forest, institution, and other recreation settings. Prerequisite: consent of instructor.

520A-1 to 6 Readings in Forestry or Forest Recreation. Intensive consideration is given to current practices and problems in forestry. Prerequisite: consent of instructor.

520B-1 to 6 Readings in Resource Economics. (Same as Economics 502 or Agricultural Industries 520b.) Directed readings in the field of resource economics. Prerequisites: consent of instructor.

520C-1 to 6 Readings in Forest Products or Wood Science. Advanced study of the techniques of manufacture in the wood and fiber using industries. Also, advanced study of physical, mechanical and chemical properties of wood as a material. Prerequisite: consent of instructor.

570-4 Principles of Research. Research philosophy, approaches to research; theory, hypotheses, inference and prediction; problem identification, project development and organization; methods of data collection, analysis and presentation; drawing conclusions and organizing results. Prerequisite: 4 hours in statistical methods or consent of instructor.

575-1 to 6 Research. Directed research in selected fields of forestry.

581-1 to 6 Advanced Forestry Seminar. Study and discussion of contemporary forestry problems. Prerequisite: consent of instructor.

588-1 to 12 International Graduate Studies. University residential graduate study program abroad. Prior approval by the department is required both for the nature of program and the number of quarter hours of credit.

599-1 to 9 Thesis. Minimum of 5 hours to be counted toward a master's degree.

Geography

404-7 (4,3) Advanced Economic Geography I. Deals with one or more of the following: transportation, manufacturing, agriculture, resources, trade and urban geography; depending on, and varying with, interests of instructors. Thus, a student may register more than one time. Emphasis will be directed at familiarizing the student with techniques of analysis, and at developing concepts and principles that underlie understanding of the phenomena and their geographic significance. Prerequisite: 304.

406-7 (4,3) Advanced Cultural Geography I. Deals with one or more of the following: population, settlement, ethnic characteristics, political factors; depending on, and varying with, interests of the instructors. Thus, a student may register more than one time. Emphasis will be directed at familiarizing the student with techniques of analysis, and at developing concepts and principles that underlie understanding of the phenomena and their geographic significance. Prerequisite: 306.

407-7 (4,3) Advanced Cultural Geography II. Content drawn from same broad range of topics as 406. To be alternated with 406 to enable student to specialize further in cultural geography. Prerequisite: 306 or consent of instructor.

410-8 (4,4) Advanced Geographic Techniques. Geographic applications of cartographic and quantitative research techniques. Prerequisite: 310 or consent of instructor.

416-8 (4,4) Cartography. Instruction and practice in the techniques of map-making and problems in map reproduction. Laboratory. Prerequisite: 310.

421A-4 Urban Geography. Examination of extracity relationships-theory and structure, intra-city relationships-theory and structure, and selected urban problems. Offered once annually. Prerequisite: consent of department.

422-8 (4,4) Economics in Geography. (a) Concepts, symbols, theory, language. Theory and analysis. Elementary mathematics, individual's preferences, production functions, the firm, markets, welfare economics, Pareto Optimality, and externalities. (b) Process, criteria, conditions. Certainty, uncertainty, and inter-temporal criteria; public, private, and merit goods and services; multipliers; shadow prices, spatial and regional economic concepts; public expenditure criteria; free market allocation, comprehensive plans, and multiple objectives. Prerequisite: taken in a,b sequence or consent of instructor.

424-4 Regional Problems in Resource Management.

430-4 Theory of Environment. Exploration of the hypothesis that the physical environment works on local hydrology, soils, natural vegetation, agriculture, and landforms, through energy and moisture exchanges. Emphasis on model building for comparison of subsystems, to rate effectiveness of contrasting environments, and to project these consequences to environmental management questions. Prerequisite: consent of department.

431-4 Medical Geography. Deals with the distributions of diseases and attempts to use the operational concepts of human ecology as a point of departure. A brief historical outline and an introduction to public health, epidemiology, and related fields is provided. Problems of communicable and chronic diseases, nutritional deficiency, geochemical relations, biometeorology and medical climatology, environmental pollution, and seasonal disease calendars are emphasized. Taught by Department of Geography staff.

432-12 (4,4,4) Exchanges in Environment. (a) Energy exchanges in the environment. (b) Moisture exchanges in the environment. (c) Momentum exchanges in the environment. Prerequisite: 302, or 400, or consent of the department.

433-8 (4,4) Advanced Physical Geography. Topics may include landforms, climate, soil, or water. Varies with the interests of the instructor. Prerequisite: 302.

438-4 Applied Meteorology. (See Geology 438.)

440-2 to 6 Readings for Majors. Supervised readings in selected subjects. Student submits statement of problem to instructor and departmental chairman before enrolling in course. Prerequisite: advanced standing and consent of instructor and department chairman.

443-4 Teaching of Geography. Presentation and evaluation of methods of teaching geography. Emphasis upon geographic literature, illustrative materials, and teaching devices suitable to particular age levels. Prerequisite: 300.

450-4 Physical Environmental Systems in Geography. Research in physical

geography. Budgeting of energy, momentum, and matter to models of atmospheric diffusion and circulation. Emphasis on research problems in urban climatology, hydrometeorology, bioclimatology, medical geography, and climatic geomorphology.

451-4 Resource Management Systems in Geography. Literature in resource management problems. Emphasis on theory methods of measurement and evaluation concerning implications of public policy. The role of resources in economic development and regional planning, water and related land resource problems, and environmental quality from a multi-disciplinary perspective.

452-4 Systems of Cultural Adaptation in Geography. Cultural-historical inquiry in geography. Emphasis on theory and methodology in the study of the relations between nature and culture, the evolution of livelihood forms, and cultural persistence and change in a geographical context.

470-16 (4,4,4-8) Urban Planning. (Same as Government 470.) (a) Planning concepts and methods, (b) field problems, (c) planning and public administration internship. Prerequisite: junior standing.

471-7 (4,3) Regional Planning. Examination of the viewpoint, methods, and techniques of regional planning. Prerequisite: consent of instructor.

487-10 (2,4,4) Honors in Geography. (a) Tutorial, (b) reading, (c) supervised research. Must be spread over the last two years of the undergraduate's career. Open to students in the honors program with consent of the department. May be taken in either a,b,c or b,a,c sequence.

490-1 to 16 (1 to 4, 1 to 4, 1 to 4, 1 to 4) Tutorial in Geography. Individual and small group conferences with staff members to examine geographic concepts. (a,b,c) Prerequisite: senior concentration in geography. (d) Summer institute. Not for geography majors.

500-4 Geographic Techniques I. Emphasizes field and quantitative techniques used in geography.

502-4 Principles of Research. Meaning, philosophy, science, reasoning, creative endeavour, problem identification of research, research methodology, preparation of project statements, analysis, and results in a multi-disciplinary approach. Prerequisite: graduate standing.

505-8 (2,2,2,2) Pro-Seminar in Geography. Discussion of basic issues and development of professional perspective in (a) Physical, (b) Economic, (c) Cultural, (d) Geographic Thought. Taught by the entire resident staff.

511-4 Philosophy of Geography. The nature of geography. Current trends in the field, present-day geographers, and schools of thought. Geography's place among the disciplines.

514-2 Teaching of College Geography.

515-4 to 6 Field Course. Designed to give actual experience in the field. Under guidance of staff members students will gather data and work toward the solution of selected field problems in one particular region of the world. This course will not be offered on campus, but will be in a field camp location suited to the study of selected problems. Prerequisite: consent of department.

520-2 to 12 Seminar in Physical Geography.

521-2 to 12 Seminar in Economic Geography.

522-2 to 12 Seminar in Regional Geography.

523-4 to 12 Seminar in Cartography. Prerequisite: 416 or consent of department.

524-2 to 12 Seminar in Cultural Geography. Prerequisite: consent of department.

525-4 Seminar: Economics in Geography. (See Economics 525.) Prerequisite: 422b or consent of instructor.

527-2 to 8 Seminar in Urban and Regional Planning. Prerequisite: graduate standing or consent of instructor.

530-2 to 10 Independent Studies in Geography.

540a-2 to 36 Research in Physical Geography. Prerequisite: 520.

540b-2 to 36 Research in Economic Geography. Prerequisite: 521.

540c-2 to 36 Research in Regional Geography. Prerequisite: 522.

540d-2 to 36 Research in Cultural Geography. Prerequisite: 524.

550-2 Introduction to Graduate Studies in Geography. Faculty introduce examples of research and convey the nature of researchable topics to students. Introduces students to the evaluation of research designs. Prerequisite: graduate standing.

599-3 to 9 Thesis. Minimum of 5 hours to be counted toward a master's degree. Prerequisite: consent of department.

600-1 to 48 Dissertation. Minimum of 36 hours to be earned for the Doctor or Philosophy degree.

Geology

400-3 Earth Science Seminar. The interrelationships and unifying principles of the earth science fields. Illustrations of the nature of the Earth's dynamic system designed especially for science teachers and earth science students. Prerequisite: GSA 110, upper class standing, or consent of department.

412-3 Advanced Mineralogy. A continuation of Geology 310 with emphasis on crystallography, crystal chemistry, crystal structure and stereographic projection. Prerequisite: 310.

414-5 Paleobotany. (See Botany 414.)

415-3 Optical Mineralogy. The optical properties of minerals and the use of the petrographic microscope for identification of crystals by the immersion method. Lecture-laboratory. Prerequisites: 310, Physics 111b, 206b, or 211b.

416-4 X-Ray Crystallography. (Same as Chemistry 416.) Introduction to the study, measurement, and identification of unknown crystalline materials by X-ray diffraction techniques (especially the Debye-Scherrer methods). Upon request, non-geology majors may work with unknowns from their own fields of study. Prerequisites: 310, Mathematics 150b or consent.

418-4 Low Temperature Geochemistry. The application of chemical principles to geologic processes that occur on and near the earth's surface. Lecture and laboratory. Prerequisites: 310, Chemistry 121a,b.

420-8 (4,4) Geology of Petroleum. The geological occurrence of petroleum, including origin, migration, and accumulation; a survey of exploration methods and production problems and techniques. Laboratory study applies geological knowledge to the search for and production of petroleum. Laboratory. Prerequisites: 221, 302.

425-5 Invertebrate Paleontology. Principles of paleontology and a survey of the important invertebrate phyla and their fossil representatives. Laboratories. Field trips required. Prerequisites: 221 or GSA 115.

428-4 Paleocology and Environments of Deposition. Characteristics, distribution and classification of recent and ancient environments. Criteria for recognizing ancient environments. Sedimentologic and paleoecologic approaches. Recognition of ancient environments and environmental associations. Laboratory. Field trips required. Prerequisites: 425, 325.

430-4 Physiographic Provinces of North America. The factors and geologic history which have determined the nature of the landscape in the physiographic divisions of North America. Prerequisite: 220 or consent.

435-8 (4,4) Hydrogeology. A problem-solving oriented course which covers the analysis and interpretation of the distribution, origin, movement, and chemistry of ground water. Laboratory. Must be taken in a,b sequence. Taught in alternate years after 1973-74. Prerequisites: 220, Mathematics 252.

436-8 (4,4) Elementary Exploration Geophysics. Theory and practice of geophysics as applied to the exploration and development of natural resources. Laboratory involves use of geophysical instruments and interpretation of field data. Field trips required. Taught in alternate years after 1972-73. Prerequisite: 220; Mathematics 252; Physics 111, 206, or 211 or concurrent enrollment.

438-4 Applied Meteorology. (Same as Geography 438.)

Analysis of meteorological patterns approached through study of several case histories. Evaluation of meteorological data, air mass and frontal analysis, development of weather forecasts, study of meteorological instruments, clouds, and precipitation patterns. Prerequisite: GSA 330 or consent of instructor.

440-1 to 4 Independent Study. Independent study which does not normally require the development of new basic data. Hours, and subject matter decided during consultation with a faculty member. Prerequisite: advanced standing and consent of instructor.

449-1 to 3 Internship. Credit for professional experience in the geological sciences. Arrangements made with chairman. Prerequisite: advanced standing.

450-3 Introduction to Field Geology. Introduction to field techniques, principles of geologic mapping, and map interpretation. Field trip fee \$5. Prerequisites: 302 and 315.

454-9 Field Geology. Advanced field mapping in the Rocky Mountains, including problems in stratigraphy, structure, petrology, paleontology, geomorphology and economic geology. Transportation fee \$70, supplies \$6 (s). Prerequisites: 302 and 315; 450 recommended.

455-3 Engineering Geology. (Same as Engineering 455). An examination of

problems posed by geology in the design, construction and maintenance of engineering works. Topics studied include ground water, land subsidence, earthquakes, and rock and soil mechanics. Two term papers and a field trip required. Prerequisite: 220 or consent.

460-4 Geological Data Processing. Two lecture and two laboratory periods each week for instruction in computer application to geological problems including the processing and programming of data and the interpretation and evaluation of results. Prerequisites: Engineering 222 or Computer Science 202.

470-9 (3,3,3) Earth Science for Teachers. Earth's dynamic system, and principles of the physical and earth sciences applied to man's environmental problems. Use of ESCP, Time, Space and Matter, IPS, ESS and other curriculum project materials, development of study units and individualized projects. Prerequisite: teaching experience.

476-3 Pleistocene Geology. Deposits, stratigraphy, and history of the Pleistocene epoch. Evidence for differentiating and dating the glacial and interglacial sequence examined including deep sea cores, soils, magnetic studies. Required field trips. Prerequisite: 220, 221.

482-4 Coal Petrology. Structural features and microscopy of coal seams. Origin and alteration of coal constituents. Includes field trips, study of coal specimens, and techniques. Prerequisite: 220 and 221 or consent of instructor.

484-4 Palynology. (Same as Botany 484.) Taxonomy, morphology, stratigraphic distribution, and ecology of fossil pollen, spores, and associated microfossils. Prerequisite: 220, 221, or consent of instructor.

500-1 to 3 Teaching for Geology Graduate Students. To help teaching assistants develop skills in conducting laboratory work and leading discussions. One hour required for all teaching assistants in Geology. Graded on an S/U basis only.

510-8 (4,4) Sedimentation-Stratigraphy. (a) Advanced sedimentation. Properties and classification of detrital and carbonate sediments. Sedimentary processes. Methods and criteria for interpretation of environments of deposition. (b) Stratigraphic column, stratigraphic maps, correlation, radiometric chronology, basin analysis, and stratigraphic models. Prerequisite: 410.

513-3 Advanced Geologic Data Analysis. Probabilistic and statistical methods utilized in the analysis of geologic data. Emphasis on sedimentary and stratigraphic data analysis. 2 hours of lecture and one laboratory period each week. Prerequisite: 460 or consent of instructor.

515-4 Metallic Mineral Deposits. Principles of metalliferous mineral transportation and deposition. Study of the geologic settings of selected examples of various types of metalliferous mineral deposits. Lecture, laboratory and field trips. Prerequisite: 302 and 315.

516-4 Industrial Rocks and Minerals. Geologic setting, origin, and uses of rocks and minerals used by industry for purposes other than sources of metals. Prerequisite: 315.

518-4 Clay Mineralogy. Study of the structure, chemistry, origin, and geologic importance of clay minerals. Industrial and other applications of clays. Lecture-laboratory. Prerequisite: 310 or consent.

520-12 (4,4,4) Advanced Petrology. (a) Igneous Petrology. Physical chemistry, petrographic classification, and genetic relationships of the igneous rocks. (b) Metamorphic Petrology. Physical chemistry, petrographic classification, and genetic relationships of the metamorphic rocks. (c) Sedimentary Petrology. Petrographic classification and origin of sedimentary rocks. Prerequisites: 310, 415, or equivalent.

528-6 (3,3) Micropaleontology. Structure, classification, paleoecology, stratigraphic distribution, and evolution of microfossils. Laboratory work in techniques of collection, preparation, and study of microfossils. Identification and use of microfossils in solving stratigraphic problems. Preparation for research in micropaleontology. (a) Conodonts and ostracodes. (b) Foraminifera. Prerequisite: 425 or consent of instructor.

529-8 (4,4) Advanced Invertebrate Paleontology. Advanced topics in applied paleontology and paleoecology. Field and laboratory studies including techniques and quantitative methods of study. Preparation for research in paleontology. (a) Emphasis on bryozoans, mollusks and arthropods. (b) Emphasis on coelenterates, brachiopods, and echinoderms. Prerequisite: 425 or consent.

540-1 to 9 Advanced Studies. Advanced studies in various topics. Specific subject matter is announced for each term in the Schedule of Classes for that term. Prerequisite: consent.

541-1 to 4 Research. Research in a topic of restricted scope which will require the collection and analysis of new, basic data. No more than nine quarter hours

total credit allowed for 440 plus 541. Hours and subject matter decided during consultation with a faculty member. Prerequisite: consent of supervising instructor.

542-3 (1,1,1) Seminar in Geology. Seminars in advanced topics in geology. Prerequisite: graduate standing.

578-8 (4,4) Advanced Geomorphology. (a) Fluvial geomorphology. Detailed study of river processes, landforms, and major concepts related to geology. Floods, drainage basin analyses, and hydraulic geometry. (b) Glacial and periglacial geomorphology. Glacial mechanics. Characteristics and origin of erosional features and deposits formed by glacial and periglacial processes. Prerequisite: 374.

582-3 Advanced Coal Petrology. Microscopy, source materials, coalification, constitution and classification of peats, lignites, bituminous coal, anthracite; applications to industrial problems. Prerequisite: 482.

584-3 Advanced Palynology. (Same as Botany 584.) Paleoecological interpretations, morphology and advanced techniques of analysis and preparation of fossil spores and pollen. Prerequisite: 484.

599-1 to 9 Thesis. Minimum of 5 hours to be counted toward a master's degree.

Government

403-4 Introduction to the Theories of International Relations. Systematic analysis of a variety of approaches which seek to explain the actions of nations. The realist and utopian traditions, ecological factors, decision-making processes, theories of conflict and integration, equilibrium and systems analysis, and other topics. Prerequisite: 303 or graduate standing.

406-4 The American Chief Executive: President and Governor. A study of the origin and background of the presidency and the governorship, qualifications, nomination and election, succession and removal, the organization of the executive branch, and the powers and functions of the president and governor. Prerequisite: GSB 212 or 231.

420-4 Pressure Groups and Politics. An analysis of interest groups and their techniques of political propaganda. Prerequisite: 231 or GSB 212.

425-4 Blacks and Whites in American Politics. Topics include various forms of political participation, leadership behavior, and analysis of political strategies including the Black Power concept. Prerequisite: 231 or GSB 212.

430-3 Government and National Security. The role of the military in American society and policies and the development of military and disarmament policy. Comparison made between American developments and in other countries, including Russia.

436-3 Government and Labor. (See Economics 436.) Prerequisite: 231, or GSB 211, GSB 212, or consent of instructor.

438-4 Social Welfare Legislation. The Social Security Act and other legislation of major significance for the welfare and maintenance of the family, the handicapped, children, and other special groups. Their relationship of the legal structure of federal, state, county, township, and municipal welfare facilities and institutions with indications of economic and social consequences.

440-4 Public Personnel Administration. An analysis of some of the central problems encountered by the government executive in recruiting, maintaining, and developing personnel, such as political neutrality, leadership and motivation, career development, security regulations, and the role of personnel in policy planning and execution. Prerequisite: 360.

441-4 Philosophy of Politics. (See Philosophy 441.)

450-8 (4,4) Latin American Governments. (a) Problem analysis of contemporary Latin American government and politics. (b) Latin American national systems.

451-4 International Politics of Europe. Comparative analysis of foreign policies of major states. Includes nationalism, unification and security, and Western Europe's relations with the developing world, Eastern Europe, the U.S.S.R., and the U.S.A.

452-4 Government and Politics of Sub-Saharan Africa. Government and politics of French-, English-, and Portuguese-speaking areas of sub-Saharan Africa. Reference to decolonization process and the relations of African states with each other and with non-African powers. May be taken in any sequence. Prerequisite: GSB 390, or 391, or consent of instructor.

453-8 (4,4) Soviet Russia. (a) Ideological foundations of Soviet politics. (b)

Dynamics of Soviet government and economy. Prerequisite: GSB 390 or consent of instructor.

454-8 Development of German Democracy. Involves a summer's residence in Germany with classroom material supplemented by lectures by German professors and government officials. Prerequisite: consent of instructor.

455-4 Major Governments of Western and Central Europe. A comparative study of the political systems of the major countries of Western and central Europe. Prerequisite: GSB 390 or consent of instructor.

456-4 Great Britain and the Commonwealth. The commonwealth association and the politics of Great Britain and the "Old Commonwealth" countries: Australia, Canada, New Zealand.

457-4 Government and Politics in the Middle East. The Arab states of the Middle East and Israel. Socialization and integration patterns, the traditional and revolutionary regimes, and regional cooperation and conflict. Prerequisite: GSB 390 or consent of instructor.

458-12 (4,4,4) Government and Politics of Asia. (a) Politics and governments of Burma, Thailand, Malaysia, North Vietnam, South Vietnam, Cambodia, Laos, Singapore, Indonesia, and the Philippines. (b) Internal political, economic, and social development of China and Japan. (c) Politics in India, Pakistan, Ceylon, Nepal. May be taken in any sequence.

459-4 Politics of Developing Areas. A survey, theoretical and descriptive, of the impact upon politics of the process of development, and the role of the governmental system in the direction and control of development. Prerequisite: GSB 390 or consent of instructor.

460-4 Policy Analysis. Basic concepts in the policy sciences, approaches to policy analysis, applications to selected areas of policy, and instruments of policy development.

461-4 Organization Theory and Public Administration. Analysis of various approaches to organization theory and public administration with emphasis on recent American literature in this field. Prerequisite: 360 or consent of instructor.

462-3 Intergovernmental Relations. Interaction between governmental units in the American federal system and the impact on the formulation of public policy and the performance of governmental functions. Prerequisite: 231 or GSB 212.

463-3 Governmental Social and Economic Policy. Examination of public policy-determining agencies and attributes of the American governmental system, with especial emphasis upon the national government and its processes and arrangements for social and economic policy-formulation and implementation. Prerequisite: 231 or GSB 212.

466-3 State Government and Administration. Emphasis on recent developments and research findings. Prerequisite: 232.

467-4 Urban Politics. Environment, institutions, processes, and functions of government in an urban society. Emphasis on current problems of social control and the provision of services in the cities. Prerequisite: 232.

468-4 Comparative Urban Politics. Comparative analysis of urban political systems in the U.S. and other nations. Attention to the social environment, political structures, political processes, and public policies of selected urban areas. Prerequisite: 232, with 467 recommended.

469-3 Administration of State and Local Finance. An examination of the administrative problems connected with local and state revenues and expenditures in the U.S. Prerequisite: 232.

470-4 Urban Planning. (See Geography 470.) Prerequisite: consent of instructor.

471-4 The Organization and Administration of American Foreign Policy. An advanced course dealing with the organizational and administrative aspects of American foreign policy. Prerequisite: GSB 345 or consent of instructor.

472-4 International Organization. Development and organization of international governmental and administrative systems, with emphasis on the United Nations. Prerequisite: 303.

474-3 Law Enforcement Administration. (Same as Administration of Justice 474.) Development and changing roles of the police; forms of state, local, and municipal control; conflict areas, intergovernmental cooperation, and developing needs for regional law enforcement; structures and internal administration of police departments; the police, organized crime, riots, and minorities. Prerequisite: 360, 467, or consent of instructor.

475-8 (4,4) International Law. (a) Rules and practices governing the nations

- in their relations in peace and war. (b) Investigation of special problems in international law. Prerequisite: 303 and 475a or consent of instructor.
- 477-4 Governments and Politics of Vietnam: North and South.** Development of nationalist and communist political groupings since the period of French domination. Role of the religious sects and the private armies. Constitutions and the legal and political systems of the two Vietnams.
- 478-4 International Politics.** Alignment and conflicts of the major powers in historical and contemporary perspective. Emphasis on the basic interests of the great powers, regional arrangements, spheres of influence, the use of coercion in world politics.
- 479-4 Advanced Comparative Politics.** Analysis of the comparative approach to the study of politics and the principal methods employed in this approach. Methodological and conceptual issues are presented in conjunction with basic political structures and processes. Prerequisite: GSB 390 or consent of instructor.
- 480-4 The Pacific and the Far East.** Political and strategic problems and the interplay of the foreign policies of the major powers in this area. Prerequisite: 303 or History 370.
- 481-4 International Relations of the Western Hemisphere.** Emphasis on the international behavior of Latin American nation-states and/or regions especially related to policy trends and historical and contemporary objectives of the U.S. Prerequisite: 392 and 450a; 450b recommended.
- 482-4 International Relations of Communist States.** History and analysis of the foreign policies principally of the Soviet Union and China, with some attention to Eastern Europe, North Korea, North Vietnam, and Cuba. Prerequisite: GSB 390 or consent of instructor.
- 483-4 International Relations of the Middle East.** Role of Middle Eastern countries in world affairs, international implications of Middle East conflicts, and strategic involvement of the U.S., Soviet Union, and other countries in the area.
- 484-8 (4,4) History of Political Theories.** (a) Ancient and Medieval theory, Plato, to Thomas Aquinas. (b) Renaissance and Rationalist theory, Machiavelli to Edmund Burke. Prerequisite: senior standing or consent of instructor.
- 485-4 Political Psychology.** Psychological theories as related to the development and change of political attitudes, leadership behavior, and mass political participation. Prerequisite: 200 recommended.
- 487-6 (3,3) American Political Ideas.** (a) Political ideas which shaped American beliefs and U.S. governmental systems, from pre-Colonial beginnings through the mid-Nineteenth Century. (b) Continuation of (a). From the mid-Nineteenth Century to the mid-Twentieth. Prerequisite: 231 or GSB 212.
- 488-9 (3,3,3) Recent Political Theory.** (a) Liberal political theorists from John Stuart Mill to the present. (b) Revolutionary political theorists from Karl Marx to the present. (c) Idealistic and nationalistic political theorists from Hegel to the present. May be taken in any sequence. Prerequisite: senior or graduate standing, or consent of instructor.
- 490-2 to 6 Honors Research.** Not for graduate students. Prerequisite: consent of instructor and chairman.
- 495-12 (4,4,4) American Constitutional Law and the Judicial Process.** (a) Role and policy of courts and the U.S. Supreme Court in the American political system. The court system, judicial review and self restraint, intergovernmental relations, separation of powers of the three branches, and the expansion of national power. Foreign commerce, war powers, power of taxation, and spending power. Prerequisite: GSB 212 or equivalent. (b) Civil liberties and civil rights. Rights of property under the contract and due process clauses and the rights of the first amendment. Prerequisite: 495a highly recommended. Prerequisite: GSB 212 or equivalent; 495a highly recommended. (c) Continuation of 495b. Constitutional guarantees relating to criminal procedure, equal protection clause, i.e., the constitutional guarantee against racial and other invidious discrimination, citizenship and elections, and the expansion of congressional power to legislate in the area of civil rights. Prerequisite: GSB 212 or equivalent, 495b or consent of the instructor.
- 497-4 Administrative Law.** Law as it affects public officials in carrying out the rights, duties, and necessary functions of the public office. Prerequisite: 360.
- 498-4 Jurisprudence.** (Theories of Law.) Major schools in legal thinking.

Positive law and natural law. Idea of justice and concept of natural rights.

500-9 (3,3,3) Methods of Empirical Research. (a) Problems in the philosophy of science as related to research in political science. Prerequisite: 499 or consent of instructor. (b) Discussion of alternate data acquisition techniques and research designs for social scientists. (c) Techniques of data analysis and computer applications in social science research. Sections a and b are required.

501-4 to 12 Seminar in Legislative Process. Prerequisite: basic courses, related training, or consent of instructor.

502-4 to 12 Seminar in Selected Governmental and Political Problems. Prerequisite: basic courses, related training, or consent of instructor.

503-4 to 12 Seminar in Pressure Groups. Prerequisite: 420 or consent of instructor.

504-4 Seminar in Judicial Process. An examination of the literature on such topics as judicial selection, the impact of court decisions, court procedure, and the factors affecting the decision-making behavior of judges. Prerequisite: 495 or equivalent or consent of instructor.

505-4 to 12 Seminar in Political Parties. Prerequisite: basic courses, related training, or consent of instructor.

506-4 to 12 Seminar in Political Behavior. Prerequisite: basic courses, related training, or consent of instructor.

508-4 to 12 Seminar in International Politics. Prerequisite: basic courses, related training, or consent of instructor.

509-4 to 12 Seminar in International Organization. Prerequisite: 472 or consent of instructor.

510-4 to 12 Seminar in State Government and Politics. Prerequisite: 466 or consent of instructor.

511-4 to 12 Seminar in Local Government and Politics. Prerequisite: 467 or consent of instructor.

512-4 to 12 Seminar in Public Administration. (a) Devoted to comparative public administration. (b) In depth study of selected problems of public administration. Prerequisite: 461 or consent of instructor.

513-4 to 12 Seminar in Constitutional Law. Prerequisite: 495 or consent of instructor.

515-4 to 12 Seminar in Comparative Government and Politics. Prerequisite: basic courses, related training, or consent of instructor.

516-4 to 12 Seminar in Municipal Administration. Prerequisite: 467 or consent of instructor.

517-4 to 12 Seminar in Political Theory. Prerequisite: 484, 488, or consent of instructor.

520-4 to 12 Seminar in American Foreign Policy. Prerequisite: basic courses, related training, or consent of instructor.

521-1 to 12 Readings. Supervised readings in selected subjects. Not more than 6 hours may apply toward the master's degree. Prerequisite: consent of instructor.

525-4 to 12 Seminar in International Law. Prerequisite: 475a or consent of instructor.

530-4 to 12 Internship in Public Affairs. Field work in the office of a governmental agency; city, county, state, national, or international. Under certain circumstances it might be in the office of a political party organization or in that of some organized pressure group. The type of internship and the place and organization in which it is taken must be mutually satisfactory to the student and the department. A paper in which the student correlates his academic knowledge with his practical experience is required. Prerequisite: consent of department.

531-4 to 12 Seminar in Empirical Theory. Systems structural-functional, conflict, decision-making, integration, organization, exchange, communications, democratic, totalitarian, change, and revolution theories analyzed to determine domain and predictive and explanatory capacities. Half of these theories offered every other year. Prerequisite: 500a,b or consent of instructor.

551-4 to 12 Polimetrics. Advanced seminar in empirical political science. Topics explored in depth: simulation, graph theory, game theory, applied non-parametric statistics, multivariate analysis, sampling, attitude measurement (scaling), and other quantitative analytic techniques utilized by social scientists. Prerequisite: consent of instructor.

582-4 Criminal Law and the Correctional Process. (Same as Administration of Justice 582.) Basic principles and administration of the criminal law and the

legal foundations of the juvenile court, the sentencing process, parole and probation, and the changing concept of mental competency. Prerequisite: consent of instructor.

584-4 Seminar in Correctional Program Management. (Same as Administration of Justice 584.) Analysis of management influence on treatment programs in various correctional settings. Field trips, observation, and research in addition to readings. Prerequisite: consent of instructor.

595-2 to 12 Individual Research. Selection, investigation, and writing of a research topic under the personal supervision of a member of the departmental graduate staff. Prerequisite: consent of instructor.

599-1 to 9 Thesis. Minimum of 9 hours to be counted toward a degree. Prerequisite: consent of instructor.

600-1 to 48 Dissertation. Minimum of 36 hours to be earned for the Doctor of Philosophy degree.

Guidance and Educational Psychology

Courses in this department may require the purchase of supplemental materials. Field trips are required for certain courses.

412-4 Mental Hygiene. A survey of principles concerning factors and conditions in personal life that tend to facilitate or deter mental health. Mental health viewed as living creatively in an atmosphere of satisfactory interpersonal relations. Prerequisite: 305.

422-4 Construction and Use of Evaluation Instruments. Construction and use of teacher-made tests, elementary statistical concepts directly related to measurement, and selection and interpretation of standardized tests. Opportunities are provided for practical applications of concepts to school-related situations. Supplementary text required. Prerequisite: 305.

442-4 Basic Principles of Guidance. Introductory course on student personnel services. Survey of philosophy, principles, and organization of guidance services. Field interviewing experiences, and additional materials may be required. Prerequisite: 305.

481-2 to 12 Seminar. Conducted by staff members and distinguished guest lecturers on pertinent topics. Prerequisite: consent of instructor and department.

501-2 to 12 Special Research Problems. For majors in Guidance. Formulating, investigating, and reporting on a problem in the area of guidance. Prerequisites: advanced standing and consent of department.

505-4 Introduction to Statistical Methods. Covers such basic descriptive techniques as measures of central tendency and variability, graphical presentation of data, and various derived scores. Also correlation, sampling theory, and hypothesis testing.

506-4 Advanced Statistical Methods. Basic statistical inference techniques: correlation, hypothesis testing, confidence intervals, introduction to prediction and one-way analysis of variance. Prerequisite: 505.

507-4 Design and Analysis of Experiments. Systems of organizing and analyzing data so that maximum information can be obtained. Within the framework of multiple linear regression, the following topics are covered: analysis of variance, factorial designs, repeated measure designs, mixed designs, tests of homogeneity, and analysis of covariance. Prerequisite: 506.

511-4 Research and Theory in Instructional Psychology. Critical review of empirical, methodological and theoretical developments in the experimental study of instructional variables as related to student behavior. Students should be prepared to reproduce papers at their expense. Prerequisite: advanced standing.

515-4 Psychological Aspects of Education. Designed to survey the applications of psychology to educational settings. Prerequisite: advanced standing.

521-8 (4,4) Analysis of Classroom Behavior. Trains school psychologists and other school personnel to serve as a consultant to classroom teachers regarding (a) prevention and modification of undesirable classroom behaviors and (b) effective use of learning principles. Must be taken in a,b sequence. Prerequisite: 305.

530-4 Standardized Testing: Theory, Use and Interpretation. Principles and procedures for determining appropriate educational uses of tests and how to apply tests in the process of helping individual students. Emphasis will be on necessary principles for understanding standardized tests, interpretation of

test results to students, teachers and parents and developing school testing programs. Prerequisite: 505.

531-4 Theory of Measurement. A comprehensive coverage of principles of measurement. Includes logic and functions, scales, the theory of measurement error, validity, scale construction, and problems in human assessment. Prerequisite: 505 or consent of instructor.

532-8 (4,4) Individual Measurement Theory. (a) Assessment of individual mental factors with attention to theories, test validation, analysis of intelligence, and related research. Historical review, test standardization, and interpretation of the Stanford-Binet and Wechsler Scales are emphasized. (b) Discussion of problems in the administration of intelligence tests. Administration of the Stanford-Binet and the Wechsler intelligence scales for children. May be taken concurrently. Prerequisite: 505 or consent of instructor.

537-4 Counseling Theory and Practice. Systematic study of the assumptions and fundamental practices of major approaches to counseling. Observation and practice utilized to supplement didactic discussion. Prerequisite: consent of department.

541-4 Occupational Information and Guidance. For pupil personnel workers, teachers, and administrators to give an orientation to theoretical, economic and informational aspects of vocational guidance and to provide experiences with using career information in counseling and decision making. Obtaining occupational information materials for use in guidance and teaching, taking vocational field trips and field work with children or adolescents will be required. Prerequisite: 442.

543-4 Guidance Through Groups. Study of the methods, techniques and materials for the organization and utilization of groups for guidance purposes. Prerequisite: 442.

545-4 Doctoral Seminar in Psychological Foundations of Education. Open only to students admitted to doctoral curricula who have completed 590 and Educational Administration and Foundations 591.

546-8 (4,4) Personality Assessment. The review of related literature covers test development, standardization procedures, related research, and test interpretation. (a) Assessment of individual interests, motivations, and perceptual systems with attention to theories and assumptions of objective diagnostic tests. (b) Projective diagnostic tests, theories, and assumptions are stressed. Must be taken in a,b sequence. Prerequisite: 532a and consent of instructor.

548a-2 to 12 Practicum in Secondary Guidance. Supervised experience in group and individual guidance procedures with children and in working with parents and teachers. The development and organization of a secondary school guidance program is stressed, including the use and interpretation of occupational and other test materials appropriate for the secondary school. Intern experiences in secondary schools for a minimum of one day a week for two successive quarters is required. Use of a tape recorder is required. Prerequisite: 537 or consent of instructor.

548b-2 to 12 Practicum in Elementary Guidance. Supervised experience in group and individual guidance procedures with children and in working with parents and teachers. The development and organization of an elementary school guidance program is stressed, including the use and interpretation of occupational and other test materials appropriate for the elementary school. Intern experiences in elementary schools for a minimum of one day a week for two successive quarters is required. Use of tape recorder is required. Prerequisite: 537 or consent of instructor.

548c-2 to 8 Practicum in Counseling. Practical experience at the appropriate grade level in counseling with a representative sample of the population. Includes counseling and listening to recordings of counseling sessions individually or in groups. Intern experience in elementary or secondary school for a minimum of one day a week for one quarter is required. Use of tape recorder is required. Prerequisite: consent of instructor and 548a or 548b.

548d-2 to 8 Practicum in School Psychology. Supervised experience to help the student work effectively as a psychologist in the school setting. Focuses on the application of specific psychological skills, the teacher consultation, and program planning for educationally handicapped children. Travel for site visitations and observations is expected. Prerequisite: consent of instructor.

553-2 to 4 Organization and Administration of Guidance and Pupil Personnel Services. Principles, procedures, and plans necessary for initiating, developing, and appraising a school guidance program. Prerequisite: 537.

555-2 to 12 Seminar in School Psychology. Major professional issues and responsibilities; the school as a social system; ethical considerations; school related agencies and facilities; and professional organizations. Assists the student prepare the project proposal required for the specialist's certificate. Prerequisite: consent of instructor.

562-8 (4,4) Human Development in Education. Theories and research evidence regarding child development and behavior are investigated. These considerations focus upon implications for research and educational practices. (a) Childhood. Prerequisite: advanced standing. (b) Adolescence. May be taken in a,b sequence.

567-2 to 12 Topical Seminar in Educational Psychology. Contemporary topics and problems in the area of educational psychology. Conceptual and empirical activities. Prerequisite: consent of instructor.

568-2 to 16 Topical Seminar in Counseling and Guidance. Contemporary topics and problems in the area of counseling and guidance. Conceptual and empirical activities. Prerequisite: consent of instructor.

580-2 to 12 Topical Seminar in Statistics and Measurement. Discussion and practical experience in dealing with advanced statistical and measurement problems. In-service training is available for advanced graduate students. Prerequisite: consent of instructor.

581-1 to 12 Specialized Practicum in Counseling, Guidance, and Counselor Supervision. Prerequisite: 548c.

590-2 Seminar in Behavioral Foundations. A course required of all students beginning advanced graduate study. Students examine empirical modes of inquiry and empirical formulations of learning behavior. Topics explored include the classroom as a social system, the learner, learning models and data language. (Taken concurrently with Educational Administration 591. Prerequisite: formal admission to Doctor of Philosophy studies.)

596-2 to 12 Independent Investigation. For specialist's certificate students. Prerequisite: consent of instructor.

597-1 to 12 Independent Study. For doctoral students in educational psychology. Formulating, investigating, and reporting on research problems in the area of guidance and educational psychology. Prerequisite: consent of department.

599-1 to 9 Thesis. Prerequisite: consent of department.

600-1 to 48 Dissertation.

Health Education

400-4 Health Appraisal of School Children. The role of the teacher in the health appraisal of the school child, including school health examinations, use of health records, and emphasis on training for recognition of health deviations from normal common among school children. Not open to students who have had 450.

401-3 Disease Prevention and Control. Principles and practices in the prevention and control of communicable, chronic and degenerative diseases in the school and community.

405-4 Sex Education in Schools. Problems of teaching sex education in schools. Designed to meet state requirements for preparation of teachers. Prerequisite: junior, senior, or graduate status, Health Education, Physical Education, or Elementary School major, or consent of department.

415s-3 to 4 Workshop in Driver Education and Traffic Safety. Summer course designed for pre-service and in-service teachers of driver education and traffic safety. Individual and group problems will be treated. Lectures by safety authorities, demonstrations, field trips, audio-visual materials, and individually supervised research in special problem areas. Prerequisite: 302 or equivalent.

426-3 Knowledge Testing in Health Education.

442s-4 Practicum in Driver and Traffic Safety Education II. Provides prospective teachers with dual-control, simulation, and multiple-car laboratory teaching experiences. Teaching beginners, developing programmed lessons, methods, and materials of instruction included. Prerequisite: 302s.

443s-4 Driver and Traffic Safety Education Program Administration III. Includes a study of program administration, supervision, and planning. Prerequisite: 442s.

445s-4 Driver Simulation. For in-service and pre-service teachers and super-

visors of driver and traffic safety education. Methods of instruction, equipment familiarization, program development and objectives. Prerequisite: 443s or consent of the instructor.

450-4 Health Education in the Elementary School. Responsibilities of schools to instruct their students in basic fundamentals of how to live healthfully. Principles, methods, programs and materials for the elementary teacher. The integration of health with other subjects, health observation of children, abnormalities, screening tests, and related materials. Not open to students who have had 400.

460-4 School Health Program. Shows the prospective teacher the fundamental processes involved in the teaching of health education at the secondary level.

461-4 Workshop in Health Education. Summer course for in-service teachers, administrators, advanced students, nurses, social workers, and others interested in public health aspects of school and community living. Individual problems of classroom health treated as units in such fields as speech defects and their detection and correction, communicable disease control, nutrition, social and mental hygiene. Lectures, demonstrations, films, field trips, and individually supervised research in special problems.

462-4 Health Education Workshop. A continuation of 461 with emphasis on total school health teaching objectives.

463-1 to 4 Workshop in Health Education with Emphasis in Disaster Preparedness. A continuation of 462.

464-4 Workshop in Alcohol and Drug Education. Summer workshop for those responsible for teaching about alcohol and drug substances. Emphasis on motivations for use, nonuse, and abuse and on the varieties of effects in the young and the older. Translates concepts, ideas, and information into teaching materials and approaches.

470s-4 Highway Safety as Related to Stimulants and Depressants. Relationship between alcohol and drugs and traffic accident causes. Concepts and educational programs designed to alleviate alcohol and drug related accidents. Prerequisite: advanced standing or consent of instructor.

471-4 Organization and Administration of School Health. Appraisal of overall school organization for health education, including health service and personnel, health and safety instruction, school environment, school health examination, local, state, and federal resources for health, health councils, and interdepartmental relationships.

475s-4 Traffic Law Enforcement and Planning. Acquaints Safety and Driver Education teachers with the purposes of traffic law enforcement and engineering and the methods used to fulfill these purposes on ways of improving existing services. Prerequisite: 433s or consent of instructor.

480s-4 Workshop in Safety Education. Summer course for in-service teachers, nurses, administrators, advanced students, and others interested in safety education as it applies to the public school and the community. Individual problems, lectures, demonstrations, films, field trips, and individual group study in special areas of interest. Prerequisite: 313 or 323 or consent of instructor.

481s-4 Safety Education Workshop. A continuation of 480s with emphasis on methods and evaluation of total school safety education. Prerequisite: 314s or 323s or 480s or consent of instructor.

485-4 International Health. A survey and analysis of the health beliefs, values, and practices of peoples in other cultures, with particular attention to how these beliefs and practices fit into a total way of life. An international orientation of potential value to both prospective teachers and students in other fields.

488-4 Educational Aspects of Environmental Sanitation. Application of principles of learning to man's contacts with his environment: water, food, air, radiation, housing, and refuse. Emphasis is placed upon both individual and community aspects of environmental health.

489-4 Introduction to Vital Statistics. An introduction to bio-statistics; examination of theories of population growth; understandings of collection, organization, summarization, presentation, evaluation, and interpretation of data relative to biological happenings.

490-2 to 12 Field Work in School and Community Health. Field training, observation, and participation in current public agency and school health programs. Provides practical experience for the health education student. Restricted to majors in the department or by special permission of the instructor.

491-4 Health Teaching Methods in School and Community. Various dimen-

sions of teacher-student relations in the classroom with emphasis on the multiple roles of the teacher. Prerequisite: 305, 471, or consent of instructor.

495s-4 Driver Education for the Handicapped. Methods and techniques designed to teach handicapped persons how to drive. Consideration of programs for EMH and physically handicapped. Familiarization with assistive equipment and program materials. Prerequisite: advanced standing or consent of instructor.

498-2 to 6 Environmental Health Problems. Designed to meet the needs and interests of those students with health education interests in various phases of specific aspects of environmental health: general sanitation; pollution; food, milk, water sanitation; garbage and refuse disposal; pest control and other similar problems. Prerequisite: community health major or consent of instructor.

500-4 Community Organization for Health Education. Review of the philosophies of community organization for health; techniques of group work, current research in community organization and examination of programs of community health agencies.

510-4 Construction of the Curriculum in Health Education and Safety. Review of health and safety instruction programs in elementary and secondary schools, consideration of health and safety needs and interests and their relationships to the curriculum, evaluation of health texts, and evaluation of current research.

511-5 Practicum in Health Education Workshop. Designed to give graduate and post-graduate students experiences in organizing, planning, and operating in-service training programs through workshop methods.

515-4 Review of Current Literature in Health Education, Public Health and Safety Education. A survey and analysis of the newer publications in the related fields of health education, public health, and safety education.

520-4 to 6 Special Projects in Health Education and Safety. Detailed research and study on advanced problems in the fields of public health, safety education, and health education.

525s-4 Organization, Administration, and Supervision of Safety Education. Designed to give the student basic principles of organization, administration, and supervision of safety education. Problems, policies practices, and methods involved in the organization and administration of a safety education program.

526-4 Evaluation in Health Education and Safety. Surveys and analyses of health and safety testing and evaluation, procedure includes surveys; inventories; knowledge, behavior and attitude tests; check lists; and questionnaires, their uses and limitations. Evaluation of total school health and safety program is emphasized. Prerequisite: consent of department.

530s-4 Problems and Research in Accident Prevention. Principles of accident prevention, causes of accidents, problems of behavior in school, home, traffic and transportation. Prerequisites: 443s, 525s, or consent of instructor.

533a-4 Human Conservation. An analysis of community health problem trends and changes including aging; chronic and degenerative diseases; mental illnesses; traumatic illness, injuries, and defects; radiological hazards; communicable diseases; and maternal and child health problems. An epidemiological approach to the cause, nature, extent, and trends in erosion and wastage of human resources. Prerequisite: permission of instructor.

533b-4 Human Conservation II. An analysis of community structures in relation to positive health services, education, and health living in respect to community health problems and health requirements. A study of trends in programming to meet minimum health requirements and to care for or ameliorate existing health problems and hazards on a communitywide basis. Prerequisite: 533.

533c-4 Human Conservation III. An analysis of the unmet health needs or requirements for optimum conservation of human resources in the community including a study of pilot and experimental programs and research in community efforts to meet health needs and solve existing health problems. An evaluative approach to existing health programming and research including an analysis of further needed experimentation and research and possible sources for leadership and funds for promoting community health research, programmings, and plannings. Prerequisites: 533a,b.

536-4 Professional Preparation in Health Education. National, state, local factors influencing teacher preparation in health education, including accreditation of teacher education programs, certification of health education teachers. Undergraduate and graduate curricula developed and analyzed.

540s-1 to 4 Readings in Traffic and Safety Education. For advanced students. Prerequisite: 24 hours of traffic and safety education course work, advanced graduate standing, and consent of instructor.

545s-4 Externship in Traffic and Safety Education. Laboratory and field experience with local, state, or national traffic or safety organizations. Prerequisite: advanced graduate standing and consent of instructor.

550s-4 Current Developments in Driver and Safety Education. Current problems, trends, and developments reviewed, analyzed, and evaluated relative to driver and safety education. Prerequisite: advanced graduate standing and consent of instructor.

590-4 to 12 Field Internship. Full quarter of field work with an approved department of public health or voluntary health agency under the supervision of the agency officer in charge and the supervisor from the Department of Health Education.

597-3 (1,1,1) Seminar in Health Education and Safety. Devoted to discussing individual health and safety projects, presenting research problems, and preliminary presentation of dissertation topics.

599-3 to 9 Thesis.

600-1 to 48 Dissertation. The dissertation for the Doctor of Philosophy degree in the College of Education must meet the minimum requirements of 36 hours.

Higher Education

402-2 Principles of Student Personnel Group Work. Acquaints the student with group work possibilities and functions in higher education.

510-4 Higher Education in the United States. An overview of American higher education in historical and sociological perspectives: Its development, scope, characteristics, issues, problems, trends, and criticism.

512-4 Higher Education in Selected Nations. Study of higher education systems and trends outside the United States, and of the university in world affairs.

513-4 Organization and Administration in Higher Education. Theories and practices in governance of various types of higher education institutions with attention, through case studies, to problems of formal and informal structures, personnel policies, decision-making, institutional self-study, and societal-governmental relations.

515-4 College Student Personnel Work: Operations and Policies. Study of organization, functions, and undergirding policies of student personnel services and programs in contemporary colleges and universities.

516-4 College Students and College Cultures. A study of the nature of students, the impact of the college on student development, the nature of the college as a unique social institution. The study of student subcultures and the interaction between students, institutions, and communities.

518-4 College Teacher and College Teaching. A study of the professional roles of academic man: as teacher, scholar, researcher, member of the profession, and faculty member. Emphasis is placed on the characteristics and values of faculty members, the teaching-learning process, models of effective behavior, and academic freedom.

522-1 to 12 Readings in Higher Education. Supervised readings in aspects of such general areas in higher education as college teaching and learning, central administration, college student services, policy issues, or history of higher education. Prerequisite: consent of instructor.

523-1 to 12 Internship in Higher Education. Supervised field experience in appropriate settings, with evaluative seminars. (a) College Teaching. (b) College Student Personnel. (c) College Administration. (d) Institutional Research. Prerequisite: consent of department.

524-2 to 6 Individual Study. Individual inquiry into selected problems in higher education. Prerequisite: consent of instructor.

535-2 to 4 Higher Education Seminar I. A series of seminars for specialized areas of administrative practice and policy. (a) Educational Programming in Student Housing. (b) Business Administration of Student Housing. (c) Student Personnel Group Work. (d) Non-Academic Personnel Management. (e) Problems in Central Administration. (f) Business and Fiscal Administration. (g) Academic and Faculty Administration. (h) Administration of Admissions and Records. (i) Junior College Administration. (j) The Technical Institute. (k) Adult and Continuing Education. (m) Institutional Research.

545-2 to 4 Higher Education Seminar II. A series of seminars for reflective and scholarly inquiry into significant domains in higher education. Prerequisite: consent of instructor. (q) History of Higher Education. (r) Sociology of Higher

Education. (s) Law, Legislatures, and Higher Education. (t) Aesthetics and Higher Education. (v) The Federal Government and Higher Education.
551-4 Curriculum Design and Policy. Study of assumptions, materials, method, and evaluation in the designs of various curricula in colleges and universities, with attention to curriculum resources and policy.

555-4 Philosophy of Higher Education. (Same as Philosophy 555.) Critical examination of assumptions and aims, operations and consequences, and basic concepts and symbols of higher education from philosophic perspectives.

565-4 The Community Junior College. A study of the characteristics and function of the community or junior college in American higher education. Course content aids the student in developing a general understanding of the philosophy, objectives, organization, and operation of the significant institution.

578-4 Economic Aspects of Higher Education. A study of economic aspects of higher education in American society. The emphasis on sources and management of college and university financing includes budgeting, control, and current trends.

589-4 to 8 Advanced Research. Selection, investigation, and writing of a special research project under the personal supervision of a graduate faculty member. Prerequisite: consent of instructor.

595-1 to 12 Higher Education Seminar III. Varied content. Prerequisite: consent of instructor.

599-1 to 9 Thesis.

600-1 to 48 Dissertation. Minimum of 36 hours to be earned for the Doctor of Philosophy degree.

History

401-9 (3,3,3) History of the South. Social, economic, political, and cultural developments of the South. (a) To 1850. (b) 1850-1900. (c) Since 1900.

403-9 (3,3,3) American Economy History. (a) To 1800. (b) 1800-1900. (c) 1900 to present.

404-3 American Party Politics, 1790-1828. Issues and conflicts which dominated the American political scene prior to the emergence of Jacksonian democracy. Prerequisite: GSB 300a.

405-6 (3,3) United States History 1850-1896. (a) Civil war. (b) Reconstruction and industrialization. Prerequisite: GSB 300b or consent of the instructor.

406-6 (3,3) Diplomatic History of Europe. (a) From the Congress of Vienna to the Fall of Bismark (1815-1890). (b) From 1890 to the present.

408-6 (3,3) Problems in Black American History. Developments which formed the foundation for the "Black Revolution" of the present time. Prerequisite: 6 hours of 300-level social science courses or consent of instructor.

409-9 (3,3,3) U.S. Constitutional History. A content and research course involving origin and development of the American constitution, from English background through the convention to the present. (a) To 1830. (b) 1830 to 1912. (c) 1912 to present.

410-2 to 5 Special Readings in History. Supervised readings for students with sufficient background. Registration by special permission only. Offered on demand.

411-9 (3,3,3) Social and Intellectual History of the United States. (a) 1607-1830. (b) 1830-1900. (c) 1900 to present. The development of American society and a study of various types of economic, social, and political thought that have influenced it.

414-9 (3,3,3) Intellectual History of Modern Europe. (a) The Enlightenment, (b) The 19th century, (c) The 20th century.

416-6 (3,3) Early Modern Europe. (a) Renaissance. (b) Reformation. Prerequisite: Six hours of 300-level social science or consent of the instructor.

417-9 (3,3,3) Advanced English History. (a) The Empire-Commonwealth. (b) Constitutional history. (c) English culture in the age of the American Revolution. (d) Tudor England.

419-6 (3,3) Europe in the Age of Absolutism. (a) 1600-1715. (b) 1715-1789. Prerequisite: Six hours of 300-level social science or consent of instructor.

420-3 The French Revolution. A sketch of the passing of feudalism in France, the background and development of the revolutionary movement, and the Napoleonic period.

425-6 (3,3) American Colonial History. (a) Discovery and Settlement, (b) British Imperial structure.

- 428-3 The Age of Jackson.** Origins, background, and development of that phase of American democracy associated with the Jacksonian era. The political, social, and economic history of the years 1815-1844.
- 430-9 (3,3,3) Late Modern Europe.** Problems in the political, social, and military history of Europe in the twentieth century. (a) First World War and interwar years. (b) Second World War years. (c) Since 1945. Prerequisite: 200c or 333b.
- 434-9 (3,3,3) Social and Political History of Modern Europe.** (a) 1815-1850. (b) 1850-1885. (c) 1885 to World War I. Changing social structure of Europe caused by industrialization. The consequence of this development in terms of the emergence of new social forces and political problems. Prerequisite: 200c or 333b.
- 435-9 (3,3,3) Twentieth-Century United States History.** Important developments in recent United States history. (a) 1896-1919. (b) 1919-1937. (c) 1937 to present. Prerequisite: GSB 300c or consent of instructor.
- 440-9 (3,3,3) History of American Diplomacy.** Important treaty relations of the United States, and a general consideration of American foreign policies. (a) America in isolation (to 1860). (b) The emerging America (from 1860 to 1920). (c) America on the world scene (1920 to the present). Prerequisite: 6 hours 300-level social science or consent of instructor.
- 442-9 (3,3,3) History of the West.** (a) Colonial. (b) Trans-Allegheny. (c) Trans-Mississippi.
- 448-6 (3,3) History of Southeast Asia.** (a) To 1900. (b) 1900 to present.
- 449-6 (3,3) Advanced African History.** (a) Cultural history of traditional states, the slave trade, and the interaction of traditional systems and European culture. (b) Investigations into the most important historical questions and interpretations of the regions covered in (a). Prerequisite: 349a,b, or c, or consent of instructor, or graduate standing.
- 451-3 Great Historians.** Writings of historians from Herodotus to Toynbee. Prerequisite: 6 hours of 300-level social science courses or consent of instructor.
- 452-3 Methods of Historical Research.** Fundamentals of historical investigation, criticism, and composition. For concentrations in history only.
- 455-3 History of Inner-Asian Relations.** Tribes, migrations, wars, and power politics in Central Asia and outlying areas of China from Han times through 19th century rivalries to latest development along the Sino-Soviet frontier.
- 460-9 (3,3,3) Medieval Society.** (a) Ecclesiastical; (b) Feudal and Royal; (c) Urban.
- 461-6 (3,3) Cultural and Intellectual History of the Middle Ages.** (a) Early Middle Ages. (b) High Middle Ages.
- 462-3 History of Modern Italy.** Italian society and politics in the nineteenth and twentieth centuries.
- 463-6 (3,3) History of France.** French social, economic, political, and intellectual evolution from medieval origins to the present day and of the French contributions to Western culture. (a) The Middle Ages to the Age of Absolutism. (b) The French Revolution to the Fifth Republic. Prerequisite: 6 hours 300-level social science, or consent of department.
- 464-6 (3,3) History of Germany.** (a) German state and society from the Middle Ages to the early 19th century. (b) Germany since 1815. Prerequisite: Six hours of 300-level social science or consent of instructor.
- 465-6 (3,3) History of Russia.** (a) Traditional Russia to 1905. (b) Revolutionary Russia Since 1905.
- 466-3 History of Scandinavia.** Denmark, Norway, Sweden, Finland, and Iceland. Related history of the Baltic and North Sea regions, from prehistoric times to the present.
- 470-3 Argentina and Chile.** A narrative and comparative study of the independent era of the history of these two leading states of South America. Prerequisite: 6 hours of 300-level social science or consent of department.
- 471-6 (3,3) History of Mexico.** (a) 19th century. (b) 20th century. Significant political, economic, diplomatic, social, and cultural aspects of Mexican life from independence to modern Mexican life.
- 472-3 Colonial Latin America: Policies and Practices.** Theory and operation of the colonial system. Prerequisite: 6 hours of 300-level social science courses or consent of instructor.
- 473-6 (3,3) The Caribbean Area.** (a) In the 18th and 19th centuries. (b) In the 20th century. An inquiry into the changing role of the political, economic, strategic and cultural nature of this Mediterranean of the New World.
- 474-3 United States-Mexican Relations.** Relations between the United States

and Mexico. Prerequisite: 6 hours of 300-level social science courses or consent of instructor.

475-6 (3,3) Dictatorship in Latin America. A political, economic, social and military study of the domestic and international aspects of dictatorship. (a) 19th century. (b) 20th century. Prerequisite: junior standing.

476-3 Andean South America Since Independence. A narrative and comparative study of Bolivia, Colombia, Ecuador, and Peru in the nineteenth and twentieth centuries. Prerequisite: 6 hours of 300-level social science or consent of department.

477-3 Brazil Since Independence. Cultural, diplomatic, military, political, and socio-economic elements of Brazilian life from independence to the current era. Prerequisite: 6 hours of 300-level social science or consent of instructor.

478-9 (3,3,3) History of Spain. Institutional intellectual, socioeconomic, and political history from the middle ages to the present. (a) Medieval Spain (to 1500). (b) The Imperial Period (1469-1825). (c) Modern Spain (since 1808). Prerequisite: 6 hours of 300-level social sciences courses or consent of instructor.

481-6 (3,3) History of Rome. (a) Rome from republic to empire, 133 B.C.-A.D. 14. (b) Roman Empire to the death of Constantine. Prerequisite: Six hours of 300-level social science or consent of instructor.

490-3 Problems in United States History. Topics vary with instructor. May be repeated for a maximum of six quarter hours provided registrations cover different topics. Topics announced in advance. Prerequisite: consent of instructor.

498-6 (3,3) History Honors. Principles of historical method, research, and writing for senior honor students only. (a) Methodology. (b) Research, honor thesis. Prerequisite: consent of department.

500-4 to 10 History Seminar. (a) American history. (c) Latin American history.

509-4 Studies in Negro History. Readings, discussions, and papers, of selected areas of Negro life and thought.

510-2 to 12 Readings in History. Individual readings. Maximum 3 hours per quarter. Graded S/U only. Prerequisite: consent of department.

514-4 Studies in Asian History. Pro-seminar course on select topics in Asian History. Prerequisite: consent of department.

515-8 (4,4) Seminar in Twentieth Century United States History. United States history since 1896 with emphasis upon politics and political behavior.

518-4 England in the Age of the "Glorious Revolution." An analysis of the ideas and forces that converted the English government into a liberal state with an emphasis on the concepts and principles later applied in the establishment of the American Constitution.

519-8 (4,4) The Age of Jefferson. Rise and development of Jeffersonian Democracy, 1790-1824, with emphasis upon social, economic, and political programs of Republicans and Federalists; the clash of mercantile and agrarian interests.

520-8 (4,4) Sectionalism and Reform. Study of major political, economic, and social issues, 1820-1850, which divided the United States and prepared the way for civil war.

521-8 (4,4) Seminar in American Diplomatic History. A content and research course concerning selected studies in American diplomacy. Prerequisite: 6 hours of 300-level social science or consent of instructor and 440.

522-8 (4,4) Seminar in American Economic History. (a) Reading seminar in the economic aspects of American history. (b) Research seminar problems. Prerequisites: Economics 214 or 215 or consent of instructor.

523-8 (4,4) Seminar in American Social History. Research and writing in selected topics relating to the development of American society and institutions. Prerequisite: consent of instructor.

524-8 (4,4) Seminar in American Constitutional History. (a) Reading seminar devoted to the important literature in constitutional history. (b) Research seminar in which the student will closely investigate a significant topic. Prerequisite: consent of instructor.

525-8 (4,4) Seminar in American Colonial History. Advanced research in specific areas of American Colonial history. Prerequisite: consent of instructor.

549-4 to 8 (4) Seminar in African History. Research and writing on selected social, economic and political topics in African history. Prerequisite: 449a,b or consent of instructor.

553-4 New Viewpoints in American History. New interpretations and recent developments in American history. Prerequisite: GSB 300.

568-8 (4,4) Seminar in Illinois History. A seminar in selected topics in Illinois history, 1818-1918. Prerequisite: consent of instructor.

575-12 (4,4,4) Studies in Latin American History. A content and research course concerning selected studies in Latin American history.

582-4 to 8 (4) Studies in Medieval and Renaissance History.

583-8 to 16 (4,4) Seminar in Medieval and Renaissance History.

586-4 to 8 (4) Studies in Early Modern European History.

587-8 to 16 (4,4) Seminar in Early Modern European History.

590-4 to 8 (4) Studies in Modern European History. Prerequisite: graduate standing or permission of department.

591-8 to 16 (4,4) Seminar in Modern European History. Prerequisite: graduate standing or permission of department.

597-3 to 7 Independent Investigation. Graded S/U only. Prerequisite: doctoral standing and consent of graduate adviser.

598-3 (1,1,1) Teaching History in College. Required of all first-year teaching assistants.

599-1 to 9 Thesis. Minimum of 5 hours to be counted toward a master's degree.

600-1 to 48 Dissertation.

Home Economics Education

407-2 to 8 Workshop. Designed to aid home economics teachers, supervisors, and leaders in the field with current problems. Resource people are used. Discussions, reports, lectures, and other methods of analyzing and working on solutions to problems. Emphasis for the workshop will be stated in the announcement of the course.

414-4 Home Economics for Elementary Teachers. Identification and development of meaningful home economics related experiences appropriate for various levels of elementary curriculum. Interpretation of current vocational education legislation and trends affecting elementary programs.

415-1 Introduction to Graduate Study. Seminar to orient the student to graduate work through relation of courses to goals of program, standards of work, habits of thinking, communication of ideas, uses of professional materials and publications.

417-4 Teaching Concepts and Generalizations in Home Economics. Use of co-operative teacher-pupil planning to develop curriculum based on subject matter concepts and generalizations. Techniques for helping students to take part in planning implementation of learning experiences, and evaluation. Provides practice in use of group process to plan for sequential learnings. Prerequisite: consent of instructor.

481-2 to 6 Readings. Supervised readings for qualified students. Prerequisite: consent of instructor and chairman of department.

485-3 Principles and Philosophies of Vocational and Technical Education. (See Occupational Education 485.)

500-4 Research Methods. Methods employed in research in home economics education with special study according to interest and needs of student. Development of prospectus. Prerequisite: Guidance 505.

505-4 Home Economics in the Secondary Schools. Curriculum development in vocational home economics is the focus. Units in family life education, consumer-homemaking, and occupational programs are developed by students for use in their professional responsibilities.

506-4 Evaluative Procedures in Home Economics. Principles and procedures underlying appraisal and evaluation. Development and critical consideration of instruments for appraising pupil growth and the program of instruction. Emphasis placed on values, attitudes and needs.

510-4 Supervision of Home Economics. Nature, function, and techniques of supervision at all levels. Emphasis given to supervision of student teachers.

510A-1 to 4 Practicum in Supervision. Experience in using a variety of techniques at various levels and areas of supervision both on and off campus. Prerequisite: 510 or Educational Administration 556 or consent of instructor.

515-4 Trends and Issues in Home Economics Education. Analysis and appraisal of current trends, problems and issues in the field. Attention given to implications for teachers.

516-4 Advanced Methods of Teaching Home Economics. Recent trends in methodology based on research and experimentation. Attention given to methods which promote cognitive, affective and psychomotor learnings. Preparation of materials for special interests of students.

517-4 Methods and Materials for Adult Programs in Home Economics. Philosophy of adult education; current organizational patterns of adult programs; unit planning, methods, techniques, and resources.

525-4 Cooperative Vocational-Technical Education. (See Occupational Education 525.)

571-4 Recent Research. Review of selected research in home economics education and governmental and industrial agencies. Emphasis on action research and use of research findings.

572-2 to 8 Special Problems. For students whose particular needs are not met by existing classes. Prerequisite: consent of chairman.

573-1 to 6 Seminar: Research in Home Economics. Presentation of prospectus outlines, research projects, problems for research, progress reports of research by graduate students and faculty. Prerequisite: consent of instructor.

599-2 to 9 Thesis. Minimum of 5 hours to be counted toward a master's degree.

600-3 to 48 Dissertation. Minimum of 36 hours to be earned for the Doctor of Philosophy degree.

Industrial Technology

There is no graduate degree program offered through Industrial Technology. Four hundred level courses may be taken for graduate credit, however, unless otherwise indicated in the course description.

440-4 Manufacturing Policy. Review of all areas covered by the industrial technology program. Includes problems for solution which simulate existing conditions in industry. Students present their solutions to the class and to the instructor in a formal manner. Prerequisite: 358, 365, 375, 382, or consent.

465-8 (4,4) Industrial Safety. (a) Principles of industrial accident prevention; accident statistics and costs; appraising safety performances; industrial hazards and safeguards; fire control. (b) Effective industrial safety organizations, management and supervision; safety psychology and training programs; health safeguards; occupational diseases and other industrial hazards. Prerequisite: senior standing.

Instructional Materials

Courses in this department may require the purchase of supplemental materials.

400-2 Library Research Methods. Introduction to the use of library materials in graduate research. Includes a survey of scholarly publishing and the use of reference works in various subjects. Open only to non-majors.

401-4 Introduction to Cataloging. Organization of library materials. Emphasis on cataloging and classification. Acquisition and the processing procedures. Both the Dewey Decimal and Library of Congress classification schemes studied. Laboratory assignments.

403-4 School Library Functions and Management. Effective library services in relation to the educational objectives of elementary and secondary school programs: organization, supervision, finance, housing, equipment, standards, and evaluation.

405-4 Library Materials for Children. Study of the aids, methods, and criteria for the selection and use of books and other instructional materials for children in the elementary schools.

406-4 Library Materials for Adolescents. A study of the aids, methods, and criteria for the selection and use of books and other instructional materials for students in the high school.

407-4 Basic Reference Sources. Evaluation, selection, and use of reference sources for elementary and secondary school libraries. Principles and methods of reference service.

413-4 Cataloging Non-Book Materials. The classification, cataloging, prepara-

tion and circulation of all types of non-book material such as films, filmstrips, slides, realia, etc. Prerequisite: 401.

417-4 Audiovisual Methods in Education. Selection and utilization of instructional materials in the learning environment, elementary through adult levels. Audio and visual materials and procedures are emphasized with some attention given to bibliographies and reference books for teachers. Prerequisite: Guidance 305.

420-4 School Library Activities and Practice. Supervised practice and observation integrated with instruction in the typical activities of school librarianship; storytelling, publicity, developing units of library instruction, and work with students.

440-4 Photography for Teachers. Photography as a tool of communication in the modern school. Techniques of camera handling, visually planning a story, macrophotography, color slides. Prerequisite: 417.

445-4 Preparation of Teacher-Made Audiovisual Materials. Laboratory practice in the preparation of bulletin boards, opaque materials, models, slides, recordings, feltboards, and other graphic materials. Prerequisite: 417 or consent of instructor.

448-4 Supervision and Administration of an Audiovisual Program. Provides professional information and training for anyone who has administrative responsibilities for an audiovisual program. For teachers, coordinators, or directors. Prerequisite: 417 or consent of instructor.

450-4 Classroom Teaching with Television. Classroom utilization of open and closed circuit television. Emphasis is placed on the changed role of the classroom teacher who uses television. Evaluation of programming, technicalities of ETV, and definition of responsibilities are included. Demonstration and a tour of production facilities are provided.

457-4 Radio and Television in the Classroom. Educational programs and their value to the teacher in the classroom. Sample tapes of radio programs and kinescopes are used.

458-4 The Medium of the Motion Picture. A study of the full range of expression by motion pictures including documentary, theatrical, educational, experimental, and industrial films. Representative films are screened.

470-4 Programming Automated Instruction. The principles and practice of writing both linear and intrinsic types of programmed instruction with emphasis on pictorial and performance branches. Individual experience in planning and producing programs.

505-4 Literature of the Humanities. Book selection and reference. Emphasis on literature, philosophy, music, and art. The philosophy and techniques involved in using major reference tools efficiently in the library. Prerequisite: 407.

506-4 Literature of the Social Sciences. Book selection and reference in the fields of history, political science, economics and business, sociology, anthropology, and other closely related fields. Includes basic terminology, structure of literature, and problems of bibliographical control and information retrieval. Prerequisite: 401, 407.

510-4 Mass Communications in Education. The use of mass media in the classroom. Includes radio, TV, comic books, newspapers, magazines, movies. Prerequisite: 417.

514-4 Survey of Research and Development in Instructional Materials. Advanced readings in research in instructional materials and the practical application of findings. Prerequisites: 405, 406, 417 or consent of instructor.

523-4 Seminar on Junior College Librarianship. Problems of particular significance to the junior college librarian: organization, materials, responsibilities, standards, and evaluation.

530-4 History of Media. The evolution of print from cuneiform tablets to the mass printing presses. The invention of photography, the motion picture, the electronic age of radio, television, and the laser. The change in storage of information from clay tablets to microfiche.

545-4 Cooperative Design of Instructional Materials. Students work on a one-to-one basis with faculty members in acquiring skills of instructional design. Students play, produce, and evaluate learning materials designed to meet specific teaching and learning problems. Prerequisite: 417, 445.

546-4 Integration of Audiovisual Materials in the Classroom. Selection of materials on the basis of curricular needs. Techniques of evaluating each

type of audiovisual material for use in the classroom. Structured for both the audiovisual administrator and the class room teacher. The principles and practices of integrating audiovisual materials into the curriculum are discussed, also the problems, annotations and classification of evaluated materials. Prerequisites: 417, or consent of instructor.

547-4 School Film and Filmstrip Production. Simplified techniques for teachers and audiovisual coordinators who may need to produce school-made films and filmstrips to meet local school problems. Prerequisites: 417 and 440 or consent of instructor.

549-4 Visual Learning. Learning from pictures in the classroom, the design of still and moving pictures, pictures used in testing perception, and the place of pictures in advertising and communication. Prerequisite: consent of instructor.

554-4 Administration of an Instructional Materials Center. Based on the concept of a single agency in the school that encompasses all forms of instructional materials. It is designed to further the training of specialists in the supervision and administration of integrated audiovisual and library programs. Prerequisite: 403 and 417.

560-4 Seminar in Instructional Materials. Designed to give advanced graduate students an opportunity to investigate and discuss topics in instructional materials before the seminar group. Topics selected would depend on background and interest of individuals. Prerequisite: consent of instructor.

570-4 to 12 Practicum in Instructional Materials. Supervised experience in a public school, junior college, or university. Practical experience in administration, supervision, and production in an instructional materials center. Prerequisite: 417, 445, and consent of chairman. Graded S/U only.

576-2 to 8 Problems in Instructional Materials. Opportunity for individual study of selected problems. Prerequisite: consent of instructor. Graded S/U only.

599-5 to 9 Thesis. Minimum of 5 hours to be counted toward a master's degree.

600-1 to 48 Dissertation.

Interior Design

Graduate work in the Department of Interior Design is offered toward a major concentration in family economics and management for the M.S. degree in home economics.

418-2 to 8 Workshop. Current problems facing the professional interior designer. Discussion, reports, lectures, design solution presentations, and other methods of analyzing and working on design problems. Prerequisite: consent of chairman.

470-4 Interior Design Seminar. Development of systematic approach involving systems analysis, human factors engineering, environmental variables. Prerequisite: consent of chairman.

481-2 to 6 Readings. Individual interests in design-related research. Prerequisite: consent of chairman.

491-4 Advanced Interior Design. Systematic analysis of human factors as determinants of design solutions for large-scale interiors. Lecture and laboratory. Prerequisite: 391c or consent of chairman.

Journalism

401-3 International Journalism. A study of the history, development, current status, and implications of the press and news services of other countries and their relationship to the international communications system. Prerequisite: senior standing.

421-4 School Publications. Designed for the prospective journalism teacher or high school publications director. Deals with practical production problems of newspapers and yearbooks.

422-3 Teaching High School Journalism. Teaching methods of journalism in secondary schools, organization and course of study, bibliography, use of journalism courses for school publications production.

431-3 Public Relations. Current methods of planning and executing public relations policies; evaluation of media; preparation of campaigns. Prerequisite: senior journalism majors only.

432-4 Foundations of Mass Communications. Construction of communication theory, development of communication models, and relation of empirical investigations to theories of mass communication. Prerequisite: graduate standing, or consent of instructor.

433-8 (4,4) Research Theory and Design. (a) Research design, sample selection, and methods appropriate to field, experimental, and survey research. (b) Research Methods. Series of research projects utilizing a variety of research methods. Class discussion precedes and follows each project. Prerequisite: 432 or consent of instructor.

442-3 The Law of Journalism. Legal limitations and privileges affecting communications; fair comment, criticism, contempt of court, right of privacy, copyright, and legal provisions affecting advertising. Prerequisite: senior journalism majors only.

445-4 Specialized Writing. Researching and writing about areas of special interest such as education, mental health, and home economics. Prerequisite: consent of instructor.

449-2 to 8 Practicum. Study, observation, and participation in publication supervision. Prerequisite: consent of department.

450-3 Mass Media Management. Basic economic theory of the firm. Management science. Operations research. Computer utilization. Media production technology. Readings and seminar discussions. Prerequisite: 370, 383a, and GSB 211a or equivalent, or consent of instructor.

455-3 Seminar on Media Problems. Readings and weekly seminar discussions on the role of the journalist in seeking solutions to the problems of mass media. Prerequisite: senior standing and consent of instructor.

475-3 Cablecommunication System Operations. The principles and practices of cablecommunication system management. The procurement and allocation of resources are examined with a view toward seeking a balance between the public interest of the municipality and its citizens and the private interest of the franchisee.

479-3 Role of Advertising in our Society. An exhaustive analysis of the literature covering such topics as: definitions and scope of advertising; advertising and the press; advertising as a social and economic force; evaluation of advertising; and advertising policies as related to the practices of specific business firms.

494-3 Criticism and Reviewing. Study of the critical analysis of literature and other arts.

498-1 to 12 Readings. Supervised readings. Not more than 6 hours may apply toward the master's degree. Prerequisite: consent of instructor.

501-3 Literature of Journalism. Critical reading of selected books relating directly and indirectly to journalism. Lectures, reviews, and discussions comprise the course work.

530-2 Seminar in Press Freedom. Observation of the comment function performed by the daily newspaper as related to current issues; role of the editorial writer, syndicated columnist, and cartoonist.

532-4 Seminar: Mass Communication Theory. Individual exploration of some aspect of mass communication theory. Students construct communication models of their own design and test them. Prerequisite: 433b or consent of instructor.

533-1 to 12 Research Problems in Journalism. Individual work on selected problems for research. Prerequisite: graduate standing.

540-3 Philosophy of Journalism. A study of journalistic ethics with emphasis on concepts of freedom and responsibility and the development of journalistic standards. Consideration of the responsibility of press in modern society.

545-3 Studies in Journalism History. A critical analysis of the literature in the context of the social and intellectual history of the times.

590-3 Seminar in Journalism History. Analysis of and practice in scholarly writing in the field of journalism history. Prerequisite: 545 or consent of instructor.

591-1 to 12 Topical Seminar in Communication. Serves the individual needs and interests of journalism graduate students. Prerequisite: graduate standing.

592-3 Communication and National Development. Examination of a wide range of functions of mass media communications in the process of national development in non-Western countries. Prerequisite: graduate standing and consent of instructor.

595-0 Graduate Seminar. Discussions of matters relating to graduate study, research, departmental and university requirements. Guest lecturers will discuss their research activities and areas of general interest to journalism grad-

uate students. Required each quarter for all journalism graduate students.
598-1 to 12 Readings. Supervised readings in selected journalistic subjects. Not more than 6 hours may apply toward the master's degree. Prerequisite: consent of instructor.

599-1 to 8 Thesis. Minimum of 5 hours to be counted toward a master's degree.
600-1 to 48 Dissertation. Minimum of 36 hours to be earned for the Doctor of Philosophy degree.

Linguistics

401-8 (4,4) Introduction to Linguistics. (a) General linguistics, fundamentals of the nature, structure, and functioning of language. (b) Structural linguistics, methods of descriptive linguistics, and analytical procedures. May be taken singly.

402-9 to 12 (4,4,1-4) Phonetics. (a) Theory and practice of articulatory phonetics. (b) Theory and practice of instrumental phonetics. Prerequisite: 402a. (c) Transcription laboratory. Prerequisite: 402a.

403-4 English Phonology. Analysis of spoken English, American, and British. Prerequisite: 401a or b, and 402a, or equivalents.

404-4 American Dialects. Phonemics of American English. Emphasis in the major American dialects. Prerequisite: 401a or b, and 402a, or equivalent.

405-4 Structural Phonology. Survey of phonological theory (phonemic and distinctive feature theory); examination of various phonological systems. Prerequisite: 402a.

408-4 Introduction to Transformational Syntax. Basic concepts and formalism of transformational generative grammars. Prerequisite: 401a or consent of instructor.

410-15 (5,5,5) Intermediate Uncommon Languages. Review of structure of modern spoken language. Introduction to written language. Emphasis on conversational style. (g,h,i) Vietnamese, (p,q,r) Lao, (s,t,u) Cambodian. The first two quarters carry undergraduate credit only. Prerequisite: GSC 250 or equivalent.

415-4 Sociolinguistics. History, methodology, and future prospects in the study of social dialectology, linguistic geography, multilingualism, languages in contact, marginal languages, and language planning. Prerequisite: one previous course in linguistics or consent of instructor.

420-12 (4,4,4) Advanced Uncommon Languages. Advanced conversation and reading of third-year level materials in preparation for classes conducted in the language. Review of grammar. (g,h,i) Vietnamese, (p,q,r) Lao, (s,t,u) Cambodian. Prerequisite: 410 or equivalent.

430-4 to 20 (4,4,4,4,4) Grammatical Structures. Detailed analysis of the structure of particular languages. May be repeated. Prerequisite: 401a and b or equivalent.

431-4 The Structure of the English Verb. Analysis of the English verb system. Special study of the modals and non-finites.

450-4 to 12 (4,4,4) Language Families. Synchronic survey of language families or sub-families. May be repeated. Prerequisite: 401a and b or equivalent.

497-2 to 12. Readings in Linguistics. Directed readings in selected topics. Prerequisite: consent of instructor and undergraduate status.

501-4 Contrastive Linguistics. Comparison of the structure of English with the structure of other languages. Phonology and syntax. Prerequisite: 401b.

504-4 Dialectology. Materials and methods of dialectology and linguistic geography. Prerequisite: 402a or equivalent.

505-4 Generative Phonology. Application of generative theory to the study of phonology. Prerequisite: 405 and 408.

506-8 (4,4) Historical Linguistics. (a) Theories and methods in the study of the history and pre-history of languages and language families. (b) Application of generative-transformational theory to problems and theory in historical linguistics. Prerequisite: for 506a is 401b, for 506b is 506a.

508-4 Advanced Transformational Syntax. Application of transformational generative theory to study in depth of English syntax. Prerequisite: 408.

510-4 History of Linguistics. The history of linguistic inquiry from classical times to the present.

530-4 to 12 Historical Grammatical Structures. History of languages or language families. Prerequisite: 506a.

540-2 to 8 Studies in Linguistics. Selected topics in theoretical and applied linguistics. Prerequisite: 401b or equivalent, or consent of instructor.

550-8 (4,4) Pro-seminar in Linguistics. Guided research in selected topics. May be taken singly. (a) Syntax/semantics. Prerequisite: 508 or consent of instructor. (b) Phonology. Prerequisite: 505 or consent of instructor.

570-3 Classroom Techniques in Teaching English as a Foreign Language. Theory and practice of classroom methodology in English as a foreign language.

571-3 (1,2) Language Laboratories. (a) Language laboratory equipment and its functions. Emphasis on routine maintenance and minor repair procedures. (b) Theory and practice of the language laboratory in foreign language pedagogy. May be taken singly. Prerequisite: consent of instructor.

572-3 Preparation of Teaching Materials in English as a Foreign Language. Theory and practice in development of EFL texts. Prerequisite: 570, or consent of instructor.

573-3 Practicum in EFL Materials Development. Prerequisite: 572.

580-4 Seminar in Special Problems of English as a Foreign Language. Prerequisite: 570, and 571b, and 572 or 573.

581-6 (2,2,2) Methods Practicum in English as a Foreign Language. Class observation and supervised practice teaching in English as a foreign language, meets concurrently with Linguistics 100. May be taken singly. Prerequisite: consent of department. Graded S/U only.

585-2 Teaching College Composition to Foreign Students. Objectives, methods, and materials for English 105 and similar courses. Observation and practice under supervision. Required for teaching assistants in Linguistics. Graded S/U only.

596-4 Stylistics. (See English 596.)

597-2 to 12 Readings in Linguistics. Individual readings in linguistics under guidance. Prerequisite: 401b or equivalent.

599-2 to 9 Thesis. Minimum of 5 hours to be counted towards a master's degree.

Mathematics

400-3 History of Mathematics. An introduction to the development of major mathematical concepts. Particular attention given to the evolution of the abstract concept of space, to the evolution of abstract algebra, to the evolution of the function concept, and to the changes in the concept of rigor in mathematics from 600 B.C. Prerequisite: 319 and 352 or consent of instructor.

401-3 Set Theory. Ordinal numbers, transfinite induction, cardinal numbers and their arithmetic properties, Cantor theorem, Schroeder-Berstein theorem, the axiom of choice and its equivalent forms, the continuum hypothesis. Prerequisite: 319 and 352 or consent of instructor.

405-3 Intermediate Ordinary Differential Equations. Topics selected from linear systems, existence and uniqueness for initial value and boundary value problems, oscillation, and stability. Prerequisite: 305b or consent.

406-3 Eigenfunction Methods in Applied Mathematics. Inner product spaces; orthonormal systems; Bessel's inequality; quadratic forms; Hermitian operators; eigenfunctions and eigenvalues; minimization properties of eigenfunction; the spectral theorem for a Hermitian matrix; functions of matrices; Sturm-Liouville differential operators; convergence properties of Fourier Series; the Legendre, Laguerre, Hermite, and Tchebycheff families of orthogonal polynomials; functions of a Sturm-Liouville operator; Green's functions; the Laplacian operator in 1,2, and 3 dimensions. Prerequisite: 221, 305b, or consent of instructor.

407-4 Introduction to Partial Differential Equations. First order linear and quasilinear partial differential equations, characteristics, second order linear partial differential equations, classification of types, boundary value and initial value problems, well posed problems, the wave equation, domain of dependence, range of influence, Laplace's equation and Dirichlet problems, the maximum principle, Poisson's integral, fundamental solution of the heat solution. Prerequisite: 305b, 351 or consent of instructor.

410-8 (4,4) Statistical Analysis. Service course for students using statistical methods in their research activities. May not be used to satisfy requirements for a mathematics concentration. Includes elements of probability, statistical estimation, tests of significance, and the analysis of the general linear model (multiple linear regression, analysis of variance, and analysis of covariance). Three lectures and two recitation hours per week. Must be taken in a,b sequence. Prerequisite: 111b or GSD 109.

411-3 Sample Survey Techniques. May not be used to satisfy requirements for a mathematics concentration. Introduction to the practical problems involved in conducting a sample survey and a comparison of basic survey designs. Prerequisite: 410b or consent of instructor.

412-3 Probability Models. May not be used to satisfy requirements for a mathematics concentration. Applications of probability models to a variety of problems in the social and physical sciences with emphasis given to Markov chains. Prerequisite: 410b or consent of instructor.

419-6 (3,3) Algebraic Structures. A study of the properties of such basic algebraic structures as groups, rings, fields. Must be taken in a,b sequence. Prerequisite: 319 or consent of instructor.

421-6 (3,3) Linear Algebra. The theory of determinants and systems of linear equations; vector spaces, linear independence, bases, dimension; linear transformations, change of base, similarity; quadratic and Hermitian forms, orthogonal and unitary transformations; triangular and diagonal form; eigenvalues and eigenvectors; normal matrices; nilpotent and idempotent matrices, the spectral theorem. Must be taken in a,b sequence. Prerequisite: 221 and 252a or consent of department.

425-3 Theory of Numbers. Selected topics from number theory. Prerequisite: 325 or consent of instructor.

426-6 (3,3) Introduction to Mathematical Logic. A formal development of the classical propositional calculus and functional calculi of first and second order from the primitive basis. Consistency and completeness. Validity and satisfiability. Must be taken in a,b sequence. Prerequisite: 301 or 319 or 352 or consent of department.

428-3 Discrete Structures. (See Computer Science 442.) Prerequisite: 301 or 319 or consent of department.

429-3 Applied Boolean Algebra. (See Computer Science 445.) Prerequisite: 428 or Computer Science 442.

430-4 Projective Geometry. Introduction to the fundamental concepts of projective geometry. Topics usually include the study of conics, polar systems of conics, homogeneous coordinates, cross-ratio, harmonic sets, duality, projectivities, and involutions. Prerequisite: 221 and 252a or consent of instructor.

432-4 Philosophy of Mathematics. (See Philosophy 432). Prerequisite: Philosophy 320 or 15 hours of credit in mathematics.

433-6 (3,3) Introduction to Topology. Topological spaces, continuity and homeomorphisms, construction of topologies, separation, compactness, connectedness, completeness. Must be taken in a,b sequence. Prerequisite: 352 or consent of instructor.

435-6 (3,3) Elementary Differential Geometry. (a) Classical differential geometry of curves from the modern viewpoint with emphasis on Frenet-Serret formulas. (b) Geometric aspects of surfaces, motivated by the theory of curves. Includes basic definitions on manifolds (vector field, differential forms, tensors, Lie brackets), manifolds with a linear connection, Riemannian geometry, sub-manifolds of R^n with emphasis on (Gaussian and Riemannian) curvature. Prerequisite: 221 and 252b.

440-2 to 4¹ Modern Algebra for Teachers. An introduction to algebra as a logical system, including groups, rings, and fields. Prerequisite: consent of instructor.

442-2 to 4¹ Survey of Geometry. A survey of geometry, including projective geometry, topology, etc. Prerequisite: consent of instructor.

451-3 Introduction to the Theory of Computation. (See Computer Science 451.) Prerequisite: 428 and either 429 or consent of instructor.

452-9 (3,3,3) Advanced Calculus. Fundamental concepts of analysis: limits, continuity, differentiation, and integration. Major topics include partial differentiation, vector analysis, Riemann-Stieltjes integrals, multiple integrals, infinite series, improper integrals, uniform convergence, Fourier series, and line integrals and surface integrals. Must be taken in a,b,c sequence. Prerequisite: 352 or consent of instructor.

455-4 Introduction to Complex Variables & Applications. Complex numbers, analytic functions, line integrals, the Cauchy-Goursat theorem and its implications, power series, Laurent series, polar and essential singularities, analytic continuation, contour integration and the residue theorem, conformal mapping, asymptotic expansions. Prerequisite: 252b.

460-4 Transformation Geometry. Geometry as the study of properties invariant under congruences, similarities, affine transformations, and projectivities. Prerequisite: 319 and 355a or consent of instructor.

472-3 Introduction to Mathematical Programming. (See Computer Science 472.) Prerequisite: 221 or 321.

475-6 (3,3) Numerical Analysis I. (See Computer Science 464.) Prerequisite: 221 and 305a and Computer Science 202.

480-6 (3,3) Introduction to Probability. Includes probability axioms, discrete and continuous distributions, moments in terms of Riemann-Stieltjes integrals, generating functions with emphasis on characteristic functions, and elementary limit theorems. Must be taken in a,b sequence. Prerequisite: 252b.

481-3 Elements of Stochastic Processes. An introduction, including normal, Poisson, and Markov processes. Prerequisite: 480b.

483-6 (3,3) Introduction to Statistics. Development of the elements of statistical theory. (a) Probability axioms, probability distributions, moments, and moment generating functions. (b) Statistical inference: estimation, testing hypotheses, and the general linear model. Not recommended for graduate students in mathematics. Must be taken in a,b sequence. Prerequisite: 252b and 221 or 321.

486-3 Design of Experiments. Mathematical model development of the statistical design and analysis of experiments with emphasis on practical applications. Includes completely randomized, randomized block, Latin square, split plot, incomplete block, and response surface designs, as well as factorial and fractional factorial experiments. Students who have had 580b should enroll concurrently in 1 of 550d. Prerequisite: 410b or 483b.

487-3 Nonparametric Methods in Statistics. Discussion of confidence intervals and tests of hypotheses where no functional form is postulated for the population. Students who have had 580b should enroll concurrently in 1 quarter hour of 550d. Prerequisite: 410b, 480b, or 483b.

488-3 Multivariate Statistical Methods. Introduction to multivariate statistical procedures with emphasis on applications. Multivariate general linear model, principal components, discriminant analysis, factor analysis. Students who have had 580b should enroll concurrently in 1 quarter hour of 550d. Prerequisite: 410b or 483b.

495-1 to 10 Special Topics in Mathematics. Individual study or small group discussions in special areas of interest under the direction of a member of the faculty. Prerequisite: consent of chairman and instructor.

501-9 (3,3,3) Real Analysis. Basic set theory including the theory of ordinal numbers. Real number system, topology of the real line. Continuous and semicontinuous functions, limits. Classical L^p spaces. Metric spaces: topology, continuous functions, convergence, Baire category. Banach spaces, Hilbert spaces. General measure and integration theory. Must be taken in a,b,c sequence. Prerequisite: 452c.

502-3 to 18 Advanced Topics in Ordinary Differential Equations. Selected topics from special areas in the theory of ordinary differential equations. Prerequisite: consent of instructor.

505-9 (3,3,3) Theory of Ordinary Differential Equations. Existence and uniqueness theorems; general properties of solutions; linear systems; geometric theory of nonlinear equations; stability and control theory; self-adjoint boundary problems; oscillation theorems. Must be taken in a,b,c sequence. Prerequisite: 501b and 421a or consent of instructor.

507-9 (3,3,3) Partial Differential Equations. Classification of partial differential equations; separation of variables; elementary solutions of the heat and wave equations; potential theory; n-dimensional parabolic operators. Must be taken in a,b,c sequence. Prerequisite: 452c.

510-9 (3,3,3) Mathematical Logic. Incompleteness and undecidability results of Gödel, Church, and Tarski (together with the necessary recursion theory). Topics from the theory of definability, model theory, proof theory, consistency of arithmetics. Must be taken in a,b,c sequence. Prerequisite: 426b or consent of instructor.

512-3 to 18. Advanced Topics in Mathematical Logic. Incompleteness and undecidability results, including the necessary recursion theory; definability theorems; model theory; consistency of arithmetic. Prerequisite: 426b or consent of instructor.

520-9 (3,3,3) Modern Algebra. Topics from group theory, ring theory, and field theory; including Sylow theorems, solvable groups, nilpotent groups, rings with descending and ascending chain conditions, elementary divisor theorem for R -modules, Galois theory, and cyclotomy. Must be taken a,b,c sequence. Prerequisite: 419 or consent of instructor.

522-3 to 18 Advanced Topics in Algebra. Group representations, homological algebra, algebraic geometry, algebraic numbers. Prerequisite: 520b.

525-3 to 18. Advanced Topics in Number Theory. Emphasizes analytic methods; as analytic prime number theory; Dirichlet's theorem on primes in arithmetical progressions; Diophantine approximations; and geometry of numbers. Prerequisite: consent of instructor.

527-3 Formal Languages. (See Computer Science 554.) Prerequisite: 451.

528-3 Automata Theory. (See Computer Science 551.) Prerequisite: 451.

529-3 Theory of Computability. (See Computer Science 557.) Prerequisite: 451 or consent of instructor.

530-9 (3,3,3) General Topology. Topological spaces; denseness, category; open, closed sets, Borel sets; separation axioms; subspaces; continuity; lattice of topologies; countability axioms; connectedness, compactness, local properties; regularity to complete normality. Hilbert space, metrizable spaces; extension theorems; well-ordering; product spaces. Must be taken in a,b,c sequence. Prerequisite: 433b or consent of instructor.

531-9 (3,3,3) Algebraic Topology. Homology and cohomology of complexes; axiomatic homology and cohomology. Homotopy theory; covering spaces. Cohomology of sheaves; applications in analysis; DeRahm cohomology; Poincaré duality. Must be taken in a,b,c sequence. Prerequisite: 433b, 419b.

532-3 to 18 Advanced Topics in Topology. Topological groups, topological dynamics, uniform spaces, homotopy theory, fiber spaces, and others. Prerequisite: 530b.

536-3 Differential Geometry. Curvature, torsion, the Frenet formulas, and intrinsic equations of curves in three-dimensional Euclidean space; applications to kinematics. Curves on a surface; first and second fundamental forms; normal sections and Meusnier's theorem; mean and total curvature. Prerequisite: 452c.

543-4¹ Probability for Teachers. An introduction to the basic concepts of probability theory. Major topics include algebra of events, probabilities in a finite sample space, conditional probabilities and stochastic independence, random variables and their distribution, mathematical expectation, standard deviation, covariance, special distributions. Prerequisite: consent of instructor.

545-4¹ Intermediate Analysis for High School Teachers. A rigorous development of differentiation and integration of continuous real functions. Topics include sequences, series, limits, real continuous functions, integrable functions on a closed interval.

548-2 to 4¹ Trends in School Mathematics. For secondary school mathematics teachers dealing with current developments in mathematics instruction at the elementary and secondary levels. Prerequisite: consent of department.

550-1 to 10 Seminar. Supervised study and preparation of reports on assigned topics. Reports presented for class discussion. (a) Algebra. (b) Geometry. (c) Analysis. (d) Probability and Statistics. (e) Mathematics Education. (f) Logic and Foundations. (g) Topology. (h) Applied Mathematics. (i) Differential Equations. (j) Number Theory. Prerequisite: consent of instructor.

551-9 (3,3,3) Functional Analysis. The theory of linear transformations between infinitely dimensional topological vector spaces, including Banach and Hilbert spaces, with various applications. The basic notion for the study is that of a functional or continuous scalar-valued linear transformation. Must be taken in a,b,c sequence. Prerequisites: 501c and 421b.

552-3 to 18 Advanced Topics in Analysis. Abstract harmonic analysis, uniform asymptotic distribution model of sequence, several complex variables, summability methods. Riemann surfaces. Prerequisite: 501c.

555-9 (3,3,3) Complex Analysis. Classical and modern analytic function theory, including Cauchy-Riemann equations, Cauchy-Goursat theorem, conformal mapping, normal families, Riemann surfaces, entire functions. Must be taken in a,b,c sequence. Prerequisite: 452c.

560-6 (3,3) Calculus of Variations. An introduction to the basic concepts and techniques of the calculus of variations including the classical necessary conditions for an extremum of a functional, general end point conditions, the second variation, fields, sufficiency conditions, and applications. Must be taken in a,b sequence. Prerequisite: 452c.

¹ These courses are open to candidates for the Master of Science in Education degree in mathematics, and to those who have received the consent of the chairman of mathematics.

572-6 (3,3) Numerical Analysis II. (See Computer Science 564.) Prerequisite: consent of instructor.

580-9 (3,3,3) Statistical Theory. Introduction to mathematical statistics. Estimation theory including such topics as the Cramer-Rao and Chapman-Robbins inequalities, and the Rao-Blackwell theorem, testing hypotheses with emphasis on the monotone likelihood ratio and the exponential family. Analysis of the general linear model and its application to the design of experiments. Decision theory including Bayes and minimax rules, admissibility and multiple decision procedures. Must be taken in a,b,c sequence. Prerequisite: 480b and 501 or concurrent enrollment in 501.

581-9 (3,3,3) Advanced Probability Theory. Background in modern probability theory. Measure-theoretic foundations; convergence theorems; additional selected topics. Prerequisite: 501c or consent of instructor.

592-2 to 4¹ Research in Mathematics Education. Critical study of research papers in the field of secondary mathematics education. Training in research and writing techniques as they pertain to the secondary mathematics program. Prerequisite: consent of chairman.

595-1 to 10 Special Project. An individual project, including a written report. (a) in algebra; (b) in geometry; (c) in analysis; (d) in probability and statistics; (e) in mathematics education; (f) in logic and foundations; (g) in topology; (h) in applied mathematics; (i) in differential equations; (j) in number theory. Graded S/U only. Prerequisite: consent of instructor.

599-1 to 9 Thesis. Minimum of 5 hours to be counted toward the Master of Arts degree.

600-1 to 48 Dissertation. Minimum of 36 hours to be earned for the Doctor of Philosophy degree.

Medical Education Preparation

There is no graduate degree program offered through medical education preparation. Four hundred level courses may be taken for graduate credit, however, unless otherwise indicated in the course description.

400-1 to 9 (1 to 3, 1 to 3, 1 to 3) Medprep Seminar. Seminar on social, professional and scientific issues of interest to students planning a career in medicine. Required of MEDPREP participants. May be taken for graduate credit only with written permission of the relevant department and the graduate dean. Prerequisites: restricted to MEDPREP students or consent of instructor.

401-1 to 18 (1 to 6, 1 to 6, 1 to 6) Medprep Tutorial. Individual instruction in academic areas required for admission to medical school. May be taken for credit only if student has not previously received credit for formal course work covering the same material. May be taken for graduate credit only with written permission of the relevant department and the graduate dean. Prerequisite: restricted to MEDPREP students.

402-1 to 8 (1 to 2, 1 to 2, 1 to 2, 1 to 2) Medprep Special Problems. Seminars on selected topics and field study as needed by students preparing for medical school. May be used for graduate credit only with written permission of the relevant department and the graduate dean. Prerequisite: restricted to MEDPREP students.

Microbiology

401-1 Undergraduate Seminar. Prerequisite: senior standing and consent of instructor.

403-5 Medical Bacteriology Lecture. A general survey of the mechanisms of infection, epidemiology, and immunity and the specific application of these principles to the symptomatology, diagnosis, treatment, and control of the more common bacterial infections of man. Prerequisite: 302.

404-3 Medical Bacteriology Laboratory. Procedures for the collection and handling of medical specimens for microbial examination and for cultivation

¹ These courses are open to candidates for the Master of Science in Education degree in mathematics, and to those who have received the consent of the chairman of mathematics.

and identification of the pathogenic organisms by their morphological, biochemical, and serological characteristics. Five hours laboratory. Prerequisite: or corequisite 403.

421-3 Microbiology of Foods Lecture. The relationships of micro-organisms to the preparation and preservation of foods with consideration of the laws governing sanitation, chemical preservatives, and fair dealing of the food producer. Three hours lecture. Prerequisite: 301.

422-2 Microbiology of Foods Laboratory. Methods for preservation, sanitary inspection, and microbiological examination of foods. Four hours laboratory. Prerequisite: or corequisite 421.

423-3 Industrial Fermentation. The application of the chemical activities of microorganisms to the industrial production of beverages, foods, antibiotics, and various commercial chemical products. Prerequisite: 301 and organic chemistry.

425-6 (3,3) Biochemistry and Physiology of Microorganisms. Lecture. The chemical basis of physiological functions in microbial cells. Prerequisites: 301 and organic chemistry.

426-6 (3,3) Biochemistry and Physiology of Microorganisms. Laboratory. Prerequisite or corequisite: 425.

441-3 Virology Lecture. General properties; classification and multiplication of bacterial and animal viruses; lysogeny; immunological and serological reactions; relation of viruses to cancer; and consideration of selected viral diseases of animals. Four hours lecture. Prerequisite: 302.

442-3 Virology Laboratory. Tissue culture methods, multiplication and assay of animal and bacterial viruses, purification, electron microscopy, interference, immunity. Six hours laboratory. Prerequisite: or corequisite 441.

451-3 Immunology Lecture. Antigens, antibodies, and antigenantibody reactions in vitro and in vivo, natural and acquired immunity. Four hours lecture. Prerequisite: 302.

452-3 Immunology Laboratory. Natural defense mechanisms and immune response, preparation of antigens and antibodies, serologic reactions, conjugated antibodies, electrophoresis, anaphylaxis. Six hours laboratory. Prerequisite: or corequisite 451 and senior or graduate standing.

460-3 Genetics of Bacteria and Viruses Lecture. Genetic mechanisms, mutation, transformation, recombination, transduction, lysogeny, phenotypic mixing, and reactivation phenomena. Three hours lecture. Prerequisite: 302.

461-3 Genetics of Bacteria and the Viruses Laboratory. Genetic mechanisms, mutation, transformation, recombination, transduction, lysogeny, phenotypic mixing, and reactivation phenomena. 6 hours laboratory. Prerequisite: or corequisite 460.

462-3 Fungal Genetics Lecture. Mendelian and molecular genetics of neurospora and yeast. Mutant induction, sexual crosses, tetrad analysis, linkage, and mapping. Prerequisite: Biology 305.

463-3 Fungal Genetics Laboratory. Six hours laboratory. Prerequisite: or corequisite 462 and consent of instructor.

500-1 Seminar. Prerequisite: consent of instructor.

502-4 Evolution of Genetic Thought. Critical examination of the development of genetic thought. Prerequisite: Biology 305 or equivalent.

503-2 Cytology of Microorganisms. Problems involved in the behavior of chromosomes at meiosis with special consideration of genetical data. 2 hours lecture.

504-5 Methods of Microbiological Research. The recognition and plan of attack upon unsolved problems in microbiology. 3 hours lecture and 4 hours laboratory.

511-1 to 15 Research. Prerequisite: consent of instructor.

528-1 to 10 Readings in Microbiology. Supervised readings for qualified graduate students. Prerequisite: consent of instructor.

541-6 Advanced Virology. Interactions between bacterial and animal viruses and their host cells; sequential synthesis of macromolecular components of viruses; synthesis of interferon; experimental carcinogenesis; genetic recombination among viruses. 3 hours lecture, 6 hours laboratory. Prerequisite: 441.

542-3 Molecular Virology. Interaction at the molecular level between tumorigenic and nontumorigenic DNA and RNA viruses and host cells, biochemical analysis of the growth cycle, uncoating, synthesis of virus-specified messenger RNA, enzymes and structural proteins, replication of viral nucleic acid, and maturation. 3 hours lecture. Prerequisite: 541.

543-3 Molecular Virology Laboratory. Characterization of viruses and their constituents; physiochemical properties; synthesis of nucleic acids and pro-

teins; induction of release of viruses from transformed cells; differentiation of sources of viral components; studies of various species of nucleic acids by such methods as sedimentation velocity, ultracentrifugation, pulse and pulse chase experiments, and polyacrylamide gel electrophoresis. Prerequisite: 541.

562-3 Molecular Genetics. Fundamentals including discussions of current research on replication, transcription, translation, mutation, suppression, repression, and their interaction and interdependence. Prerequisite: 425 and a 400-level course in genetics.

599-3 to 9 Thesis. Minimum of 5 hours to be counted toward a master's degree. Prerequisite: consent of instructor.

600-3 to 48 Dissertation. Minimum of 36 hours to be earned for the Doctor of Philosophy degree. Prerequisite: consent of instructor.

Music

405-3 Seminar in Instrumental Music Education. Advanced problems of administration and supervision of public school instrumental music programs, selection of appropriate materials for study and development, rehearsal techniques, preparation and techniques for performances of all types. Prerequisite: 305I.

409-2 Band Arranging. Advanced methods and techniques in arranging for the concert and marching bands from public school to collegiate level. Includes methods of transcribing from orchestral, organ, and piano literature. Prerequisite: 309a or equivalent.

411-15 (3,3,3,3,3) Music Literature. (a) Symphonic: A study of the development of the symphony and the symphonic poem. (b) Choral: The literature of the larger vocal forms such as the cantata and oratorio. (c) Chamber Music: Study of chamber music from the Renaissance to the present. (d) Piano. From beginning to the present, including an introductory study of early harpsichord literature. (e) Organ. From the early Baroque to the present. Prerequisite: 357a,b,c, or consent of instructor.

411-2 to 6 Collegium Musicium. Practicum in the preparation and performance of music from early times to the classical period. Prerequisite: Music major and/or consent of the department.

420-1 to 3 Music Education Practicum. A shop-laboratory course dealing with the selection, adjustments, maintenance, and repair of musical instruments. Prerequisite: consent of instructor.

430-2 Stage Band Arranging. The study and analysis of jazz harmony, melody, and rhythm as applied to modern instrumentation. Workshop wherein arrangements are written and played. Prerequisite: 309a.

440-1 to 4 Private Applied Music.

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|----------------|---------------|----------------|----------------|
| a. Violin | f. Oboe | k. Piano | p. Baritone |
| b. Viola | g. Clarinet | l. French Horn | q. Voice |
| c. Cello | h. Bassoon | m. Trumpet | r. Organ |
| d. String Bass | i. Saxophone | n. Trombone | s. Harpsichord |
| e. Flute | j. Percussion | o. Tuba | |

Applied music for graduate credit is offered at the 400 and 500 levels in the areas listed above. Credit is given at 1 to 4 hours per quarter on each level. May be repeated each quarter of graduate study. Students with majors in performance usually take 4 hours per quarter at the 500 level; majors in music education and all minors usually take 2 hours at the 400 level. Prerequisite for 440 and 540: 3 quarters at previous level on same instrument or consent of instructor.

441-6 (2,2,2) Counterpoint. (a) 16th Century Counterpoint. Species counterpoint and creative writing in the style of Palestrina and his contemporaries. Prerequisite: 205c or consent of instructor. (b) 18th Century Counterpoint. Analysis and creative writing in the contrapuntal-harmonic technique of Bach and his contemporaries. Prerequisite: 205c or consent of instructor. (c) Canon and Fugue. Analysis and creative writing of the larger imitative forms. Prerequisite: 441b.

444-2 to 6 Intermediate Composition. Required of undergraduates with concentration in theory-composition, culminating with original works in contemporary idioms. Taught by individual instruction. Prerequisites: 312-6.

447-6 (3,3) Electronic Music. (a) Introduction to classical studio equipment and techniques; use of voltage controlled equipment. Individual laboratory experience available. (b) Emphasis on creative projects, more sophisti-

cated sound experimentation and analysis. Enrollment limited. Prerequisite: 499, or GSA 361, or consent of instructor.

451-3 Teaching of General Classroom Music.

453-2 to 6 Choral Materials and Techniques. Demonstration and performance of choral rehearsal procedures; developing tone, diction, blend, and balance; concert production; performance of selected choral materials appropriate for junior and senior high school. Prerequisite: consent of instructor.

454-2 to 6 Instrumental Materials and Techniques. Demonstration and performance of instrumental music rehearsal procedures; developing tone, articulation, blend, and balance; concert production; performance of selected choral materials appropriate for junior and senior high school. Prerequisite: consent of instructor.

455-2 to 6 Elementary Music Education Workshop.

456-6 (3,3) Music for Exceptional Children. (a) Theories, applications, and techniques for therapeutic and recreational use of music with physically and mentally handicapped children. Includes keyboard, autoharp, guitar, and tuned and untuned classroom instruments. (b) Applications for the gifted, emotionally disturbed, and culturally disadvantaged child. Must be taken in a,b sequence. Prerequisite: 302a or consent.

460-3 Teaching Music Appreciation. Principles and methods for secondary schools and colleges; theories upon which various methods and principles are based.

461-2 Teaching Techniques and Materials for the Beginning and Intermediate Levels. Designed to meet the needs of applied students in which the problems of private studio teaching and college level teaching are discussed.

462-2 Teaching Techniques and Materials for the Advanced Student. Designed to meet the needs of applied students in which the problems of private studio teaching and college level teaching are discussed. (Continuation of Music 461.)

468-2 to 12 Music Productions. Study of the techniques involved in staging operas and musicals.

471-6 (3,3) Ethnomusicology. (Same as Anthropology 471.) A survey of theory, method, and form in ethnomusicology, with concentration on selected geographical areas. (a) Oceania, Asia, and Africa. (b) Middle East, Europe, and the New World.

481-1 to 6 Readings in Theory.

482-1 to 6 Readings in Music History and Literature.

483-1 to 6 Readings in Music Education.

499-1 to 12 Independent Study. The capable student engages in original investigations with faculty specialists. May be repeated for credit. Prerequisite: consent of instructor.

501-3 Introduction to Graduate Study in Music. Basic bibliographical and historical research techniques in music theory, literature, and education.

502-6 (2,2,2) Analytic Techniques. Analysis of representative works chosen from the Baroque, Classical, Romantic, and Modern eras.

503-3 to 4 Objective Research Techniques in Music Education. Theory, techniques, and procedures of evaluating music aptitude and achievement; survey of current research investigations in music education. A minor original research project is required.

504-6 (3,3) Medieval and Renaissance Music. (a) Medieval. (b) Renaissance.

505-3 Music of the Baroque Period. Opera, oratorio, cantata, and instrumental music in the period 1600 to 1750; the development of vocal and instrumental forms culminating in the works of Bach and Handel.

506-3 Music of the Classical Period. Development of opera, the symphony, the sonata, and chamber music in the 18th and early 19th century with particular emphasis on Haydn, Mozart and Beethoven.

507-3 Music of the Romantic and Impressionistic Periods. Development of opera, the symphony, the symphonic poem, the sonata, and chamber music in the 19th and early 20th centuries. Rise of nationalism, impressionism.

508-3 Music of the Twentieth Century. The heritage of 20th century music; study and analysis of musical philosophies of contemporary composers.

509-3 The History and Philosophy of Music Education. A study of the historical and philosophical evolution of music education and the identification of current forces, issues and trends influencing the profession.

512-3 History of Opera. The development of opera as a form, with a detailed study of operas since 1600.

518-3 Pedagogy of Music Literature. Principles of teaching music literature and music appreciation courses at the college level.

- 522-3 Seminar: Music History and Literature.** Advanced study in special periods of music history-literature.
- 531-2 to 9 Advanced Composition.** Composition in the larger forms for solo and ensemble performance. Required of all theory-composition majors 3 hours per quarter; elective credit for majors in other areas. Prerequisite: 444-6.
- 535-3 Contemporary Idioms.** Techniques of composition developed during the 20th century by composers of Europe and America.
- 540-1 to 4 Private Applied Music.** (See Music 440).
- 545-3 to 9 Pedagogy of Music Theory.** An orientation of the philosophies of theory to the problems of pedagogy. Required of all theory-composition majors.
- 546-3 Musical Aesthetics.** Nature and significance of music in the life of man. Critical theory in the writings of philosophers of music and art from Plato through Dewey and Cage.
- 550-3 Administration and Supervision of Music.**
- 556-2 to 6 Advanced Conducting.** Problems in score reading and interpretation. Laboratory conducting of larger ensembles.
- 560-2 to 3 Seminar in Music Education.** Trends, current practices, philosophies of music education.
- 566-1 to 12 Instrumental Ensemble.**
- 567-1 to 12 Vocal Ensemble.**
- 568-2 to 12 Opera Workshop.** An intensive course in opera for voice majors, including the study and public performances of scenes and entire operas.
- 595-1 to 9 Music Document.**
- 598-6 Graduate Recital.**
- 599-3 to 9 Thesis.**

Occupational Education

- 419-4 to 16 Student Teaching in Occupational Programs.** Experience in working with special and post-high school technical training programs in approved centers. The student teacher will follow the program of the supervisors of the primary specialization in both regular and extra-class activities. Prerequisite: 319-12, 490.
- 420-8 (4,4) Enterprise: The Man-Machine System.** Classroom, laboratory, and library study of man-machine systems in a variety of industries and institutions, with emphasis on teaching children and youth to understand the world of work. For advanced students and experienced teachers. Must be taken in a,b sequence. Eye protection is required. Safety glasses may be purchased for approximately \$4.50. Prerequisite: 20 hrs. in occupational education.
- 421-4 Principles of Enterprise Teaching.** Problems and special methods of teaching in enterprise education programs. Prerequisite: 16 hours occupational education courses.
- 425-2 to 12 Practicum.** Applications of occupational skills and knowledge. Co-operative arrangements with corporations and professional agencies provide opportunity to study under specialists. Prerequisite: 20 hours in specialty.
- 430-2 to 8 Special Problems.** Special opportunity to obtain assistance and guidance in the investigation and solution of occupational education problems. Prerequisite: consent of instructor and coordinator.
- 450-2 to 12 Advanced Occupational Skills and Knowledges.** Modern occupational practice in selected fields. For experienced professionals seeking advanced techniques in specialized areas of occupational education. Prerequisite: intermediate level study in the specialty.
- 485-3 Principles and Philosophy of Vocational and Technical Education.** (Same as Agricultural Industries 485, Home Economics Education 485, Secondary Education 485, and Secretarial and Business Education 485.) Team teaching used. Nature and purposes of practical arts, vocational and technical education, their relationships and differences, and the place of each in preparing people for the world of work.
- 488-3 Analysis for Occupational Education.** Fundamentals of analyzing occupations and careers for establishing units of instruction for occupational education courses. Required for occupational teachers, coordinators, and supervisors. An extra text is available for approximately \$2.00. Prerequisite: 12 hours in teaching specialty.
- 489-3 Organization of Subject Matter.** Course and unit construction, prepara-

tion of materials for distribution to students, preparation of teacher-made tests, course evaluation and updating. Prerequisite: 488.

490-3 Principles of Occupational Teaching. Methods of teaching in occupational education programs. Required for occupational teachers, coordinators, and supervisors. Prerequisite: 12 hours in teaching specialty.

493-3 Audio-Visual Media for Occupational Education. Selection, development, analysis, and use of commercial and self-made software systems.

500-8 (4,4) Legislation, Organization, and Administration of Occupational Education. (a) Historical and contemporary thought and practice re federal and state legislation for occupational education in sundry institutions. Legislators are used as resource persons. Required for supervisors. (b) Policies governing the organization and administration of programs in states and local agencies. Students write a proposal for a new program. Must be taken in a,b sequence.

502-4 Evaluation of Occupational Education Programs. Criteria and instrument development, testing techniques, and appraisals. Special emphasis given to the principles and methods of evaluation of progress in laboratory and shop subjects of a practical arts nature. Experience in development and construction of pertinent and effective evaluative devices. Prerequisite: one course in tests and measurement.

505-4 Administration and Supervision of Occupational Education. Principles, practices, and techniques relating to supervising and administering local programs. Required for vocational coordinators and supervisors.

506-4 Cooperative Programs. Problems and procedures involved in setting up and operating cooperative work-study programs. Required for vocational coordinators.

510-4 Planning Occupational Education Facilities. Principles and practices of planning classrooms and laboratories for occupational education programs. How to work with administrators, staff, and paid professionals to assure judicious location and design of facilities.

525-4 Cooperative Vocational-Technical Education. (Same as Agricultural Education 525, Home Economics Education 525, and Secretarial and Business Education 525.) Team teaching used. Interrelated cooperative programs as they are developed in America, and especially Illinois, are presented. Coordinators' duties and responsibilities along with the operation of interrelated vocational cooperative programs are featured.

540-4 Research in Occupational Education. Basic research methods and techniques in the design, investigation, and reporting of research studies relating to occupational education.

541-4 Occupational Information and Guidance. Designed for school counselors, industrial supervisors, and teachers to give them orientation to and experience with occupational information and vocational adjustment.

550-4 College Teaching of Occupational Education. Problems of college students and their adjustments to occupational subject matter. Organization and utilization of laboratories and instructional systems. Professional contributions of college teachers.

560-2 to 12 New Developments in Occupational Education. Recent developments and trends in occupational education, presented by recognized authorities for discussion and review.

570-2 to 6 Special Investigations.

580-1 to 9 Seminar.

599-1 to 9. Thesis.

Philosophy

400-4 Contemporary Mind. Analysis of thought-patterns and motivations dominating the American mind during the present decade of the 20th century.

406-4 Philosophy of Biology. Leading concepts of biological sciences: species, evolution, life, organism and part, etc. Abstract ideas of biology are related, wherever possible, to specific experiments recorded in scientific literature. Prerequisites: 300 or 320, and three laboratory or field courses in the biological sciences or consent of instructor.

415-3 Logic of the Social Sciences. (Same as Sociology 415.) Logical and epistemological examination of the social studies as types of knowledge. Basic problems in philosophy of science with major emphasis upon social science:

relationship of theory to fact, nature of induction, nature of causal law, testability, influence of value judgments, etc. Intended for students with considerable maturity in a social science or in philosophy.

420-4 Theory of Logic. Propositions, analysis of terms, theory of inference, both formal and material. Prerequisite: 320.

424-3 Advanced Formal Logic. Special relevance to philosophy students. Includes logical principles, many-valued logics, modal logics, and the logic of imperatives. Prerequisite: 320.

425-3 Philosophy of Language. Introduction to basic problems in the philosophy of language including alternative theories of meaning and reference and the relation between meaning and intention.

432-4 Philosophy of Mathematics. (Same as Mathematics 432.) Philosophical problems of mathematics. Epistemological issues raised by non-Euclidean geometry. Representative writers on foundations, including nominalists, institutionists, logicists and formalists. Ontological commitment, conventionalist theories of mathematical truth, logical paradoxes and alternative set theories; significance of the theorems of Godel and Skolem-Lowenheim. Prerequisite: 320 or 15 hours mathematics.

441-4 Philosophy of Politics. (Same as Government 441.) Some of the central problems of modern political life, such as sovereignty, world government, authority and consent, the relations of economics and social studies to political theory. Prerequisite: GSC 102 or 340 or consent of instructor.

443-4 Philosophy of History. Classical and contemporary reflections on the nature of history and historical knowledge as the basis for dealing with the humanities. Prerequisite: consent of instructor.

460-4 Advanced Philosophy of Art. The definition of art, its relations to science, culture, and morals; the various types of art defined. Familiarity with at least one of the fine arts is assumed. Prerequisites: GSC 207 or 360, and six courses in music, painting, sculpture, literature, or drama.

465-3 British Moralists. Texts and commentaries for 17th and 18th centuries. Moral philosophy of Hobbes, Locke, Cudworth, Hutcheson, Butler, Price, and Hume. Prerequisite: 340 or consent of department.

471-8 (4,4) The Classic Greek Philosophers. (a) Plato. (b) Aristotle. Prerequisite: 381 or consent of department.

472-12 (4,4,4) Seventeenth Century Philosophers. (a) Descartes. (b) Locke. (c) Spinoza. Prerequisite: 383 or consent of department.

473-8 (4,4) Eighteenth Century Philosophers. (a) Hume. (b) Kant. Prerequisite: 383 or consent of department.

474-12 (4,4,4) Nineteenth Century Philosophers. (a) Hegel. (b) J. S. Mill. (c) Marx. Prerequisite: 306 or consent of department.

477-4 Latin American Philosophy. A survey of philosophic thought in Latin America from colonial times through 19th century positivism and the reactions against it, up to recent trends. Reading of original texts in English translations. Discussions and reports.

478-4 Seminar in Latin American Thought. (See Spanish 478.)

482-3 Recent European Philosophy. Philosophical trends in Europe from the end of the 19th Century to the present. Phenomenology, existentialism, the new Marxism, structuralism, and other developments. Language, history, culture, and politics.

490-2 to 12 Special Problems. Hours and credits to be arranged. Courses for qualified seniors and graduates who need to pursue certain topics further than regularly titled courses permit. Special topics announced from time to time. Students are invited to suggest topics for individual study and papers or for group study. Prerequisite: consent of instructor.

497-12 (4,4,4) Honors. Topic for each quarter will vary. Enrollment restricted to undergraduates. Prerequisite: consent of department.

500-4 Metaphysics. Recent writers and current problems in metaphysics.

501-4 Philosophy of Religion. Analysis of a problem in philosophical theology or the phenomenology of religion, or of the work of a particular thinker.

503-4 Philosophical Ideas in Literature. Metaphysical and ethical world views embodied in representative classics of poetry and prose from ancient to contemporary times.

505-4 Philosophy of Science. Logic, methods, history, or epistemology of science.

510-4 Indian Philosophy. Schools, systems, or problems in Indian thought.

511-4 Chinese Philosophy. Confucianism, Taoism, or Buddhism. Emphasis on comparison of philosophy East and West.

- 512-4 Philosophy of Culture.** Forms and assumptions of Eastern and Western philosophies.
- 515-4 Theory of Nature.** Presuppositions of the Western view of nature, the need for revision of causal determinism, and the reintroduction of freedom into the spatiotemporal world.
- 520-4 Logic.** Recent advances in logic.
- 524-4 Analytic Philosophy.** Analytic Philosophy of men such as Austin, Ryle, Ayer, Carnap, G. E. Moore.
- 530-4 Theory of Knowledge.** A contemporary writer or problem in epistemology. Emphasis on problem of reliability and structure of scientific knowledge.
- 531-4 Whitehead.** Study in depth of a selected aspect or problem in Whitehead's philosophy.
- 540-4 Philosophy of Journalism.** (See Journalism 540.)
- 542-4 Political and Legal Philosophy.** Relations of law, morality, and politics, and consideration of problems and issues in philosophy of law.
- 545-4 Ethics.** Recent British and American ethical theory.
- 550-4 Theory of Value.** General theory of value or treatment of one or more philosophers on contemporary problems of value.
- 560-4 Aesthetics.** Selected topics or writings.
- 570-4 American Idealism.** One or more American idealists. Recent seminars have been devoted to the thought of Brand Blanshard and Peter A. Bertocci.
- 572-4 Twentieth Century Philosophers.** Inception and development of THE LIBRARY OF LIVING PHILOSOPHERS from Volume I on John Dewey to the present.
- 575-8 (4,4) Phenomenology and Existential Philosophy.** (a) Phenomenology. The phenomenological tradition and its contemporary transformations. (b) Existential Philosophy. Classical works of existentialism.
- 577-12 (4,4,4) Dewey.** (a) Metaphysics. (b) Theory of Knowledge. (c) Ethics.
- 579-4 Bertrand Russell.** Bertrand Russell's theories of meaning, logic, and knowledge.
- 581-4 Plato.** Thorough study of several of the dialogues. System of Plato as a whole, discussions and reports on the readings.
- 582-4 Aristotle.** Intensive reading of several texts, illustrating widely varied portions of Aristotle's thought.
- 584-4 Medieval Philosophy.** Representative philosophers and problems.
- 585-4 British Empiricism.**
- 586-4 Spinoza.** Analysis of the improvement of the understanding and the ethics. Medieval tradition and to Spinoza's contemporaries. Discussions and reports.
- 587-4 Hegel.**
- 588-12 (4,4,4) Kant.** (a) Critique of Pure Reason. (b) Critique of Practical Reason. (c) Critique of Judgment.
- 590-2 to 16 General Graduate Seminar.** Selected topics or problems in philosophy.
- 591-1 to 5 Readings in Philosophy.** Supervised readings for qualified students. Consent of instructor required.
- 599-2 to 9 Thesis.** Minimum of 5 hours to be counted toward a master's degree.
- 600-3 to 48 Dissertation.**

Physical Education

Courses in this department may require the purchase of supplemental materials.

- 400-4 Evaluation in Physical Education.** Historical background of measurement in physical education; selection and evaluation of contemporary testing devices; structure and use of tests; administering the testing program; and interpretation and application of results. Fulfills the tests and measurements course requirements for the Master of Science in Education degree.
- 402-4 Organization and Administration of Intramural and Extramural Activities.** Planning intramural programs of sports; planning and coordinating extramural activities commonly associated with physical education.
- 403-4 The Adaptation of Physical and Recreational Activities for the Special Student.** Recognition of problems and planning of programs for students with special problems.
- 404-2 to 4 The Teaching of Sports.** Teaching methods, officiating, organization, safety precautions, and selecting equipment for sports.

406-4 Basic Concepts of Physical Education. The place of physical education in the school program, and the concepts underlying the program. (Required of all students not presenting the undergraduate courses 354 or 340.)

407-2 to 4 Advanced Theory and Techniques in the Prevention and Rehabilitation of Athletic Injuries. Theoretical and practical methods of preventing and treating athletic injuries.

408-4 Physical Fitness—Its Role and Application in Education. Improvement of programs and teaching techniques involved in the development of various aspects of physical fitness. Units on postural status; body weight control; tension factors, causes, and control; exercise tolerance; and general body mechanics and control.

410-4 Behavioral Foundations of Coaching. Behavioral problems of the athlete and coach and possible solutions to such problems. Application of behavioral principles and theories as a basis for understanding the interaction between coach and student in the athletic environment. Prerequisite: Guidance 305 or consent of instructor.

415-4 Workshop in Gymnastics for Women. For undergraduates and graduates. Techniques and theory of teaching, coaching, judging official performances, conducting gymnastic meets, clinics, and demonstrations. Spotting and analysis of performance.

416-4 Current Theories and Practices in the Teaching of Dance. (Same as Theater 416.) History and evolution of dance; place of dance in education. Prerequisite: GSE 113d or Physical Education-Women 115h, and 240.

420-4 Physiological Effects of Motor Activity. The general physiological effects of motor activity upon the structure and function of body organs; specific effect of exercise on the muscular system. Requires purchase of laboratory manual. Prerequisite: GSA 209 or equivalent.

444-2 to 8 Contemporary Dance Workshop. Dance technique and theory, composition, improvisation, and production. Advanced study of the problems of choreography and production in their presentation as theater. Public performance is required. Prerequisite: one year of technique and theory or equivalent. Mandatory Pass/Fail for undergraduates.

475-2 to 4 Individual Research. The selection, investigation and writing of a research topic under supervision of an instructor. (a) Dance, (b) kinesiology, (c) measurement, (d) motor development, (e) physiology of exercise, (f) history and philosophy.

500-4 Techniques of Research. Critical analysis of research literature; study of research methods and planning research studies. Prerequisite: 400 or concomitant registration in 400.

501-4 Curriculum in Physical Education. Principles and procedures for curriculum construction and revision; criteria for selecting activities and judging outcomes and the place of the physical education course of study within the total curriculum.

502-4 Foundations of Motor Skills. Application of physiological, kinesiological, and mechanical principles to intelligent control of large-muscle activities. Recommended background: a course in kinesiology.

503-4 Seminar in Physical Education. The course content and its procedures center around group discussions of controversial issues that currently exist in physical education and provide opportunities for practice in seeking unbiased solutions to professional problems.

504-4 Research Projects in Physical Education. Planning, conducting, and reporting original research studies. Prerequisite: 500 or equivalent.

508-4 Administration of Interschool Athletics. Existing problems in interschool athletics, with attention to secondary school athletic programs.

509-4 Supervision of Physical Education. The functions of supervision in physical and health education; basic principles and methods of supervision. Techniques and methods for increasing the effectiveness of the program at the elementary and high school levels.

510-4 Motor Development. Early patterns of motor behavior and the development of physical skills in childhood. The development of physical abilities during adolescence. Individual differences in motor proficiency and factors affecting the acquisition of motor skills. Concepts of motor learning with inferences for improving instructional practices.

511-4 Analysis of Human Physical Movement. Basic human movements as performed by individuals of different ages analyzed. Understanding of movement mechanics at varying levels of skill analyzed. Additional material required. Prerequisite: 303 or equivalent.

513-4 Perceptual Motor Learning of Physical Skills. Principles of learning applied to motor performance. Variables that affect learning of physical skills. Prerequisite: consent of instructor.

514-4 Advanced Laboratory Techniques for Physical Exercise. Fundamental theory and procedures of instrument preparation, calibration, and application in data procurement. Prerequisite: 420 or equivalent, consent of department.

515-4 Body Composition and Human Physical Performance. Physical dimensions of the human body as they influence motor performance and are modified by protracted physical exercise. Prerequisite: 420 or equivalent.

517-4 Athletic and Physical Education Facility, Design, Construction, and Maintenance. Basic principles of design, construction, and maintenance of athletic and physical education facilities based upon program characteristics and potential student enrollment. Emphasis on the development of new materials and trends toward new concepts of design and construction. Prerequisite: Physical Education-Men 354 or Physical Education-Women 353 or equivalent or consent of instructor.

520-4 Metabolic Analysis of Human Activity. Metabolic principles pertinent to human physical performance with emphasis on sport, exercise, and occupational activity analysis. A detailed study of oxygen utilization, oxygen debt, mechanisms of oxygen transport as they relate to physiological homeostasis in localized and total body motor activity. Emphasis on the laboratory study of aerobic and anerobic performance. Prerequisite: 420 or equivalent.

525-1 to 6 Readings in Physical Education. Supervised reading in selected subjects. Open only to last-quarter seniors and graduate students.

599-1 to 9 Thesis. Minimum of 5 hours to be counted toward a master's degree. Five bound copies of Thesis required. May require purchase of appropriate equipment. Prerequisite: 500 or equivalent.

600-2 to 48 Dissertation. Minimum of 36 hours to be earned for the Doctor of Philosophy degree. Five bound copies of Dissertation required. May require purchase of appropriate equipment. Prerequisite: 500 or equivalent.

Physics

401-3 Mechanics. Rigid body mechanics, normal coordinates, mechanics of continuous media, and advanced principles. Prerequisites: 301, Mathematics 407, or consent of instructor.

404-6 (3,3) Physical Electronics. Kinetic theory and statistical mechanics with applications to electronic conduction in solids, vacuum, and gases, electron emission and ballistics; Bose-Einstein and Fermi statistics, electron theory of metals; semiconductors; quantum physical phenomena of the solid state. Prerequisites: 304, 305, 401 or consent of instructor.

405-3 Electronics. Advanced theory and application of vacuum tubes and semiconductor devices as circuit elements in power supplies, oscillators, amplifiers, and shaping circuits. Prerequisites: 305 and 309 or consent of instructor.

410-6 (3,3) Introduction to Electromagnetic Wave Theory. A theoretical study of electromagnetic wave generation, propagation, and detection, with applications to microwaves and modern optics. Prerequisite: 305, 310.

415-12 (3,3,3,3) Modern Physics. Elements of wave mechanics, special relativity, atomic, molecular, and nuclear physics. Prerequisites: 301, 305, Mathematics 407, or consent of instructor.

418-1 to 4 Modern Physics Laboratory. Advanced laboratory work with pulsed and continuous lasers and optical detectors, nuclear magnetic resonance, nuclear spectroscopy, vacuum techniques, mass and beta spectroscopy, and semiconductor physics.

420-2 to 5 Special Projects. Each student is assigned to a definite investigative topic. Adapted to advanced undergraduate students. Prerequisites: 301, 305.

447-5¹ Topics in Classical Physics. Assists experienced teachers to improve their understanding of classical physics and the strategy of presenting it. Emphasis on demonstration of phenomena as basic strategy in the introduction of new material. Attention given to the design of demonstration apparatus. Related laboratory experience is an integral part of the course. Prerequisite: consent of department.

448-5¹ Topics in Modern Physics. Assists experienced teachers to extend their understanding of modern physics. Lectures and demonstrations aim at improvement of the means of presenting the ideas of modern physics. Related

laboratory experience is an integral part of this course. Prerequisite: consent of chairman of department.

449-3¹ (1,1,1) In-Service Institute for Teachers of Physics. A series of lectures, demonstrations, discussions, and films to assist teachers of high school physics in meeting their classroom problems and responsibility. Prerequisite: consent of chairman of department.

504-12 (4,4,4) X-Ray Diffraction and Lattice Dynamics. (See Applied Science 504.)

510-9 (3,3,3) Classical Mechanics. Generalized coordinates and forces. Lagrangian, Hamiltonian and variational formulations of mechanics. Central forces, oscillations; normal modes of molecular systems. Dynamics of non-rigid solids and liquids. Prerequisite: 401.

511-9 (3,3,3) Mathematical Methods in Physics. Vector spaces and operators in physics. Hilbert spaces and complete orthonormal sets of functions. Elements and applications of the theory of analytic functions. Methods for the solution of partial differential equations of physics. Prerequisite: Mathematics 407 or equivalent, consent of instructor.

520-2 to 5 Special Projects. Each student assigned a definite investigative topic requiring resourcefulness and initiative. Prerequisite: consent of instructor.

530-9 (3,3,3) Electromagnetic Theory. Determination of static, electrostatic, and magnetostatic fields. Microscopic and macroscopic theory of insulators and conductors. Maxwell's equations; radiation, propagation and scattering of electromagnetic waves. Electrodynamics and special theory of relativity. Prerequisite: 305.

531-9 (3,3,3) Quantum Mechanics. Quantum mechanics of free and bound particles. Angular momentum, perturbation theory, scattering theory. Prerequisite: 415, Mathematics 407 or consent of instructor. Physics 511 desirable.

532-9 (3,3,3) Advanced Quantum Mechanics. Relativistic quantum mechanics, the Dirac equation; introduction to quantum field theory. Introduction to many-body problems. Special topics in solid state theory, nuclear physics, and elementary particle physics according to the interests of the students and the instructor. Prerequisites: 531 and consent of instructor.

540-9 (3,3,3) Nuclear Physics. Fundamental properties and systematics of nuclei, scattering theory, the nuclear two body problem, nuclear models, electromagnetic properties of nuclei, particle radioactivity, nuclear reactions, the optical model. Prerequisite: 531 and consent of instructor.

550-9 (3,3,3) Atomic and Molecular Spectra. Detailed quantum mechanical treatment of atomic and molecular spectroscopy. Prerequisite: 531 and consent of instructor.

560-9 (3,3,3) Statistical Mechanics. Principles of classical and quantum equilibrium statistics. Ergodic Hypothesis, ensembles, partition functions. Applications to atomic, molecular and other physical systems. Fluctuations and non-equilibrium phenomena. Prerequisite: consent of instructor.

570-9 (3,3,3) Solid State Physics. Fundamental concepts in solid state physics. Lattice vibrations, band theory of solids, the Fermi surface, dynamics of electrons. Transport, cohesive, optical, magnetic and other properties of solids. Prerequisite: consent of instructor.

575-1 to 4 Graduate Seminar. Lectures on special topics to be given when a demand arises. Prerequisite: consent of instructor.

580-3 to 6 Selected Topics in Physics. Topics of special interest. Prerequisite: consent of instructor.

592-1 Colloquy in Molecular Science. Required each quarter of all resident students who have been admitted to advanced study in molecular science. Weekly conference on current research and recent literature of the field.

597-3 to 45 Special Topics in Molecular Science. Prerequisite: admission to the molecular science doctoral program and consent of instructor.

598-3 to 25 Special Projects in Molecular Science. Prerequisite: admission to the molecular science doctoral program and consent of instructor.

599-1 to 9 Thesis.

600-1 to 48 Dissertation. Hours and credit to be arranged by chairman. Prerequisite: admission to advanced study in molecular science.

¹ Open to teachers of high school physics, to National Science Foundation Institute participants, and to others who have received the consent of the chairman of the Department of Physics and Astronomy or the director of the institute. May count toward the Master of Science in Education degree with approval of the Department of Secondary Education.

Physiology

410-5 (5,5,5) Advanced Anatomy. Primarily for students with a concentration in physiology or related sciences. Laboratory sessions involve dissection of the human body. 2 hours lecture and 6 hours laboratory per week. Prerequisite: consent of instructor.

414-4 Anatomy and Physiology of Speech and Hearing Mechanisms. Covers anatomy and physiology of the vocal apparatus and the hearing apparatus. 3 hours lecture and 2 hours laboratory per week. Prerequisite: consent of instructor required for graduate students.

415-7 (3,4) Experimental Animal Surgery. Principles of surgery as applied in animal research. Course covers animal preparation, anesthesia, instruments, selected surgical procedures, care of animal quarters. Part (a) (2 lectures and 1 two-hour laboratory per week) is preparatory for part (b) (2 lectures and 2 two-hour laboratories per week) or for Animal Industries 502 (large animal surgery course)

417-8 (4,4) Principles of Pharmacology. Action of drugs and other chemical substances on living organisms; pharmacodynamics, chemotherapy, toxicology, and therapeutics. 3 lectures and 1 two-hour laboratory per week. Prerequisites: basic courses in chemistry and biology.

426-4 Comparative Endocrinology. (Same as Zoology 426.) Comparison of mechanisms influencing hormone release, hormone biosynthesis, and the effects of hormones on target tissues. Includes ablation and histology of glands, and chemical and bioassays with vertebrates and invertebrates. Prerequisite: Biology 308 and consent of instructor.

430-6 (3,3) Cellular Physiology. Structure and function of living cells and cell materials; chemical and physical analysis of biological activity at the cellular level. 3 lectures per week.

433-4 Comparative Physiology. Comparisons of physiological processes in animal phyla, with emphasis on developmental aspects of organ and organ system function. 3 lectures and 1 two-hour laboratory per week.

440-3 Electron Microscopy. Open to students with advanced knowledge of natural or physical sciences. Course provides lectures, demonstrations, and practical experience in specimen preparation and use of the electron microscope. 2 lectures and 1 two-hour laboratory per week.

450-1 to 16 Special Problems in Physiology. Eight hours laboratory. Prerequisite: consent of department.

456-4 to 12 Independent Research for Honors. Supervised research and investigation in different branches of physiology. Prerequisite: consent of instructor and chairman. Open to undergraduate honors students only.

460-15 (5,5,5) Mammalian Physiology. Functions of mammalian organ systems, with emphasis on man. (a) blood, circulation, and respiration; (b) digestion, excretion, and endocrines; and (c) nervous system and sense organs. 3 lectures and 2 two-hour laboratories per week.

465-6 (3,3) Biophysics. Physical analysis of biological systems, physical properties of biological materials, molecular biophysics, effects of physical environmental factors on living organisms, theoretical biophysics. 3 lectures per week. Prerequisites: 1 year of college physics, 1 year of college mathematics, 1 year of college biology.

471-3 Biophysical Instrumentation. Construction and maintenance of biophysical instruments. 1 lecture, 2 two-hour laboratories per week. Prerequisites: Engineering 410 or equivalent electronics background, permission of instructor.

500-1 Advanced Seminar in Physiological Sciences. Presentations of research and current literature. Required of all graduate students with a major concentration in physiology.

519-4 Advanced Endocrinology. Methods of analysis of endocrine effects; research methods used in endocrinology; endocrine drug principles in human and animal behavior. 3 lectures and 1 two-hour laboratory per week. Prerequisites: strong background in chemistry and biology.

520-3 Physiological Techniques. Advanced study of special procedures used in physiological research. 1 lecture and 2 two-hour laboratories per week. Prerequisite: graduate standing in physiology or a related science.

521-1 to 4 Readings or Special Research in Physiology. By special arrangement with instructor. A maximum of 12 hours of 521 may be accumulated.

540-8 (4,4) Advanced Comparative Physiology. Current concepts, research,

and literature in comparative studies of physiological processes in the animal kingdom. 3 lectures and 1 two-hour laboratory per week. Prerequisites: graduate courses in chemistry and biology (including physiology 433 or the equivalent), consent of instructor.

565-4 Advanced Biophysics. Advanced study of biophysical research and literature. 3 lectures and 1 two-hour laboratory per week. Prerequisite: 465 or equivalent, consent of instructor.

580-2 to 18 (2 to 3 for each topic) Current Topics in Physiology. Readings and group discussions in areas of current interest. (a) Biological structure. (b) Biophysics. (c) Cardiovascular physiology. (d) Cellular physiology. (e) Endocrinology and pharmacology. (f) Metabolism. (g) Neurophysiology. Prerequisite: background in biological sciences and consent of instructor.

599-1 to 9 Thesis Research. A maximum of 9 credit hours of 599 may be applied toward requirements for the master's degree.

600-1 to 48 Doctoral Dissertation Research. Hours and credit to be arranged by adviser and the department Graduate Training Committee.

Plant Industries

Field trips are required for certain courses.

401-4 Soil Physics. Physical properties of the soil; factors affecting them, their measurements, evaluation, and their influence in determination of soil productivity. Prerequisite: 301.

402-4 Soil Morphology and Classification. Morphology and soil formation, description and identification of soil profiles, classification of soils, techniques of soil mapping, and interpretation of survey data. Field trips approximate cost \$6. Prerequisite: 301.

403-4 Basic Soil-Plant Relationships. The soil as a substrate for plant growth. The properties of the soil important in supplying the necessary mineral nutrients, water and oxygen and for providing an environment conducive for the elaboration of the root system. Prerequisite: 301.

404-3 Turf Management. Principles and methods of establishing and maintaining turf for homes, recreational areas, and public grounds. Study of basic plant and soil materials, fertility, culture, water management, and pest control as related to turfgrasses in variable environments. Field trips cost not more than \$2. Prerequisite: an introductory biology course.

406-5 Radioisotopes, Principles and Practices. Lectures on the principles of radioisotope technology as applied to agricultural and biological sciences. Prerequisites: general chemistry and biochemistry or equivalent.

407-5 (3,2) Fertilizers and Soil Fertility. (a) Lecture. The uses of fertilizer materials; effects of various fertilizers on soils and crops; fertility maintenance and soil management. Prerequisite: one course in soils. (b) Laboratory. The laboratory study of the chemistry and fertility of soils. Parallels the theoretical presentation given in 407a. Prerequisites: 407a or concurrent enrollment.

408-4 World Crop Production Problems. Ecological and physiological factors influencing reproduction in various areas of the world. Natural limitations on crop production. Nonagricultural factors influencing world crop output. Prerequisite: 109.

409-3 Crop Physiology and Ecology. The effects and significance of physiological and ecological parameters on crop yields. Prerequisite: Botany 320 or consent of instructor.

410-4 Pest Control Principles and Operations. Pests and pest damage to plants; principles of pest control; control strategy and influence of pest control operations. Field trips, costing approximately \$3. Prerequisite: Zoology 316 or equivalent, or consent of department.

415-4 Plant Breeding. Principles of plant breeding emphasized together with their application to the practical breeding of horticultural, agronomic, and forest plants. Prerequisite: any course in genetics.

418-4 Weeds and Their Control. Losses due to weeds, their identification and distribution, methods of weed dissemination and reproduction. Mechanical, biological, and chemical control of weeds. "Bioactivity of herbicides." State and federal legislation pertaining to weed control herbicides. Herbicide commercialization. Field trips. Prerequisite: one introductory biology course.

419-4 Forage Crop Management. Forage production and utilization; forage crop characteristics, breeding, and ecology; grasslands as related to animal production, soil conservation, crop rotation, and land use. Field trip ap-

proximate cost \$3. Prerequisite: one course in introductory biology or equivalent.

424-5 (3,2) Soil Microbiology. (a) (Lecture). A study of the numbers, characteristics, and biochemical activities of soil microorganisms, with particular consideration of their role in the transformations of organic matter, nitrogen, and minerals as related to soil fertility and management. Prerequisite: one course in microbiology or soils. **(b) (Laboratory).** Experiments designed to determine numbers, and to study the characteristics and biochemical activities of the soil microflora as related to fertility. Prerequisites: 424a, or concurrent enrollment.

437-4 Vegetable Production. Culture, harvesting, and marketing of vegetables. Field trips cost approximately \$3.00. Two-hour laboratory. Prerequisite: 264 or consent of department.

438-3 Advanced Studies in Vegetable Crops. Genetics, morphological, and physiological factors influencing the production of vegetable crops. Offered in alternate years. Prerequisite: 264, Botany 320, or consent of department.

440-5 Plant Propagation. Fundamental principles of asexual and sexual propagation of horticultural plants. Actual work with seeds, cuttings, grafts, and other methods of propagation. Prerequisites: 264.

444-4 Floriculture. Principles of greenhouse management governing production, timing, and marketing of the major floricultural crops grown in the commercial greenhouse. Requires student-financed field trip. Prerequisite: 264.

507-3 Advanced Soil Fertility. Theoretical principles of soil fertility; evaluation of research data and methods used in soil fertility research. Prerequisite: 407a.

518-4 Principles of Herbicide Action. Chemistry and mode of action of herbicides. Nature of herbicidal action. Illustrates the various types of chemical weed control procedures in current use. The physiology of herbicidal action examined using the different mechanisms established for various chemical groups of herbicides. Prerequisite: 418, Botany 320.

520-1 to 6 Readings. Contemporary books and periodicals on selected subjects within the fields of plant industries. Prerequisite: consent of department.

533-5 Growth and Development in Plants. Physiological control of developmental processes. Emphasis on exogenous growth-regulating compounds and their behavior in plants. Prerequisite: Botany 320 or consent of instructor.

575-1 to 6 Research. Directed research on approved projects investigating selected fields of the plant industries. Prerequisite: consent of department.

581-1 to 6 Seminar. Group discussions of and individual papers on subjects and problems relating to soils, field and horticultural crops, and other phases of the fields of the plant industries.

588-1 to 12 International Graduate Studies. Residential graduate study programs abroad. Approval of department required both for the nature of program and the number of quarter hours of credit. Prerequisite: consent of department.

590-1 to 4 Special Studies in Plant Industries. Directed study in specialized areas of crop production, horticulture, or soils depending on the program of the student. Discussions, seminars, readings, and instruction in research techniques. Prerequisite: consent of department.

599-1 to 9 Thesis. At least 5 hours is required for the master's degree. Prerequisite: consent of department.

Psychology

404-4 Theories of Perception. An examination of the different theories concerned with an organism's sensory contact with his environment. Physiological, social, and organizational theories of perception will be considered. Prerequisite: 211b or consent of instructor.

407-4 Theories of Learning. A consideration of the major contemporary learning theories and their relation to experimental data. Prerequisite: 211b or consent of instructor.

408-4 Theories of Motivation. Systematic analysis of the concept of motivation with emphasis on its utility as an explanatory component of general behavior theory. Prerequisite: 211b or consent of instructor.

411-4 Seminar in Psychological Principles of Training. Undergraduate seminar. In depth coverage of those areas in which the principles of learning derived from laboratory research can be applied to practical problems. Prerequisite: 311, GSB 202.

- 414-4 Advances in Physiological Psychology.** Reading and discussion of articles dealing with recent significant advances in the neuroendocrine bases of behavior. Emphasis on readings and discussion by the students. Prerequisite: 314 or consent of instructor.
- 415-4 Psychopharmacology.** The effects of drugs on psychological processes and on the behavior of humans and animals. These effects related to the physiological and biochemical alterations that drugs produce. Prerequisite: 314 or Chemistry 122a and 123a, and GSA 209, and GSB 202.
- 421-4 Psychological Tests and Measurements.** Principles of psychological measurement, including errors of measurement, techniques for estimating reliability and validity, techniques of test construction, and problems in assessment and prediction. The laboratory will include the use of selected instruments. Lecture and laboratory. Prerequisite: 8 hours of psychology.
- 425-4 Mathematical Psychology.** A survey of mathematical models of behavior, elementary models of learning, perception, and decision making are examined with a view towards introducing the student to the literature in mathematical psychology. Prerequisite: 211b or consent of instructor.
- 431-4 Psychopathology.** Classification, description, etiology and treatment of the disorders of personality organization and behavioral integration. Observations in a state mental hospital. Prerequisite: 305 or consent of instructor.
- 440-4 Theories of Personality.** A review and critical evaluation of major personality theories and their supporting evidence. Prerequisite: 305 or consent of instructor.
- 451-4 Advanced Child Psychology.** An examination of the concepts, methods, and problems of human development with consideration of both its psychological and psychosocial aspects. Prerequisite: 211b, and 301, or consent of instructor.
- 459-4 Theory and Practice in the Preschool.** Designed for those in nursery education and related fields. Examines variety of topics and provides lectures, demonstrations, and practicum experience in the Child Study Cooperative Nursery. Prerequisite: consent of instructor.
- 461-4 Advanced Social Psychology.** Examines current areas of interest in the study of social behavior: language behavior, communication, social influence, attitude change, interpersonal perception, etc. Emphasis is on the individual in the social context. Prerequisite: 307 or consent of instructor.
- 465-4 Group Dynamics and Individual Behavior.** Examination of research and theory in the area of small-group interaction. Examines such topics as group structure and function, group problem-solving, leadership, etc. Prerequisite: 307 or consent of instructor.
- 467-4 Psychology of Black Americans.** Critical examination of the issues in research and theory. Psychological differences between Black and White Americans. Includes self-concept, personality and temperament, intellectual functioning, behavioral genetics, socialization practices, and intergroup and intragroup relations. Prerequisite: 307 and GSB 202.
- 479-4 Animal Behavior.** (See Zoology 479.)
- 490-1 to 16 Independent Projects.** Independent readings and projects in psychology. Prerequisite: consent of instructor.
- 495-1 to 18 Seminar: Selected Topics.** Varied content. To be offered from time to time as need exists and as faculty interest and time permit. Prerequisite: consent of instructor.
- 509-4 Instrumentation in Behavioral Science.** Study of methods of research instrumentation. Techniques of stimulation and of physiological and psychological response recording. Lecture and laboratory. Prerequisite: consent of instructor.
- 510-4 History and Systems.** Study of the important antecedents of contemporary scientific psychology. Considers issues, conceptual developments, and research advances, and presents the major schools and systems. Prerequisite: consent of instructor.
- 512-4 Sensory Processes.** A study of the structure and functions of the sense organs. Emphasis will be placed on the psychological data which describe the function of these organs. Lecture and laboratory. Prerequisite: consent of instructor.
- 514-8 (4,4) Physiological Psychology.** Lecture and laboratory. May be taken in any sequence or one course only. (a) Anatomy and physiology of the nervous system reviewed. Emphasis on the relevance for psychology. Includes basic neuroanatomy and neurophysiology, sensory and motor physiology, clinical neurology and pathology, and methods of studying central nervous system

functioning. (b) The role of biological processes in the behavior of humans and animals. Includes sleeping, arousal and attention; ingestive behavior (hunger and thirst); sexual and social behavior; reinforcement, emotions, and mental disorders; and learning and memory. Prerequisite: a, consent of instructor or b; b, consent of instructor or a.

516-4 Learning Processes. Processes by which individual behavior is changed, using procedures developed in the learning laboratory. Introduction to major concepts and data of learning. Prerequisite: consent of instructor.

522-12 (4,4,4) Research Design and Inference. A relatively detailed treatment of the rationale behind quantitative methods for psychological research. (a) Use of Bayesian probability theory in the evaluation of experimental data; (b) estimation, hypothesis testing and decision making; (c) design of experiments and analysis of variance. Must be taken in a,b,c sequence. Prerequisite: Mathematics 111b or consent of instructor.

523-2 Research Seminar. Evaluation of Research. A study of principles of research design from the point of view of the scholar reading the journals. Prerequisite: 522c or Guidance 507.

524-4 Multivariate Methods in Psychology. A detailed coverage of psychometric methods, with special emphasis on the theory and applications of multivariate regression analysis. Includes an introduction to factor analysis. Prerequisite: 522c or Guidance 507.

525-4 Mental Test Theory. Derivation of the basic psychometric equations, effects of test length and group heterogeneity on test parameters, criteria of parallel tests, weighting and differential prediction. Prerequisite: 522c or Guidance 507.

526-4 Experimental Design in Psychology. Consideration of the logic of psychological experimentation. Topics include randomization as related to experimental inference, complex designs used in experimental psychology, the use of concomitant information in experiments, faults and refinements in common psychological designs. Prerequisite: 522c.

530-4 Personality Theory and Dynamics. Intensive treatment and critical analysis of several representative approaches to personality. Consideration also of important personality concepts common to most theoretical approaches. Prerequisite: consent of instructor.

531-8 Advanced Psychopathology. Consideration of special topics, including psychological theories of the nature and etiology of human pathology, assessment of pathology, and institutional care and treatment. Includes extensive field experience in a mental hospital setting. Graded S/U only. Prerequisite: 530, 541, and consent of instructor.

532-2 Experimental Approaches to Personality. Presentation of conceptual formulations and research data from representative experimental approaches to personality. Critical evaluation of methodological approaches to personality study. Prerequisite: 530 or consent of instructor.

533-3 Experimental Approaches to Psychopathology. An examination of the research literature on several issues in clinical psychopathology. Prerequisite: consent of instructor.

536-4 Fundamentals of Counseling. Introduction to the common assumptions, dimensions, and communicative skills underlying psychological counseling. Observation utilized to supplement didactic discussion. Lecture and demonstration. Prerequisite: consent of instructor.

537-4 Counseling and Psychotherapy. Systematic presentation of major approaches to counseling and psychotherapy. Consideration of salient aspects of the therapeutic situation and of the process and nature of changes during psychotherapy. Critical evaluation of both theory and practice. Consideration of research findings and problems. Prerequisite: 530 and consent of instructor.

538-2 Group Psychotherapy. Presentation of major approaches to group psychotherapy. Prerequisites: 537 and consent of instructor.

539-4 Experimental Approaches to Psychotherapy. A review and evaluation of empirical research related to the amelioration of maladjustment. Emphasis is on measurement and methodological problems. Prerequisite: 536, 537, or consent of instructor.

541-4 Psychodiagnostics I. Introduction to clinical psychology with attention to the function and clinical use of individual intelligence tests. Theories of intelligence and related research. Age scales with emphasis on infant and child testing. Point scales and tests of deterioration with emphasis on child and adult testing. Lecture and practicum. Prerequisites: consent of instructor.

543-6 (4,2) Psychodiagnostics II. Basic theory and assumptions underlying projective methods. Use of projective techniques as measures of personality and as tools for clinical diagnosis and research. (a) Thematic projective techniques. (b) Rorschach and Bender-Gestalt. Lecture and practicum. Prerequisite: 541 or consent of instructor.

545-2 Psychodiagnostics III. Nature and theory of questionnaires for personality assessment and psychodiagnosis. Consideration of their use in clinical research. Lecture and practicum. Prerequisite: consent of instructor.

547-4 Assessment Procedures in Counseling. Use and integration of psychological test data, vocational, socio-economic, and educational information in assessment and counseling. Prerequisite: 421 or consent of instructor.

552-4 Experimental Child Psychology. Consideration of relationship of methodology to child theory, typical methodological procedures and problems specific to children, and representative research topics. Prerequisite: 451 or consent of instructor.

554-2 Developmental Theory. Systematic study and critical evaluation of theories of child behavior. Prerequisite: 451 or consent of instructor.

556-2 Psychological Treatment of the Child. Investigation of personality and behavior problems. Etiological factors and methods of treatment. Prerequisite: 451 or consent of instructor.

561-4 Social Influence Processes. Critical review of theoretical and empirical developments in the study of influence processes, attitude change, etc. Social and intrapersonal determinants are examined. Prerequisite: 461 or consent of instructor.

562-4 Observational Techniques and Content Analysis. Examination and evaluation of research methods and measurement techniques utilized in social psychology. Prerequisite: 461 or consent of instructor.

564-4 Communication and Group Behavior. Emphasis in this course is on language behavior and the psychological study of the communication process. Examines theories, methods and research in these areas. Prerequisite: 461 or consent of instructor.

571-4 Industrial Motivation and Morale. A review of the factors which determine motivation and morale as well as their measurement and evaluation. Prerequisite: 320 or consent of instructor.

573-2 Selection and Placement. Selection and validation of test batteries, use of the interview and personal history data in selection, quota, and classification problems, administration of a selection program. Prerequisite: 524 or consent of instructor.

574-2 Psychology of Industrial Relations. Analysis of psychological factors involved in industrial organization, employer-employee relations, and union-management relations. Prerequisite: 571 or consent of instructor.

576-2 to 4 Human Engineering. Analysis of man-machine systems, human factors in the design of display and control systems, limitations and capabilities of the operator. Prerequisite: 512, 581, or consent of instructor.

581-4 Psychophysical Methods. Survey of the major psychophysical methods and their applications. Lecture and laboratory. Prerequisite: consent of instructor.

590-1 to 16 Readings in Psychology. Readings in selected topics in psychology under staff supervision. Graded S/U only. Prerequisite: consent of chairman.

591-1 to 36 Research in Psychology. Research under staff supervision in selected areas of psychology. Graded S/U only. Prerequisite: consent of the chairman.

593-1 to 18 Practicum in Psychology. Practicum experience in a professional setting is offered under staff supervision in the following areas: (e) Clinical Psychology, (f) Counseling Psychology, (h) Industrial Psychology, (j) Child Psychology, (l) Teaching of Psychology. Graded S/U only. Prerequisite: consent of instructor.

595-1 to 18 Advanced Seminar. Seminars of varied content for advanced students. Prerequisite: consent of chairman.

598-2 Ethical and Professional Problems in Psychology. Problems in the professional practice of psychology and in teaching and research. Professional ethics, relations to other professions and the public, organization and structure of the field, current trends. Prerequisite: major in psychology or consent of instructor.

599-1 to 9 Thesis.

600-1 to 45 Dissertation.

Radio-Television

There is no graduate degree program offered through the Department of Radio and Television. Four hundred level courses may be taken for graduate credit, however, unless otherwise indicated in the courses description.

430-3 Public Affairs and the Radio-TV Establishment. Interdisciplinary examination of selected current major public issues and study of broadcast management's responses to those issues. Operational organization and reorganization, policy development, and procurement and allocation of personnel and other resources as responses to the developing public affairs commitment. Prerequisite: C grade in 300M, 300P, 300S.

453-3 Radio and Television in Education. The history and role of radio and television in education. Philosophies for education by radio and television. Analysis of types of educational broadcasting, including in-school broadcasting, adult education, and service programs. Prerequisites: C grade in 300M, 300P, 300S.

464-3 Instruments of Public Affairs, Television Programming. Study and practice of sophisticated film and studio tools and techniques necessary for creation of public affairs television programming. Prerequisite: C grade in 300M, 300P, 300S.

467-3 Radio-Television Production Survey. General survey of production problems in radio and television, including problems of writing, announcing, production, direction, sales and management. For non-majors only.

470-4 Documentary Film Production. For the student with a serious interest in the television documentary. Students work in teams researching, writing, shooting, and editing films on subjects related to history, culture, and social issues. Prerequisite: C grade in 300M, 300P, 300S; 370 or Cinema and Photography 355. Mandatory Pass/Fail.

475-1 to 8 Individual Study. May be repeated for a total of 8 hours, but for no more than 4 hours in one quarter. Assignments made through consultation with radio-television instructors. Prerequisite: C grade in 300M, 300P, 300S and consent.

481-4 ITV Administration, Production, Utilization. Development of ITV production with emphasis on the use of instructional objectives, the relationship of the users' manual to the instructional series, and the functions of various personnel in the administration of instructional television. Prerequisites: C grade in 300M, 300P, 300S.

490-8 Theatre-Television Workshop. (Same as Theater 490.) Experimental workshop in television drama. Laboratory hours required. Offered summers only. Limited to six students from each department. Prerequisites: C grade in 300M, 300P, 300S; 303, 387 and consent. Mandatory Pass/Fail.

Recreation and Outdoor Education

Courses in this department may require the purchase of supplemental materials. Field trips are required for certain courses.

425-4 Areas and Facilities. All phases of principles, development, maintenance and construction of areas and facilities used in a recreation setting. Stress is put on selection and supervision of maintenance personnel. There is a maximum fee of \$5.00 for course materials in lieu of textbook. Prerequisite: 305.

450-4 Performing Arts in Recreation and Education. Principles, materials, and techniques of producing all types of drama, music, and dance activities for a variety of recreation and education settings and population groups.

470-4 School and Community Recreation. The role of the public schools in community recreation. Emphasis on current practices and trends in curriculum content, adult education, extracurricular activities, after-school and vacation programs, and cooperative programs with other agencies.

480-2 to 16 Practicum in Outdoor Education. A supervised experience in a professional setting. Emphasis on administrative, supervisory, teaching and program leadership in an outdoor, conservation, or environmental education setting. Prerequisite: consent of instructor.

490-8 to 16 Internship in Recreation. Supervised experience in a professional setting. Emphasis on administrative, supervisory, teaching and program leader-

ship in schools, community, industrial, commercial, agency, park, institutional and other recreation situations. Prerequisite: 20 hrs. in recreation.

500-4 Principles of Recreation. Principles and interpretations of recreation and the basic concepts underlying the organization of leisure activity. Emphasis on cultural significance of recreation and the relationship of recreation to the totality of life.

510-4 Outdoor Education Workshop. Leadership development for outdoor education and its place in the school program. Methods of utilization of natural and cultural resources for enrichment of the school curriculum.

520-4 Recreation Administration Workshop. Bases for planning community programs in recreation. Administrative problems including legislation, finance and budget, office management, public relations, and personnel are considered through application of principles.

525-4 Special Population Workshop. Basis for planning, organization, selection, evaluation, and adaption of activities to a variety of institutional and community recreation settings.

530-4 Recreation Program Workshop. Program planning, organization, and implementation of comprehensive leisure time programs in public and private recreation settings, emphasis on application of basic program principles to practice. Prerequisite: 500.

540-4 Planning Outdoor Areas for Education and Recreation. Scope, content, objectives, procedures, and types of recreation surveys and appraisals. Practical experience with the master plan. Prerequisite: 500.

560-4 Seminar in Environmental and Outdoor Education. Discussion of individual projects, presentation of research problems and dissertation topics. Prerequisite: consent of instructor.

570-4 Seminar in Leisure and Recreation. Designed to develop the students' ability to design, conduct, analyze, and interpret research related to the problems of leisure. Problems involved in outdoor recreation, community recreation, agency and church recreation, commercial recreation and recreation for special populations will be discussed. Current economic and social changes will be examined to determine the effect they have upon the recreation profession. One or more field trips may be required. Prerequisite: 500.

596-2 to 9 Independent Study. Independent study and research in the student's field of interest.

599-5 to 9 Thesis. Prerequisite: consent of chairman.

Rehabilitation

Courses in this unit may require purchase of additional learning aids.

414-1 to 16 Developing Employment Opportunities. Designed to train rehabilitation personnel in the attitudes, methods and skills pertinent to placement of handicapped persons in competitive and other occupations. Prerequisites: special standing and consent of instructor.

417-4 Rehabilitation of the Economically Deprived. Analysis of employment problems of the economically deprived with attention to training, counseling, and programs for rehabilitation.

420-3 to 4 Human Development and Behavior. Consideration of human development from the framework of the major theories, to include acquisition and maintenance of diverse behavior patterns. Prerequisite: advanced standing.

480-2 to 4 An Introduction to Rehabilitation. Philosophy, procedures, and practices underlying the rehabilitation movement, including the historical, social cultural, and economic factors and recent legislation that have contributed to its rapid development.

481-2 An Introduction to Employment and Developmental Services. A review of the development and growth of employment services and special youth centers, current social needs and trends, and the organizational patterns in such centers.

485-4 Scientific Methods in the Behavioral Sciences. Scientific methods as an approach to the investigation of human behavior including consideration of various systems of behavior theory and practice.

486-4 Introduction to Behavior Modification. Overview of the field of behavior modification, its procedures, techniques, and methods. A survey of current literature examining the various populations being utilized.

490-1 to 6 Readings in Rehabilitation. Select readings supervised by the staff. Prerequisite: consent of instructor.

501-6 (2,2,2) Rehabilitation Administration. (a) Programming and organizational structures, formal and informal, of public and voluntary agencies and facilities. (b) Current and progressive supervisory practices in rehabilitation agencies, communication channels, employee counseling and evaluation methods. (c) Developing community resources, involvement and utilization of public and voluntary agencies in developing a comprehensive rehabilitation program. Prerequisite: consent of instructor.

503-2 Case Management in Rehabilitation. Basic procedures in providing and coordinating available services for the handicapped in the context of a professional-client relationship. Prerequisite: consent of instructor.

511-2 to 4 Vocational Development and Occupational Choice. The psychosocial meaning of work, vocational development and theory of occupational choice, and the analysis of the labor market now and in the future. Prerequisite: consent of instructor.

519-2 to 3 Selection, Placement, and Follow-up. A survey of current methods and criteria used in job development, selective placement, and follow-up of handicapped and deprived individuals. Prerequisite: consent of instructor.

520-4 Functional Analysis of Behavior. Analysis of operant and respondent behavior with emphasis on the contribution of infrahuman investigations to the understanding of human behavior. Laboratory required. Prerequisite: consent of instructor.

521-4 Child Behavior. Systematic examination of the manner in which children (from conception on) acquire and maintain their behavior patterns and the role of the environment in controlling such development. Prerequisite: consent of instructor.

526-4 Complex Human Behavior. The manner in which humans acquire, maintain, and attenuate the more complex forms of behavior, particularly in the social, vocational, and educational areas of behavior. Prerequisite: consent of instructor.

531-2 to 4 Vocational Appraisal. Consideration of tests and procedures used in assessing the individual's functioning abilities and the meaning work has in achieving fulfillment, which also includes the requirements of the job for purposes of aligning the two. Prerequisite: 511 or consent of instructor.

532-3 to 4 Assessment Procedures in Rehabilitation. A general review of the fundamental bases of measurement, the criteria for selecting assessment devices, introduction to select standardized and time-sample instruments, and the use of these in rehabilitation. Prerequisite: consent of instructor.

533-4 Measurement in Behavior Change. Dividing the types of measurement into two categories, direct and indirect, an analysis of the relative advantages or disadvantages inherent in each technique when applied to specific behavior areas. Prerequisites: consent of instructor.

535-4 Schedules of Reinforcement. A study of schedules as a basis for understanding and controlling behavior, and the nature of schedule effects in relation to other behavioral variables. Prerequisite: consent of instructor.

536-4 Individual Assessment in Rehabilitation. Theoretical aspects of measuring instruments for individual assessment in rehabilitation. Includes problems in administration and interpretation. Field and laboratory experiences included. Prerequisite: 532 and consent of instructor.

537-4 Diagnostic Procedures for Special Populations. A detailed survey of the procedures in diagnosis and assessment of the retarded, blind, deaf, brain injured, and others. May include some laboratory assignments. Prerequisites: 532 and consent of instructor.

539-1 to 6 Behavioral Programming. Application of the technologies related to the arrangement of behavioral programs. Laboratory required. Prerequisite: consent of instructor.

541-1 to 6 Medical Aspects of Rehabilitation. A review of human systems, disfunctions leading to major diseases entities and injuries, and the implications for rehabilitation. Prerequisite: consent of instructor.

543-4 Structural Basis of Behavior. Structural basis of the respondent and operant behavior systems and their relationship to environmental variables effecting both systems. Prerequisite: consent of instructor.

551-3 to 4 General Rehabilitation Counseling. An overview of the basic counseling processes appropriate to rehabilitation settings. Includes consideration of the stylistic and interpersonal factors common to various persuasions. Prerequisite: consent of department.

552-4 Rehabilitation Counseling Research. An intensive study of the heuristic

- aspects of theory and the resultant research in rehabilitation counseling. Also develops researchable problems. Prerequisite: 551.
- 555-2 Rehabilitation Counseling with the Mentally Retarded.** Review and discussion of the philosophy, issues, approaches, and research pertinent to the counseling function in the development of the retarded. Prerequisite: 551 or concurrent registration.
- 556-2 to 4 Group Procedures in Rehabilitation.** Characteristics of intensive group experiences, and procedures in preparation for group counseling. Prerequisites: 551.
- 558-4 Programmed Instruction and Behavior.** Techniques and procedure in programming material for rapid acquisition of new behavior with particular emphasis on automated instruction and programmed texts. Prerequisite: consent of instructor.
- 561-2 to 3 Psycho-Social Aspects of Disability.** An examination of the socio-emotional impact of traumatic injury or chronic illness (on human functioning) and its role in the rehabilitation process. Prerequisites: consent of instructor.
- 563-4 to 8 Aversive Control and Aggressive Behavior.** Methods of aversive control and negative reinforcement procedures. A review of the aggressive response as a consequence of aversive control. Prerequisite: consent of instructor.
- 564-4 Sexual Behavior.** The definition and measurement of sexual responses, their significance and importance, for understanding complex behavior patterns. Prerequisites: consent of instructor.
- 565-4 Verbal Behavior.** Theoretical and empirical study of human verbal behavior. Emphasis on the environmental control of such behavior. Analysis of procedures used to modify deviant and retarded verbal responses. Prerequisite: consent of instructor.
- 567-4 School-Related Behavior.** An intensive analysis of the students' and teachers' behavior, its functional relationship, and the ways in which behavior modification techniques might create a more satisfactory environment for teaching and learning. Prerequisites: consent of instructor.
- 571-1 to 6 Seminar in Selected Topics.** Selected topics of pertinence to rehabilitation and counseling personnel. Prerequisite: consent of department.
- 574-1 to 12, Seminar in Pastoral Counseling.** Aspects of counseling and the helping relation that are relevant in pastoral settings. Includes the special problems involved in pastoral counseling. Prerequisite: consent of instructor.
- 576-1 to 12 Seminar in Behavior Modification.** Basic issues involved in the modification of human behavior in the applied areas—scientific, methodological, ethical and social issues will be evaluated. Prerequisite: consent of instructor.
- 578-1 to 6 Seminar in Correctional Rehabilitation Counseling.** (Same as Administration of Justice 578.) Review of major issues and research relative to rehabilitation practices in youth and correctional settings. Prerequisite: consent of instructor.
- 585-1 to 48 (1 to 12, 1 to 12, 1 to 24) Practicum in Rehabilitation.** (a) Practice in various facilities and agencies including supervised experiences in the function and administration of these services. (b) Application of behavioral methods with humans under close direction of supervisory staff. (c) Practice in developing counseling skills with individuals and groups in varied settings. Prerequisite: consent of instructor.
- 589-0 to 12 Internship in Rehabilitation.** Full-time practice in a rehabilitation setting supervised by both agency personnel and university faculty. Prerequisites: 585 and consent of department. Graded S/U only.
- 590-1 to 16 Independent Projects.** Independent development of projects and systematic readings in pertinent rehabilitation areas. Prerequisite: consent of instructor.
- 591-1 to 16 Research in Rehabilitation.** Systematic research on factors and procedures relevant to rehabilitation. Prerequisite: consent of instructor.
- 599-1 to 9 Thesis.** Prerequisite: consent of instructor.

Secondary Education

- 402-4 Aerospace Education Workshop.** Teachers learn about current developments in this area and how to incorporate aerospace information into existing curricula. They study in some detail the social, political, and economic consequences of this era.

407-8 (4,4) The Middle and Junior High School. (a) Organization, administration, and curriculum. (b) Workshop. Enables teachers to discover and evaluate new content, methods, and materials available and develops teacher-made functional instructional models. Must be taken in a,b sequence. Middle or junior high school teaching experience may be substituted for (a) as a prerequisite to (b). Prerequisite: 310.

485-3 Principles and Philosophies of Vocational and Technical Education. (See Occupational Education 485.)

487-4 Teaching the Natural Sciences in Secondary Schools. Objectives of science education; instruction methods and techniques appropriate for teaching science; desirable equipment, audio-visual aids, and instructional material; development of a course outline and at least one instruction unit. Prerequisite: 310 or concurrent.

488-4 Teaching Social Studies in Secondary Schools. Objectives, scope and sequence of curriculum, methods of teaching different courses and age groups, materials and evaluation. Prerequisite: 310 or concurrent.

490-4 Workshop in Economics Education. (Same as Economics 490.) Designed to assist elementary and secondary school teachers in promoting economic understanding through the translation of economic principles and problems into classroom teaching materials.

495-2-4 Seminar: Problems Related to Teaching Disadvantaged Youth. For members of the National Teachers Corps and others working in classrooms with disadvantaged youth. Emphasis placed upon actual problems encountered by those enrolled. Reports and discussion based upon surveys and reading will be featured. Prerequisite: 310.

498-2 to 6 Field Study Abroad. Orientation and study before travel, readings, reports, and planned travel. Includes visits to cultural and educational institutions. Prerequisite: consent of instructor.

506-4 Reading in the Secondary School. For junior and senior high school teachers who desire a foundation in reading. Emphasis placed on the basic skills, appraisal of reading abilities, materials of instruction, and methods of teaching reading in the content areas. Prerequisite: 352 or teaching experience.

507-2 to 4 Readings in Reading. Independent reading; acquaintanceship with the literature and research in reading. Conference periods. Prerequisite: consent of instructor.

508-4 Current Developments in Selected Subject Areas in Secondary Schools. Problems, issues, and trends in the subject areas of the secondary school.

509-4 to 8 Practicum in Reading. For advanced students; teaching demonstrations and evaluations. Each student works with a group of reading disability cases. Prerequisites: 521a,b,c.

510-4 to 8 Seminar: Problems in Reading. Major field content seminar: Problems and practices; comprehensive review and evaluation of research and literature. Each student pursues a problem of his own interest. Prerequisite: consent of instructor.

514-4 Organization and Administration of Reading Programs. For reading specialists, principals, supervisors, consultants. Recent trends in elementary and high school reading programs, providing reading instruction for total school population, materials and equipment, in-service training, role of the reading specialist. Problems of class members are studied and discussed.

516-4 to 12 Internship in Reading. Culminating experience for doctoral candidates. Each student supervises reading services in his own or cooperating school. Conference periods. Prerequisites: 521a,b,c, and consent of instructor.

518-4 Supervision of Professional Education Experiences. The role and responsibility of the cooperating public school teacher in the supervision of teacher education students involved in various field experiences. Attention is given to the joint responsibilities of the University and the public school in this cooperative venture. A course for present and prospective teachers who wish to effectively deal with students in the various professional education experiences.

521-12 (4,4,4) Diagnosis and Correction of Reading Disabilities. Causes of reading difficulties; observation and interview procedures; standardized tests, instruments, and informal inventories; analysis techniques; experiences in preparing materials for corrective purposes. Each student diagnoses and treats a reading disability case under supervision.

560-2 to 12 New Developments in Occupational Education. (See Occupational Education.)

- 561-4 Curriculum.** (Same as Educational Administration and Foundations 560.) Modern practices and procedures in curriculum development, with attention to the professional, social, economic, and other major factors in curriculum planning.
- 562-4 Secondary School Curriculum.** Developments in secondary education. Bases of the curriculum of the secondary school.
- 564-4 Secondary School Principalship.** (See Educational Administration and Foundations 564.)
- 566-4 Seminar in Instruction.** Study and discussion of problems of instruction with attention to experimentation. Prerequisite: consent of instructor.
- 570-4 Student Activities.** Activities of secondary school students. Includes student movements and mores.
- 571-4 Seminar in Curriculum.** Current curriculum issues. Emphasizes the process of curriculum development, evaluation, and implementation in the public school setting. Limited to doctoral students. Prerequisite: 562, Elementary Education 561, or equivalent.
- 572-4 Seminar: Research and Evaluation in Secondary Education.** Critical analysis of evaluation techniques and significant research in organization, learning, teaching, and curriculum in secondary education. Prerequisite: advanced standing and consent of instructor.
- 575-2 to 4 Individual Research.** The selection, investigation, and writing of a research topic, under the personal supervision of a member of the departmental graduate staff, in one of the following areas: (a) Curriculum, (b) Supervision, (c) Language Arts, (d) Science, (e) Reading, (f) Social Studies, (g) Problems in secondary education. (h) Individual research—junior high school methods.
- 588-4 Social Studies Education in the Secondary School Curriculum.** Evaluation of the current professional literature in the curriculum and teaching of secondary school social studies. For improving classroom teaching practices, curriculum design, and in-service programs. Prerequisite: 488 or equivalent.
- 591-4 Workshop in Secondary Education.** Designed primarily to help high school principals to work effectively and with the help of resource leadership on the most urgent problems confronting their schools. Prerequisite: consent of instructor.
- 596-5 to 9 Independent Investigation.** A field study required of each student working for the sixth-year professional certificate. The work should be done in the setting of a school system where the student is employed or where full cooperation is extended. Involves selecting a problem, survey of pertinent literature, recording of results, and appropriate interpretations and summarizations.
- 597-4 Seminar in Proposal Development.** For doctoral students. Student prepares proposal for a doctoral level study in the area of Curriculum and Instruction. Provides an opportunity for students to interact in the process of designing, evaluating, and implementing educational studies.
- 598-2 to 12 Practicum.** Experience in curriculum construction, evaluation, and implementation. Students placed in local, state, or federal educational institutions and organizations under supervision of a number of the departmental graduate staff and a member of the cooperating institution. Not a substitute for student teaching. Prerequisite: consent of department.
- 599-3 to 9 Thesis.** Minimum of 5 hours to be counted toward a master's degree.
- 600-1 to 48 Dissertation.** Minimum of 36 hours to be earned for the Doctor of Philosophy degree.

Secretarial and Business Education

- 409-4 Teaching Distributive Education.** For those who plan to become teacher-coordinators of vocational cooperative or in-school distributive education programs. Emphasis on the planning of facilities; selection and review of course content; preparation of instructional materials; organization and arrangement of units; related instruction; simulated block and project plans; and student evaluation. Prerequisite: Marketing 301.
- 410-4 Teaching Consumer Education.** For teaching in secondary schools and junior colleges. Emphasis on meeting state requirements for teachers of consumer education in Illinois. Selection and study of course content; preparation of instructional materials; organization and arrangement of units of study; and planning an evaluation program. Prerequisite: GSB 346, or Finance 305, or equivalent.

411-1 to 6 Workshop in Business Education. Major issues in business teacher education. Offered during one or two weeks of the summer session. Prerequisite: senior standing.

412-4 Teaching Data Processing. Instructional methods and materials for and the evaluation of pupil progress in data processing. Prerequisite: 317 or Data Processing 101a.

414-6 (3,3) Organization and Administration of Project Plan and Cooperative Vocational Business Education Programs. (a) Philosophy and objectives of cooperative vocational programs, methods of selecting students' work stations, and placing and coordinating students in supervised cooperative work stations. (b) Preparation of instructional materials, job analysis, conducting related information classes, evaluating workers and work stations, advisory committees, public relations aspects of cooperative programs. Prerequisite: consent of instructor.

415-6 Supervised Business Experience and Related Study. Prepares teachers and coordinators in accordance with the requirements of the Illinois State plan for the administration of vocational education. Principles and problems of coordinating in-school or cooperative vocational business education programs; supervised occupational experience; classroom analysis and evaluation of on-the-job experiences of the members of the class in relation to their future work as coordinators and vocational teachers. Prerequisite: consent of instructor.

426-4 Office Management. Principles of management applied to office problems. Emphasis on the role of the office in business management; office organization; physical facilities and layout of office; office services, procedures, standards, and controls; and records management.

427-4 Records Administration. The value of records, their creation, control, retention, and disposition. Application of principles to such records as medical, legal, educational, industrial, and governmental.

485-3 Principles and Philosophies of Vocational and Technical Education. (See Occupational Education 485.)

502-4 Research in Business Education. A study of research findings and techniques as exhibited in representative investigations in business education. Emphasis on reading and interpreting research, using research findings in solving instructional problems, and uncovering potential topics for future research.

503-4 Tests and Measurements in Business Education. The selection, construction, administration, and interpretation of tests and test scores in business education subjects. Principal emphasis on teacher-made tests, especially of the performance type, with secondary attention to published tests in the field. Prerequisite: Guidance 422a or Mathematics 410a.

508-4 Administration and Supervision in Business Education. History and philosophy of administration and supervision in Business Education with consideration of problems arising at local, state, and national levels; and at secondary, college, and university levels. Supervisory problems will include curriculum construction and evaluation, classroom supervision, promotional policies, selection of textbooks, purchase and maintenance of equipment, physical arrangements, and other areas according to need of students.

509-4 Improvement of Instruction in General (Basic) Business Subjects. Designed for the experienced high school teacher who is interested in the study of curriculum and teaching problems in basic business subjects. The course will include teaching procedures, review of materials, formulation of tests and evaluation. The organization of teaching units and projects will be emphasized.

510-4 Improvement of Instruction in Secretarial Subjects. Designed for the experienced high school teacher who is interested in the study of curriculum and teaching problems in secretarial subjects. The course will include teaching procedures, review of materials, formulation of tests and evaluation. Prerequisite: 403 or 404 or 406.

525-4 Cooperative Vocational-Technical Education. (See Occupational Education 525.)

590-1 to 5 Readings in Business Education. Supervised readings in selected subjects. Prerequisite: consent of instructor.

591-2 to 5 Individual Research in Business Education. Selection and investigation of a problem, use of relevant sources and techniques, collection, evaluation, and interpretation of data; and the writing of a report on the investigation. Prerequisite: consent of instructor.

599-1 to 9 Thesis. Minimum of 5 hours to be counted toward a master's degree.

Social Welfare

There is no graduate degree program offered through Social Welfare. Four hundred level courses in this unit may be taken for graduate credit, however, unless otherwise indicated in the course description.

460-4 Methods of Social Research. Principles and methods of scientific inquiry applied to social work research and practice. Required for undergraduates. Not for graduate credit. Prerequisite: statistics.

482-8 Social Work in Selected Agencies. At least 16 hours per week of supervised experience in a social agency with concurrent weekly seminar. Not for graduate credit. Prerequisite: 481 and consent of instructor.

483-8 Advanced Field Practicum. Supervised field work experience in a social agency with concurrent weekly seminar. Sixteen hours per week. Not for graduate credit. Elective for undergraduates. Prerequisite: 482 and consent of instructor.

485-4 Integrative Methods in Social Work. A team-teaching seminar approach to exploring the interrelationship of casework, groupwork, and community work in synthesizing a "gestalt" impact on intervention and problem-solving techniques. Not for graduate credit. Prerequisite: 481, 482.

491-3 Comparative Social Welfare Systems. An examination of social welfare policies and practices in other countries and by international organizations. Prerequisite: 375.

Sociology

406-4 Social Change. Processes of social change in the modern world; culture lag and conflict of norms; individual and social problems arising from conflicting systems of social values and cultural norms. Prerequisite: two sociology courses or consent of instructor.

412-4 Sociological Research. Application of the scientific method to sociological problems. The role of theory. Principles of good research design, measurement, sampling and analysis. Prerequisite: graduate status or consent of instructor.

415-3 Logic of the Social Sciences. (See Philosophy 415.)

424-4 Collective Behavior. The behavior of people in large groups; collective interstimulation and emotions; crowds, audiences, and publics; mass stimuli and mass response. Prerequisite: 321 or consent of instructor.

426-4 Social Factors in Behavior and Personality. How group situations and values affect behavior and shape personality; development of concepts, role-concepts, attitudes, values; theories of motivation; self-concepts; conflicting social values in relation to individual motivation. Prerequisite: 321 or Psychology 305, or consent of instructor.

427-4 Personality and Social Adjustment. Basic mechanisms of adjustive behavior; concepts and criteria of personal integration and social adjustment; varieties of adjustive and non-adjustive behavior; theories of personal organization and disorganization; selected problems. Prerequisite: 321 or Psychology 305 or consent of instructor.

435-4 Social Stratification. A comparative study of social class systems, with emphasis on the American systems. Relationships of class position to behavior in family, religion, politics, etc. Prerequisite: two sociology courses or consent of instructor.

437-4 Sociology of Rural Development. Development in the United States and other countries. Conceptions of "rural," "urban," "developed" and "underdeveloped" considered. Analytic frames of reference for treating these phenomena compared. Prerequisite: two sociology courses or consent of instructor.

438-4 Sociology of Occupations and Professions. Natural history and institutional aspects of occupations in our society, cultural context of occupations in both primitive and modern society, preparation for jobs, human values in work, promotion and discharge, mobility, retirement. Prerequisite: two sociology courses or consent of instructor.

450-4 Social Thought Before 1800. The ideological basis of Western society. The classical foundations. Trends of thought from the Renaissance to the Enlightenment. Prerequisite: two sociology courses or consent of instructor.

451-4 Social Thought from Romanticism to Realism. Rise and development of scientific social thought. Prerequisite: two sociology courses or consent of instructor.

452-4 Black Social Thought. Original works of black writers from the standpoint of problems and prospects of black people in America, and the social context in which these works developed. Relevance of these writings to understanding the current racial situation in the United States considered. Prerequisite: one sociology course and consent of instructor.

453-4 Social Movements. A sociological study of modern social movements; social and cultural backgrounds, forms of expression and organization; social structure of social movements, their role and function in modern society. Prerequisite: two sociology courses or consent of instructor.

454-4 Sociology of Science. Emphasis on the origins and growth of science in historical perspective, reciprocal relations between science and society in the twentieth century, science as a social system, differentiation within and relations between disciplines, and implications of the social organization of scientific research and finding. Prerequisite: two sociology courses or consent of instructor.

460-4 Sociology of Medicine. Man and his adaptation to illness, the sick role, the doctor patient relationship, the organization of medical care and health institutions in the United States, and the role of the sociologist in the health fields. Prerequisite: two sociology courses or consent of instructor.

471-4 Principles of Demography. Techniques in analyzing and evaluating data on human population; composition, birth and death rates, life tables, migration data, estimates of future trend. Practical uses of demographic techniques. Prerequisite: consent of instructor.

472-4 The American Correctional System. (See Administration of Justice 472.)

473-4 Juvenile Delinquency. (Same as Administration of Justice 473.) Nature of juvenile delinquency; relationship to theories of deviant behavior; efforts at prevention and control. Prerequisite: two sociology courses or consent of instructor.

497-4 Senior Seminar. Issues in sociology and the analysis of these issues. Prerequisite: senior standing with 20 hours in sociology or consent of instructor.

498-8 (4,4) Individual Research. With a faculty member the student arranges a research topic resulting in a paper or report. Prerequisite: senior standing with 20 hours of sociology and consent of instructor.

499-4 Special Projects. The class works in groups or in concert in the development and completion of a theoretical or applied project. Prerequisite: 308, 312, and senior standing with 20 hours of sociology or consent of instructor.

501-4 Survey of Sociological Theory. The development of sociology as a science of society, from synthetic philosophy to analytic sociology. Prerequisite: 451 or consent of instructor.

502-4 Seminar in European Sociological Theory: 1800-1910. The theoretical systems of selected European sociologists studied from the original writings. Prerequisite: 15 hours of sociology or consent of instructor.

503-4 Seminar in European Sociological Theory: 1910 to the Present. A Continuation of 502. Prerequisite: 15 hours of sociology or consent of instructor.

504-4 Seminar in American Sociology. A survey of development of American sociology from its beginnings in the late 19th century to the present. Prerequisite: 501 or consent of instructor.

506-4 Seminar in Contemporary Sociological Theory. An analysis of recent sociological theories, including a survey of current approaches to the construction and application of systematic theoretical models. Special attention will be given to "structural-functional" analysis and to the theoretical adequacy of selected theory-oriented empirical research areas. Prerequisite: 15 hours of sociology or consent of instructor.

512-6 to 7 (4,2 to 3) Sociological Research. (a) Application of the scientific method to sociological problems. The role of theory. Principles of good research design, measurement, sampling and analysis. (b) Under guidance of instructor, students conduct a sociological research project. Must be taken in a,b sequence.

519-4 Methodological Foundations of the Social Sciences. Social science methodology; the nature of social facts and phenomena, the formation of concepts, the application of logic in the social sciences. Prerequisites: Philosophy 420 or consent of instructor.

521-4 Seminar in Social Psychology. Survey of theoretical systems; progress toward integrated body of behavioral theory. Prerequisite: 426.

522-4 The Sociology of Small Groups. The study of the small group as a small-scale social system. The interrelationship between selected patterned properties of groups such as interaction, emotion, norms, beliefs, values, and myths as the group encounters and attempts to deal with basic problems of group development. Prerequisite: 426 or consent of instructor.

526-12 (4,4,4) Quantitative Methods in Sociology. (a) Linear causal models as a tool in theory and research. Central tendency, variation, covariation, and correlation. Bivariate and multivariate regression models. Path analysis and related techniques. (b) Problems of Measurement. Bivariate and multivariate statistics for nominal and ordinal measures. Linear models of measurement error, reliability and validity. (c) Advanced application of linear models. Models of reciprocal causation feedback and control. The identification problem. Must be taken in a,b,c sequence.

529-4 Sampling and Inference in Social Research. Sampling designs. Sampling distributions. Point and interval estimation. Hypothesis testing: Parametric and nonparametric approaches. Power and efficiency of statistical tests.

530-2 to 4 Selected Topics in Social Research. Problems of design, execution, and analysis of social research. Content varies with interests of instructor and student. May be repeated. Prerequisite: consent of instructor.

532-4 Urban Social Structure. Theories of urban social structure and change, with emphasis on the comparative analysis of ecological and normative processes of integration and disintegration in modern urban communities.

533-4 Ecology of Human Communities. Spatial and temporal organization of population and institutions with special reference to the organization of rural and metropolitan communities. Emphasis on basic research methods and current sources of data in respect to type, structure, and growth of the communities. Prerequisite: 15 hours of sociology or consent of instructor.

534-4 Seminar in Intergroup Relations. Cross-cultural study of inter-ethnic and inter-faith relations, with special attention to conflict, accommodation, acculturation and assimilation. Prerequisite: 15 hours of sociology or consent of instructor.

537-4 Sociology of Law. An analysis of the role of law in society. Special emphasis will be given to the relationships between law and social organization, social control, social value systems, and social change; consideration will be given to research in the field. Prerequisite: 15 hours of sociology or consent of instructor.

538-4 Seminar in Industrial Sociology. Selected aspects of industrial organization and related problems including such topics as: functional and dysfunctional deviations from ideal bureaucracy, promotion policies, labor relations, job aptitudes, job satisfactions, and public relations. Prerequisites: 15 hours of sociology or consent of instructor.

539-4 Sociology of Bureaucracy. Analysis of the structural characteristics and conditions for the emergence of bureaucratic and quasi-bureaucratic forms of organization. Attention to such problems as the bases of authority, stabilizing mechanisms, systems of formal and informal relations, rationality and paradox in bureaucratic organization; impact of bureaucratic organization upon character structure and its role in the formation of classes and elites. Prerequisites: 15 hours of sociology or consent of instructor.

542-4 Seminar on the Family. The family as a field of sociological study. Assessment of significant historical and contemporary writing. Prerequisite: 15 hours of sociology including 340, or consent of instructor.

543-4 Seminar in Family Variability. An analysis of the structure, organization and function of the family in several contemporary and primitive societies. Prerequisite: 15 hours of sociology including 340, or consent of instructor.

544-4 Seminar in Family Research. A detailed analysis of significant research in the field of the family. Special attention to methods employed as they relate to the specific problems investigated. Prerequisite: 15 hours of sociology including 340, or consent of instructor.

545-4 The Family and Social Change. The significant social factors responsible for changes in the family. Analysis of representative writings from several periods. Prerequisite: 15 hours of sociology including 340 or consent of instructor.

551-4 Seminar in the Sociology of Religion. Analysis of religion in complex societies with comparative consideration of archaic and traditional religious institutions. Emphasis on the problems of secularization, institutionalization, the sociology of knowledge, and social change. Prerequisite: consent of the instructor.

561-4 Alcohol and Society. Analysis of the determinants of ranges of variation in drinking patterns, normal or pathological, viewed cross-culturally and in the context of complex society. Special consideration will be given to the following: the ecology of drinking and alcoholism, drinking patterns and social structure, drinking centered subcultures and institutions, as well as to the genesis and patterning of deviant drinking (alcoholism), responsive movements and systems of control. Prerequisite: consent of instructor.

562-4 Deviance and Disorganization. Comparative study of the role of social, cultural, and psychological factors in the genesis of specific social pathologies exhibiting marked variation in group rates. Pathologies such as suicide, homicide, and alcoholism will be taken as illustrative. The strategic significance of the study of such phenomena for theories of social and personal disorganization will be considered in detail. Prerequisite: consent of instructor.

563-4 Research Problems in Deviance and Disorganization. For students who are concerned to develop viable research projects in the areas of social disorganization and deviant behavior. Students formulate and present original research prospectuses for critical evaluation. Consideration given to questions of theoretical relevance, research design, and appropriate techniques. Prerequisite: consent of instructor.

564-4 Social Factors in Mental Disorders. An examination of the role of social organization and structure in the emergence of mental disorders. Consideration given to pertinent theoretical and research contributions. Prerequisite: 15 hours of sociology or consent of instructor.

566-4 Community Organization and Disorganization. Nature of the community and community generating processes. Appraisal of consensus and allocation of power. Illustrative community case studies. Prerequisite: consent of instructor.

572-4 Seminar in Criminology. Critical study of important research and theoretical analyses. Prerequisite: consent of instructor.

591-2 to 6 Individual Research. Supervised research projects. Open only to graduate students with a major in sociology. Prerequisite: consent of instructor and chairman of department. Credit according to achievement.

596-2 to 12 Readings in Sociology. Supervised readings in selected subjects. Prerequisite: consent of instructor and chairman of department.

599-2 to 9 Thesis. Prerequisite: consent of chairman.

600-1 to 48 Dissertation. Prerequisite: consent of chairman.

Special Education

400-4 The Exceptional Child. Physical, mental, emotional, and social traits of all types of exceptional children. Effects of handicaps in learning situations. Methods of differentiation and techniques for rehabilitation. Case studies, observations and field trips may be required. Prerequisite: Psychology 301 or 303 or consent of instructor.

410a-4 Problems and Characteristics of the Behavior Disordered. Diagnosis, screening, classroom management, placement considerations, goals, and the effective use of ancillary services for school children who are emotionally disturbed or socially maladjusted. Emphasis on the understanding of maladaptive behavior through principles of learning and behavior. Prerequisite: 400 or consent of instructor and department chairman.

410b-4 Problems and Characteristics of the Mentally Retarded Child. Emphasizes a developmental approach to understanding and dealing with children with low mental abilities. Considers historical, theoretical and practical factors pertinent to mental retardation. This course is prerequisite to special education student teaching. Prerequisite: 400 or consent of instructor and department chairman.

410c-4 Problems and Characteristics of the Gifted Child. Designed to help teachers in the identification of and programming for gifted and talented children. Prerequisite: Psychology 301 or 303 or consent of instructor.

410e-4 Problems and Characteristics of Children with Specific Learning Disabilities. Behavioral, emotional, physical, and learning characteristics of children with learning disabilities. Emphasis on receptive and expressive modalities for learning; theories dealing with etiology and treatment. Prerequisite: 400 and consent of instructor and department chairman.

411-4 Assessment and Remediation of Learning Disabilities. (Same as Guidance 411.) Theories of special tests and remedial programs designed for

children with specific learning disabilities of a perceptual or coordination nature and who may demonstrate related adjustment problems. Prerequisite: 400 and consent of instructor.

413a-4 Directed Observation of Behaviorally Disordered. Student observation and participation in group and individual work with behaviorally disordered children. Prerequisite: consent of instructor and department chairman.

413b-4 Directed Observation of Mentally Retarded Children. Student observation and participation in group and individual work with mentally retarded children. Prerequisite: 410b and a major in special education.

420a-4 Methods and Materials for Teaching Behaviorally Disordered Children. Offered in conjunction with practice teaching, dealing with methods and materials needed in teaching behaviorally disordered children. Prerequisite: 410a and consent of instructor and department chairman.

420b-4 Methods and Materials for Teaching Mentally Retarded Children. Primary emphasis on methods of teaching. Practical problems of grouping, behavior management, individualization, and the applicability of materials to dysfunctions are included. Minimum of one video-taping session and individualized tutoring is required of all participants. Prerequisite: taken quarter prior to student teaching and consent of instructor.

420c-4 Methods and Materials for Teaching Children with Learning Disabilities. Techniques for implementing educational therapy and remediation of children with learning disabilities. Emphasis on visual, auditory, tactile, and fine and gross motor problems. Prerequisite: 410e and consent of instructor and department chairman.

428-4 Speech Correction for the Classroom Teacher. (Same as Speech Pathology and Audiology 428.)

496-2 to 8 Readings and Independent Study in Special Education. Study of a highly specific problem area in the education of exceptional children. Open only to selected seniors and graduate students. Prerequisites: 400 and consent of staff and department chairman.

501-8 (4,4) Special Research Problem. (a) Research design and methodology in special education. (b) Development and performance of research study under direction. Prerequisite: consent of department.

513-4 Organization, Administration, and Supervision of Special Classes. Emphasis upon the functions, underlying principles, and cautions to be observed in the organization and administration of special classes. The selection and training of teachers, problems of supervision, special equipment, transportation, cooperating agencies, and legal aspects of the problem. Prerequisite: 400 and consent of instructor and department chairman.

515-4 Itinerant Teaching of Exceptional Children. Consultation and interviewing techniques for use with individual exceptional children, their parents, teachers and other school or agency personnel. Methods of individual and small group instruction. Emphasis on itinerant service for emotionally disturbed and hard-of-hearing children through separate concurrently scheduled lectures and demonstrations. Prerequisite: 410a,b, or d.

517-4 The Atypical Child and Social Agencies. A survey of social agencies contributing to the welfare and care of exceptional children. Emphasis given to services rendered and to methods of contact and cost. Specialists invited to appear before the class. Prerequisite: 400 or consent of instructor and department chairman.

518a-4 Workshop in Education of Children with Learning and Behavioral Disorders. Designed to promote better understanding of the psychological and educational problems of children with learning and behavioral disorders. Specialists used as consultants. Open to graduate students majoring in education, guidance, or special education with consent of instructor. Prerequisite: 400 and consent of instructor and department chairman.

518b-4 Workshop in the Education of Mentally Retarded Children. Designed to promote better understanding of the psychological and educational problems of mentally retarded children. Specialists used as consultants. Open to graduate students majoring in education, guidance, or special education with consent of instructor. Prerequisite: 400 and consent of instructor and department chairman.

518c-4 Workshop in the Education of Gifted Children. Designed to promote better understanding of the psychological and educational problems of gifted children. Specialists used as consultants. Open to graduate students majoring in education, guidance, or special education with consent of instructor. Prerequisite: consent of instructor and department chairman.

518s-4 Workshop in the Administration of Special Education. Designed to promote better understanding of the organization, administration and supervision of school programs for atypical children. Specialists used as consultants. Open to graduate students majoring in educational administration, guidance, or special education with consent of instructor. Prerequisite: 400 and consent of instructor and department chairman.

577-4 to 12 Practicum in Special Education. Supervised experience in school or institution programs for atypical children. Special research project. Open to graduate students only. Prerequisites: 410a,b,c, or e and consent of staff and department chairman.

580a-4 Seminar: Education of Behaviorally Disordered Children. Analysis of research, trends, and programs in the education of children who are behaviorally disturbed, socially maladjusted, or have learning disabilities. Open to graduate students in special education only. Prerequisites: 400 and consent of instructor and department chairman.

580b-4 Seminar: Education of Mentally Retarded Children. Analysis of research, trends, and programs in the education of children who are mentally retarded. Open to graduate students in special education only. Prerequisites: 400 and consent of instructor and department chairman.

590-4 Seminar: Education of Children with Mental Deviations. Critical review of administrative practices, research, theories and etiological factors relevant to programs in the education of children who are mentally retarded or gifted. Implications of research in related disciplines. Application of theories to practice. Open to advanced graduate students in special education only. Prerequisite: consent of instructor.

591-4 Seminar: Education of Physically Handicapped Children. Critical review of administrative practices, research theories and etiological factors relevant to programs in the education of children who are acoustically, visually, or orthopedically handicapped or those who, for medical reasons, must receive homebound instruction. Open to advanced graduate students in special education only. Prerequisite: consent of instructor.

592-4 Seminar: Education of Children with Learning and Behavioral Disorders. Critical review of administration practices, research theories, and etiological factors relevant to programs in the education of children who are emotionally disturbed, socially maladjusted, and/or have specific learning disabilities. Implications of research in related disciplines. Application of theories to practice. Open to advanced graduate students in special education only. Prerequisite: consent of instructor.

596-4 to 8 Independent Investigation. A field study required of each student working for the sixth-year specialists certificate. The work should be done in the setting of a school system where the student is employed or where full cooperation is extended. The study will involve selecting of the problem, surveying of pertinent literature, recording of results, and appropriate interpretations and summaries. Prerequisite: consent of staff and department chairman.

599-2 to 9 Thesis. Minimum of five hours to be counted toward a master's degree.

600-1 to 48 Dissertation.

Speech

Courses in this department may require the purchase of additional textbooks or materials.

401-4 Creative Dramatics. (Same as Theater 401.) Materials, techniques, and procedures for conducting sessions in informal drama with emphasis upon its contribution to the total growth and development of the child. Includes lectures, observations, student participation. Prerequisite: junior standing.

406-4 Teaching Speech in Secondary Schools. Philosophy of speech education, and effective teaching of speech through curricular and extra-curricular work. Prerequisite: 16 hours of speech.

407-8 (4,4) American Public Address. Critical studies of American speakers; selected speakers and speeches which reflect the dominant social and political ideas in American history. A lecture, reading, and discussion course. Parts may be taken independently.

- 408-4 Psychology of Speech.** Nature and development of speech, its basic psychology, and the part speech plays in personality development.
- 417-4 Contemporary Public Address.** A critical study of speakers and speeches selected to present the characteristic ideas of leading social and political developments in national and international affairs since 1918. A lecture, reading, and discussion course.
- 418-4 British Public Address.** Study of British speakers. Selection of material governed by men and issues that affected British history.
- 422-4 Oral Interpretation of Prose.** The study of the prose form through analysis and performance. Prerequisite: 323, GSC 200, or consent of instructor.
- 423-4 Oral Interpretation of Poetry.** The study of poetic form through analysis and performance. Prerequisite: 323, GSC 200, or consent of instructor.
- 424-4 Oral Interpretation of Dramatic Literature.** The study of dramatic form through analysis and performance. Prerequisite: 323, GSC 200, or consent of instructor.
- 425-3 Techniques of Discussion Leadership.** Group discussion designed to clarify the functions and concepts of the leader in democratic society.
- 427-4 Secondary School Forensic Program.** Coaching and organizational methods for forensic programs in school and college.
- 428-4 Communication Theories and Models.** Survey, analysis, and criticism of contemporary theories and models of human communications.
- 429-4 Experimental Studies in Oral Communication.** Principles of research design accompanied by a critical examination of research in oral communication. Prerequisite: 428.
- 430-2 to 4 Independent Study.** Creative project to be completed in one quarter. Nature of assignment determined by student and instructor and approved by department chairman. Prerequisite: 12 hours speech courses and consent of instructor.
- 431-2 to 12 Internship or Practicum in Public Relations.** Students compete for a professional quarter under the supervision of the director of PR instruction and the PR group of a corporation, institution, agency, or counseling firm. Credit depends upon the demands and complexity of the work which the student performs. Evaluation is a joint function of the group professionals and the director. Prerequisite: 331; Administrative Science 340; Marketing 301, 363; Journalism 370; one or more Journalism courses in newswriting; and one or more courses in research methods.
- 434-8 (4,4) Group Performance.** (a) Group performance. Media of oral interpretation. Theory and practical application; the compiled script. (b) Group performance. Medium of oral interpretation, theory, and practical application: chamber theater. Need not be taken in sequence. Prerequisite: 323.
- 435-4 Studies in Organizational Communication.** Communication systems and behavior within formal organizations. Focused on theory and research of informational and directive communication as related to channels, structures, status, involvement, morale, and leadership.
- 441-4 Teaching Speech in Elementary Schools.** Study of oral language development in children, analysis of their speech needs, and methods of teaching speech in elementary schools with emphasis on speech improvement and development of basic speech skills.
- 445-12 (4,4,4) Language Behavior.** Psycholinguistic approach to the study of language learning and the use of language. Relation of language to other developing behaviors. Applicability of psychological and linguistic theories to social psychological aspects of language communication.
- 449-4 General Semantics.** Means of changing implications so that language, in spoken or written form, describes the life facts.
- 450-12 (4,4,4) Laboratory in Interpersonal Communication.** Communication viewed as a process of relating and evaluating. Applications of and related philosophy, methodology and research to the functioning of the class itself through various speech activities. The course encompasses the common core of communication behaviors relevant to the chief communication specialties.
- 484-4 Political Communication.** This course will place contemporary techniques of political campaign communication in historical perspective, discuss some of the major controversies which have recently arisen, and review critically empirical research dealing with the influence of communication variables on political values, attitudes, and behavior. Prerequisite: junior standing or consent of the instructor.
- 500-4 Survey of Classical Rhetoric.** Ancient rhetoricians and orators from

Corax to Augustine, with special emphasis upon the works of Aristotle and Cicero. Lectures and special studies.

501-4 Teaching Oral Language at the Pre-School and Early Elementary Level. For teachers of culturally disadvantaged children. Emphasis on environmentally derived language problems. Theory of language development, relationships between language and learning, and practice in constructing ameliorative language experiences.

504-4 Medieval and Renaissance Rhetoric. An examination of the trends in rhetorical theory between A.D. 100 and 1600 designed to facilitate understanding of the transition from classical to modern theory.

505-4 Modern Rhetorical Theory. An analysis of selected theories of public address from the seventeenth century to the present, with a view of discovering the methods and objectives of modern rhetoricians and relating them to society and its problems during the period.

507-6 (3,3) Studies in Public Address. The study of orators, oratory, issues and movements in terms of implications for rhetorical theory and current concepts of communication. Prerequisite: 407a,b.

508-4 Seminar: Studies in Discussion. Studies in group thinking and group action with a view to improving discussion and conference techniques.

510-4 Seminar: Persuasion and Social Control. Uses and applications of persuasion in the various fields of social activity. Mass media examined as they apply to politics, business, religion, and education.

511-4 (2,2) Teaching the College Speech Course. Problems, methods, and materials in the teaching of speech in college with primary emphasis on the basic course. Examination of textbooks, courses of study, curriculum making, measurement, and relationship to other fields.

520-3 Philosophical Foundations of Speech. A special course reviewing the philosophy of speech for graduate and advanced students. Designed to take advantage of the knowledge and background of distinguished visiting professors.

522-4 to 12 Studies in Interpretation. Historical perspectives, critical methods, contemporary social relationships, modern media experiments, chamber theatre, selected authors, or periods. Course may be repeated for a total of 12 hours. Prerequisite: 12 hours of interpretation or consent of instructor.

523-3 Seminar: Problems in Interpretation. An examination of basic research areas within the field of interpretation in terms of current theories and methodologies. Prerequisite: 12 hours in interpretation and theater and consent of instructor.

524-6 (3,3) Problems in Rhetoric and Public Address. Rhetorical theory and criticism of public address examined. Classical and contemporary theory and practice studied.

525-4 Seminar: Speech Education. Problems of philosophy and methods of teaching speech in the elementary and secondary schools. Prerequisite: consent of instructor.

526-4 Language Behavior Seminar. Problems in language behavior research. Location and development of research topics, formulation of proposals, methods of conducting language behavior research. Prerequisite: 406, 441 or 445.

530-1 to 4 Research Problems. Independent study under the supervision of a member of the graduate faculty in speech.

532-4 (2,2) Areas and Techniques of Research in Speech. Study and analysis of outstanding works in the various areas of research. Lectures on research techniques and study possibilities in the field.

540-4 Seminar: Experimental Communications Research. Types of quantitative research and methods of observation and data collection most relevant to the study of human communication. Prerequisite: 428, 429, and two courses in statistics.

542-4 Seminar in Non-quantitative Research Methods. Survey and critical analysis of non-quantitative approaches to the study of communication, particularly relating to methods of observation, data collection, and interpretation. Emphasis on case and field studies.

599-2 to 9 Thesis. Minimum of 5 hours to be counted toward a master's degree.

600-1 to 48 Dissertation. Minimum of 36 hours to be earned for the Doctor of Philosophy degree.

Speech Pathology and Audiology

400-1 to 4 Independent Study in Speech Pathology and Audiology. Activities

involved shall be investigative, creative, or clinical in character. Must be arranged in advance with the instructor, with consent of the chairman, and may be repeated for up to 6 hours. Prerequisite: consent of chairman.

401-4 Diagnostic Procedures in Speech Pathology. A general introductory course devoted to a discussion of the role of the speech and hearing clinician as a differential diagnostician. Special emphasis is placed on the techniques and importance of the oral-peripheral examination, articulation and language evaluation, audiometric and case history information in constructing an initial evaluation report. Prerequisite: 200, 314.

406-4 Techniques and Interpretation of Hearing Tests. Principles and techniques of testing the hearing and interpreting those tests in terms of the individual's needs. Prerequisite: 316 or consent of instructor.

419-4 Communication Problems of the Deaf and Hard of Hearing. Objectives and techniques for the teaching of lip reading, speech conservation, and auditory training. Prerequisite: 406 or consent of instructor.

428-4 Speech Correction for the Classroom Teacher. (Same as Special Education 428.) Etiology and therapy of common speech defects. May be taken by all inservice teachers, seniors, and graduate students in education.

430-2 to 4 Clinical Practice: Articulation. Supervised clinical practicum in articulation. Emphasis will be upon therapy procedures, diagnostic techniques, and preparation of reports. Prerequisite: 302.

431-2 to 4 Clinical Practice: Language. Supervised clinical practicum in language. Emphasis will be upon therapy procedures, diagnostic techniques, and preparation of reports. Prerequisite: 303.

432-2 to 4 Clinical Practice: Hearing Rehabilitation. Supervised clinical practicum in hearing rehabilitation. Emphasis will be upon therapy procedures, diagnostic techniques, and preparation of reports. Prerequisite: 316, 406, 419.

435-2 to 4 Clinical Practice: Speech and Language Diagnostics. Supervised clinical practicum in language diagnostics. Emphasis will be upon therapy procedures, diagnostic techniques, and preparation of reports. Prerequisite: 302, 303, 401.

436-2 to 4 Clinical Practice: Hearing Diagnostics. Supervised clinical practicum in hearing diagnostics. Emphasis will be upon therapy procedures, diagnostic techniques, and preparation of reports. Prerequisite: 316, 406.

509-4 Research Design in Hearing and Speech Pathology. Evaluation of the strategies and procedural tactics of behavioral research. Prerequisite: consent of instructor.

510-4 Stuttering: Behavior Assessment. Explores the assumptions underlying diagnosis and assessment. Procedures involved in the differential assessment of disfluent behaviors are examined, evaluated, and related to therapeutic strategies. Prerequisite: 319 or consent.

511-4 Stuttering: Behavior Therapy. Principles of behavior change are examined, related to assessment, and to the tactics of modification: Prerequisite: 510.

512-4 Seminar: Phonology. An introductory discussion of the important linguistic, physiological and acoustic variables which affect language production at the segmental and suprasegmental level of language. Prerequisite: consent.

513-4 Phonological Acquisition in Children. A survey course designed to familiarize the student with current research and theories devoted to explaining phonological development in children on a linguistic basis. Prerequisite: consent.

514-4 Seminar: Phonetic Theory. A historical examination of the growth and development of distinctive feature systems from 1920 to the present. This course concentrates on the mathematical, logical, physiological and acoustic assumptions of the various matrices which have been developed. Prerequisite: consent.

515-1 to 4 Readings in Speech Pathology and Audiology. Supervised and directed readings in specific areas of speech pathology. Prerequisite: advanced standing.

518-4 Seminar: Physiological Acoustics of the Ear. Advanced study of the physiological responses of the middle and inner ear to the acoustic stimulus. Theories of middle ear function and of cochlear function are presented in detail. Prerequisite: 316, 406.

519-4 Seminar: Psychoacoustics. Advanced study of the behavioral response of the human hearing mechanism to the various parameters of the acoustic stimulus; threshold sensitivity, loudness, pitch, localization, modulation, beats, and masking. Prerequisite: 316, 406, 518, or consent of instructor.

521-4 Seminar: Physio-Acoustics of Speech. Lectures and discussion of the be-

havior of structures of the head and neck which are directly concerned with the production of the acoustics of verbal coding. Prerequisite: consent of instructor.

522-4 Seminar: Voice Disorders. An intensive study of the variables of airstream modulation resulting from impaired structures and function of head and neck. Prerequisite: 318 or equivalent.

523-2 to 4 Clinical Practice: Voice Disorders. Supervised clinical practicum in voice disorders. Emphasis will be upon therapy procedures, diagnostic techniques, and preparation of reports. Prerequisite: 318 or equivalent.

524-4 Seminar: Language Disorders. Examination of language disorders associated with childhood. Procedures for the evaluation of aberrant language development in clinical populations in contrast to the linguistic development of normal speakers. Prerequisite: 303 or 545.

525-4 Advanced Audiology I. Problems in masked bone conduction audiometry including SAL and Rainville testing; methods of hearing assessment for children and infants; functional hearing loss in children and adults. Prerequisite: 316 and 406.

528-4 Seminar: Experimental Audiology. Basic psychophysical methods, basic operating principles of electronic equipment, and the use of laboratory sound-production and measurement equipment will be presented. Students will design and perform model psycho-acoustic experimentation. Prerequisites: 520 and 516, or consent of instructor.

530-1 to 4 Research Problems in Speech Pathology and Audiology. Individual work upon selected problems for research.

531-1 to 4 Seminar: Experimental Phonetics. An investigation into the experimental approaches for the study of the phenomena of speech.

532-2 to 4 Clinical Practice: Fluency Disorders. Supervised clinical practicum in fluency disorders. Emphasis will be upon therapy procedures, diagnostic techniques, and preparation of reports. Prerequisite: 510 and 511.

533-4 Seminar: Speech Science. Special problems in voice science and acoustic perception.

534-4 Seminar: Instrumentation. Familiarity with instruments, their uses, capabilities, and limitations, as they apply to the study of speech and hearing.

535-2 to 4 Clinical Practice: Cerebral Palsy and Aphasia. Supervised clinical practicum in cerebral palsy and aphasia. Emphasis will be upon therapy procedures, diagnostic techniques, and preparation of reports. Prerequisite: 541.

536-4 Seminar: Administration of Speech and Hearing Programs. A study of program settings, organizational procedures, and professional interrelationships in adult speech and hearing therapy. Field trips to rehabilitation centers and related agencies.

540-4 Neuroanatomy and Neurophysiology of Communicative Disorders. The neuroanatomical and neurophysiological bases for communicative disorders studied with special reference to: histogenesis of the central and autonomic nervous systems, their component parts and relationships to each other; structural descriptions of the brain and spinal cord, including fiber tracts and afferent and efferent systems; biochemical mechanics and theories of neural transmission. Prerequisite: 314.

541-4 Neuromuscular Disorders of Speech. In-depth study of disorders of speech due to neuromuscular and neurophysiological pathologies resulting from damage to the brain and biochemical dysfunctions of the C.N.S. Review of relevant research and therapeutic paradigms will accompany opportunities to design and execute research in neuropathology, as well as clinical practicum with patients so disabled. Prerequisite: 540 and consent.

542-4 Neuropsychological Disorders of Communication. Study of the neuropsychological disabilities of speech and language resulting from C.N.S. damage or dysfunction. Pertinent research relating to the syndromes of dyspraxia, aphasia, and geriatric linguistic disabilities will be reviewed. Diagnostic and therapeutic paradigms useful in management of these patients will be explored, including clinical contact with patients diagnosed as displaying neuropsychological disabilities. Prerequisite: 540 and consent.

545-4 Modern Techniques for the Syntactically Impaired. Discussion of the application of current theoretical and research findings to the syntactically impaired. This course emphasizes diagnostic and therapeutic models applicable to language disorders. Opportunities for research and clinical experience with young children displaying developmental language problems will be provided. Prerequisite: 303 or consent.

548-4 Stuttering: Behavior Theory. Examines modern learning theory approaches to fluency and fluency failure. The learning models dealt with are critically examined in relation to clinical and experimental data. Prerequisite: 319 or consent.

549-4 Stuttering: Behavior Research. Reviews the research data on stuttering in relation to design, methodology and technology. Discussions serve as the background for original investigations. Prerequisite: 319, 509 or consent.

550-4 Psycholinguistic Correlates of Verbal Impairment. Clinical, diagnostic, and therapeutic procedures suggested by the current status of our knowledge of the mental behaviors or deviant groups will be studied. Presentation of behavioral paradigms for the clinical treatment of the verbally impaired child will be emphasized. Diagnostic and therapeutic experiences with this clinical group will be required. Prerequisite: 545.

599-2 to 9 Thesis.

600-1 to 48 Dissertation.

Theater

401-4 Creative Dramatics. (See Speech 401.)

402-12 (4,4,4) Play Directing. (a) The director as the controlling force in theatrical production, with emphasis on his use of the visual language of the stage. (b) The director as the interpreter of the play, with emphasis on his work with the actors in rehearsal. Prerequisite: 402a or consent of instructor. (c) Study of theories and practice in techniques of directing presentational forms of theater and non-proscenium productions. Prerequisites: 402a and b or consent of instructor.

404-4 Theater Management. Theater operational procedure, including both fundamental structuring and house management. The former aspect includes administration, purchasing, and accounting practices, ticket sales, publicity, promotion, and public relations. The latter covers the management of box-office and ushering.

407-2 Sound in the Theater. Consideration of sound system design and application of sound in dramatic production. Lecture and laboratory 2 hours. Prerequisite: 111b or consent of instructor.

409-4 High School Theater and Its Production Problems. Consideration of stages, machinery, equipment, light controls and instruments, production techniques, and analysis of basic needs of high school theater.

410-3 Children's Theater. Creative dramatics; dramatization of children's literature; play production for elementary schools. Recommended for educational concentrations.

411A-4 Playwriting: The One-Act Play. Principles of dramatic construction and practice in the writing of a one-act play. Individual conferences supplement the class discussion and analysis of student writing. Deserving plays have opportunity to be produced in the University Theater's Quarter-Night program for new plays. Prerequisite: 311 for theater and speech majors.

411B-4 Playwriting: The Full-Length Play. Principles of dramatic construction and practice in the writing of a full-length play, (encompassing such varied types as the children's play, the historical pageant-drama, the musical, etc.). In special cases students may elect to write two short plays. Individual conferences supplement the class discussion and analysis of student writing. Prerequisite: 411A or consent of instructor; none except 311 for theater and speech majors.

412-12 (4,4,4) Stage Design. The design of settings for the stage and other dramatic media. Prerequisite: 207.

414-4 Costume Design. History of western costume from Greek to Renaissance and its adaptation to stage use. Theory and principles of theatrical costuming. Application of principles of design and color. Designs for single scenes.

415-4 Costume Design. History of costume, Renaissance through 19th Century. Style, fantasy, and the comic in costume design. Principles of dramatic theory and criticism as applied to costume design. Evaluation of research tools. Methods and procedures in designing costumes for a complete show. Prerequisite: 414.

416-4 Current Theories and Practices in the Teaching of Dance. (See Physical Education 416.)

417-4 Advanced Acting. Lectures, readings, and practical application dealing with advanced studies of characterizations and acting styles on an individual basis. Prerequisite: 217, 317. Mandatory Pass/Fail.

432-4 Stage Lighting. Instruments and control equipment; principles and techniques of lighting dramatic productions.

438-4 Contemporary Developments in the Theater. Critical study of theory and practice in acting, directing, production, and architecture in the modern theater. The rise and development of the film, radio, and television as dramatic media.

444-2 to 8 Contemporary Dance Workshop.

490-4 to 8 Theater-Television Workshop. (See Radio-Television 490.)

500-2 Introduction to Research Methods. An introduction to the principles and methods of scientific, historical, critical, and projective research in theater. Prerequisite: graduate standing.

502-4 to 12 Advanced Directing. Scene-study workshop, with emphasis on exercises designed to overcome the individual's specific problems as a director. May be repeated only by permission of instructor. Prerequisite: consent of instructor.

503-12 (4,4,4) Advanced Technical Problems. Solutions of problems presented by certain types of plays and modes of production. (a) Scene design. (b) Stage lighting and sound. (c) Costume design. Prerequisite: consent of department.

504-4 The Comic Theater. A study of comedic theory as applied to major types of dramatic composition. Dramatic theories of comedy from Aristotle to Freud are explored. Individual reports.

505-4 The Tragic Theater. An examination of tragic drama and criticism as related to the societies which produced such drama. Particular emphasis is placed upon the Athenian, Elizabethan and modern theater.

511-4 Playwriting Workshop. A practical laboratory course in which playwriting students will have one or more original plays presented in staged readings or, whenever possible, in modified productions. Students will be expected to constantly improve their work before and after presentation, to attend rehearsals, to work closely with directors and actors. Plays will be evaluated by critique panels composed of faculty and students. The Workshop gathers a performance group for the presentation of the new plays. The Department also produces original plays in its Quarter-Night Series. Restricted to graduate playwriting students in the theater program. Graduates in interdisciplinary programs may be admitted by consent of instructor. Prerequisites: 411A and B.

517-4 to 12 Graduate Practicum in Acting. An advanced acting studio for graduate students which may be repeated for a total of twelve credits. Instruction in advanced rehearsal and performance problems. Prerequisite: 417 or equivalent and permission of instructor.

519-1 to 12 Theater Practicum. Practical experience in acting, directing, and associated work on campus, on area tours, and in summer stock.

526-3 to 12 Seminar in Theater Arts. Special problems of interest to advanced students. Subject is determined by the instructor. Seminar in same subject cannot be repeated. Prerequisite: consent of department.

530-1 to 4 Research Problems in Theater. Individual work upon selected problems for research.

599-1 to 9 Thesis. Minimum of 5 hours to be counted toward a master's degree.

Zoology

Students enrolled in zoology courses may incur field trip or laboratory expenses of \$5.00 to \$25.00.

402-4 Natural History of Invertebrates. Introduction to environmental relationships, intraspecies communication, and interspecies relationships of invertebrate animals. Prerequisite: one year of zoology including 317a.

403-4 Natural History of Vertebrates. Observation, identification, and life histories. Designed for teachers. Not for students specializing in vertebrate zoology. Prerequisite: 317b.

404-2 to 12 Zoology Field Studies. A trip of four to eight weeks to acquaint students with animals in various environments and/or with methods of field study, collection, and preservation. Cost per individual will be approximately

\$25 per week. (Only 4 hours may be used for credit.) Prerequisite: consent of department.

406-4 Protozoology. Taxonomy, cytology, reproduction, and physiology of unicellular animals including methods of culturing. Prerequisite: 317a.

407-5 Parasitology. Principles, collection, identification, morphology, life histories, and control measures. Prerequisite: 317a.

408-4 Herpetology. Taxonomic groups, identification, morphology, and natural history of amphibians and reptiles. Prerequisite: 317b.

409-5 Histology. Microscopic structure of organs and tissues with emphasis on mammalian forms. Prerequisite: 15 hours biological science.

410-5 Vertebrate Paleontology. History of vertebrate animals in terms of their morphological change, geological succession, and ecological relationships.

413-10 (5,5) The Lower and Higher Invertebrates. (a) Structure, phylogeny, and natural history of the lower invertebrates, through lophophorates. (b) Structure, phylogeny, and natural history of the higher invertebrates, protostomes, deuterostomes except arthropods. Need not be taken in sequence. Prerequisite: 317a.

414-5 Freshwater Invertebrates. Taxonomic groups, identification, and natural history of the North American fauna. Prerequisites: one year of zoology including 317a.

415-4 Limnology. Lakes and other inland waters, the organisms living in them, and factors affecting these organisms. Prerequisite: 317a.

425-4 (2,2) Genetic Methods. Experimental methods in applying basic principles of genetics. (a) Monogenic and digenic inheritance, sex-linkage, gene interaction, linkage, and chromosome mapping. (b) Mutation, artificial and natural selection, gene frequencies, and genetic drift. Four hours laboratory per week. Must be taken in a,b sequence. Prerequisite: Biology 305.

426-4 Comparative Endocrinology. (Same as Physiology 426.) Comparison of mechanisms influencing hormone release, hormone biosynthesis, and the effects of hormones on target tissues. Includes ablation and histology of glands, and chemical and bioassays with vertebrates and invertebrates. Prerequisite: Biology 308 and consent of instructor.

430-8 (4,4) Biological Statistics. (a) Examination of distributions, the parametric statistics and simple regression theory. (b) Examination of experimental design, the analysis of variance, and the analysis of covariance. Prerequisite: consent of instructor.

441-4 Emergence of Order in Biological Systems. From molecular to the gross morphological level: cybernetic, systemic, thermodynamic, and evolutionary aspects. Prerequisite: consent of instructor.

459-4 Game Birds. Identification, life history, ecology, and management. Cost of field trips up to \$15 per student. Prerequisite: 317a and b or consent of instructor.

461-4 Mammalogy. Taxonomic groups, identification, and natural history of mammals. Prerequisite: 317b.

463-4 Wildlife Management. The principles and varied techniques of managing wildlife resources. Cost of field trips up to \$15 per student. Prerequisite: 15 hours of biological science or consent of instructor.

465-4 Ichthyology. Taxonomic groups, identification, and natural history of fishes. Prerequisite: 317b.

466-4 Fish Management. Sampling, dynamics, and manipulation of fish populations, age and growth of fishes, and habitat improvement. Prerequisites: one year of biological science, consent of instructor.

467-4 Ornithology. Classification and recognition of birds and the study of their songs, nests, migratory habits, and other behavior. Cost of field trips is \$5 to \$10 per student. Two lectures and 4 laboratory hours per week. Prerequisite: 317b.

471-4 Entomology. Structure, classification, and life histories of insects. Two lectures and 4 laboratory hours per week. Prerequisite: 317a.

479-4 Animal Behavior. (Same as Animal Industries 479 and Psychology 479.) The biological basis for the actions and responses of animals. Prerequisite: GSA 209, or equivalent.

508-4 Helminthology. Identification, structure, physiology, and life history of parasitic worms. Prerequisite: consent of instructor.

509-3 Histochemistry. Principles and techniques of microchemical investigation of tissues. Prerequisite: 409 and Chemistry 305a,b, or consent of instructor.

512-3 Animal Geography. Principles of the distribution of the animals of the world. Prerequisite: consent of instructor.

- 514-4 Advanced Entomology.** Morphology, physiology, systematics, and distribution of insects. Prerequisite: 471.
- 520-5 Advanced Invertebrates.** The nature and life of invertebrate animals with emphasis on comparative form, function, behavior, and occurrence. Prerequisite: consent of instructor.
- 521-4 Advanced Limnology.** The physical, chemical, and biological factors affecting organisms in streams. Emphasis on the effects of pollution. Prerequisite: 415 and consent of instructor.
- 525-5 Cytology.** (Same as Botany 525.) Microscopic study of protoplasm, including mitosis and meiosis; discussions of cytological behavior. Prerequisite: consent of instructor.
- 540-3 Factors in Animal Reproduction.** Genetic and physiological factors in determination, differentiation, and modification of sex in animals. Prerequisite: consent of instructor.
- 542-3 Osteology.** Modification of the vertebrate skeleton as a result of growth, functional adaptation, and phylogenetic relationship. Prerequisite: consent of instructor.
- 561-4 Game Mammals.** Natural history and management. Prerequisite: consent of instructor.
- 566-4 Fish Culture.** Production of game, food, and bait fishes. Design of facilities, chemical and biological variables, spawning techniques, diseases and nutrition. Prerequisite: consent of instructor.
- 573-4 Physiological Ecology.** Physiologic and morphologic adaptations and homeokinetic mechanisms in the ecology of organisms. Prerequisite: Biology 307 or equivalent and consent of instructor.
- 577-3 Population Ecology.** Principles of population dynamics as related to animals. Prerequisite: consent of instructor.
- 578-4 Population Genetics.** Genetic structure of populations, factors causing changes, and principles governing rate and direction of change. Prerequisite: consent of instructor.
- 580-4 Advanced Systematics.** The implication of systematics, including the theory and dynamics of classification, speciation, population genetics, and evolution. Prerequisite: consent of instructor.
- 581-3 The Zoological Literature.** Diversity and functions of zoological literature, scientific writing, and the publication process. Prerequisite: graduate status in a biological science.
- 582-1 to 6 (1,1,1,1,1) Graduate Zoology Seminar.** Special topics in zoology. Consult department for each term's topic. Prerequisite: consent of instructor and department.
- 583-3 (1,1,1) The Teaching of Zoology in College.** Methods, practices, and objectives in teaching zoology. Designed as part of the apprenticeship program for preparation of college teachers. Prerequisite: graduate status in a biological science.
- 585-9 to 27 (Each Section 1 to 3) Seminar.** (a) Seminar in animal behavior. (b) Seminar in developmental biology. (c) Seminar in ecosystems. (d) Seminar in wetland ecology. (e) Seminar in wildlife ecology. (f) Seminar in ornithology. (g) Seminar in parasitology. (h) Seminar on the amphibia. (j) Seminar in invertebrate zoology. (k) Seminar in mammalian paleontology. (l) Seminar in aquaculture. Prerequisite: consent of instructor.
- 596-1 to 12 Special Research.** Investigations in zoology other than those for theses. Only 3 hours may be credited toward a degree. Prerequisite: consent of instructor.
- 599-1 to 12 Research and Thesis.** For master's degree. Prerequisite: consent of instructor.
- 600-1 to 48 Research and Dissertation.** For Doctor of Philosophy degree. Prerequisite: consent of instructor.

4 / Faculty

Graduate instruction at Southern Illinois University at Carbondale is the responsibility of the graduate faculty. Although the Graduate Faculty is not organized into departments, its members are normally affiliated with specific disciplines.

Preceding the Graduate Faculty is a list of faculty members and students elected to the Graduate Council for the year 1972–1973.

The Graduate Council

Ian Beattie, Associate Professor
Marcia Brink, Graduate Student
George G. Brown, Associate Professor
Lincoln Canfield, Professor
John Cody, Professor
Philip Davis, Professor
Russell Dutcher, Professor
David Ehrenfreund, Professor
Florence Foote, Professor
Harvey Gardiner, Research Professor
Hermann Haas, Professor
William Herr, Professor
Charles Hindersman, Professor
Larry Lagow, Graduate Student
Herman Lantz, Professor
Christian Moe, Professor
Robert Mueller, Professor
Lydia Pulsipher, Graduate Student
Brent Opell, Graduate Student
Leland Stauber, Associate Professor
Dean Stuck, Associate Professor
Donald Tindall, Associate Professor
Gola Waters, Associate Professor
Howard Webb, Professor
Sally Wright, Graduate Student
John Zimmerman, Professor

Accountancy (School of Business)

Barron, Mary N., Associate Professor, M.B.A., University of Michigan, 1946
Booker, Jon A., Assistant Professor, Ph.D., North Texas State University, 1971
Burger, Clifford R., Professor, M.S., Indiana State Teachers College, 1947
Eriksen, Douglas C., Assistant Professor, Ph.D., University of Missouri, 1968
Gallegly, Robert L., Associate Professor, A.M., University of Illinois, 1947
Schmidlein, Edward J., Professor, Ph.D., New York University, 1953
Seth, Shirish, Associate Professor, Ph.D., Michigan State University, 1969
Swick, Ralph D., *Chairman* and Professor, D.B.A., Indiana University, 1954
Tucker, Marvin, Associate Professor, Ph.D., University of Alabama, 1966
Woelfel, Charles J., Professor, Ph.D., University of Texas, 1957
Wright, Roland M., Professor, Ph.D., University of Iowa, 1962

Administrative Sciences (School of Business)

Bateman, David N., Assistant Professor, Ph.D., Southern Illinois University, 1970
Bedwell, Ralph, Associate Professor, Ph.D., Southern Illinois University, 1969

Bishop, Ronald C., *Chairman* and Associate Professor, Southern Illinois University, 1969
 Fohr, John M., Professor, Ed.D., Michigan State University, 1959
 Hunt, James G., Professor, Ph.D., University of Illinois, 1966
 Larson, Lars L., Assistant Professor, Ph.D., University of Illinois, 1971
 Osborn, Richard N., Assistant Professor, Ph.D., Kent State University, 1971
 Orescanin, Danilo, Professor, D.B.A., Indiana University, 1960
 Sanders, Ronald L., Assistant Professor, Ph.D., University of Kentucky, 1971
 Vicars, William M., Assistant Professor, Ph.D., Southern Illinois University, 1969

Agricultural Industries (School of Agriculture)

Benton, Ralph A., Professor, Ph.D., University of Illinois, 1955
 Buila, Theodore, Assistant Professor, Ph.D., Cornell University, 1968
 Hanson, Ronald J., Assistant Professor, Ph.D., University of Illinois, 1972
 Herr, William McD., Professor, Ph.D., Cornell University, 1954
 Hoerner, Harry J., Assistant Professor, Ed.D., Oklahoma State University, 1969
 Keepper, Wendell, Professor, Ph.D., Cornell University, 1938
 Langford, Gordon L., Assistant Professor, Ph.D., Montana State University, 1969
 Lybecker, Donald W., Assistant Professor, Ph.D., Iowa State University, 1970
 Paterson, J. J., Associate Professor, M.S., University of Saskatchewan, 1943
 Small, Leslie E., Assistant Professor, Ph.D., Cornell University, 1972
 Solverson, Lyle, Associate Professor, Ph.D., University of Wisconsin, 1967
 Stitt, Thomas R., Associate Professor, Ph.D., Ohio State University, 1967
 Welton, Richard F., Assistant Professor, Ph.D., Ohio State University, 1971
 Wills, Walter J., Professor, Ph.D., University of Illinois, 1952
 Wolff, Robert L., Assistant Professor, Ph.D., Louisiana State University, 1971
 Wood, Eugene S., *Chairman* and Professor, Ed.D., University of Missouri, Columbia, 1958

Animal Industries (School of Agriculture)

Goodman, Billy L., Professor, Ph.D., Ohio State University, 1959
 Hausler, Carl L., Assistant Professor, Ph.D., Purdue University, 1970
 Hinners, Scott W., Professor, Ph.D., University of Illinois, 1958
 Hodson, Harold H. Jr., Associate Professor, Ph.D., Iowa State University, 1965
 Kammlade, W. G., Jr., Associate Professor, Ph.D., University of Illinois, 1951
 Kroening, Gilbert H., Associate Professor, Ph.D., Cornell University, 1965
 Lee, D. Dixon, Jr., Assistant Professor, Ph.D., North Carolina State University, 1970
 Marion, G. B., *Chairman* and Professor, Ph.D., University of Wisconsin, 1951
 Olson, Howard H., Professor, Ph.D., University of Minnesota, 1952
 Strack, Louis E., Associate Professor, D.V.M., University of Illinois, 1961
 Waring, George H., Associate Professor, Ph.D., Colorado State University, 1966

Anthropology (College of Liberal Arts)

Altschuler, Milton, Associate Professor, Ph.D., University of Minnesota, 1964
 Bender, Marvin L., Assistant Professor, Ph.D., University of Texas, 1968
 Cook, Edwin A., *Chairman* and Associate Professor, Ph.D., Yale University, 1967
 Dark, Philip J. C., Professor, Ph.D., Yale University, 1954
 Grimes, J. Larry, Assistant Professor, Ph.D., University of Texas, 1969
 Handler, Jerome S., Associate Professor, Ph.D., Brandeis University, 1965
 Kelley, Charles, Professor, Ph.D., Harvard University, 1945
 MacLachlan, Bruce B., Associate Professor, Ph.D., University of Chicago, 1962
 Maring, Ester G., Assistant Professor, Ph.D., Indiana University, 1969
 Maring, Joel M., Associate Professor, Ph.D., Indiana University, 1967
 Muller, Jon D., Associate Professor, Ph.D., Harvard University, 1967
 Rands, Robert L., Professor, Ph.D., Columbia University, 1952
 Riley, Carroll L., Professor, Ph.D., University of New Mexico, 1952
 Taylor, Walter W., Professor, Ph.D., Harvard University, 1943
 Walker, Malcolm T., Assistant Professor, Ph.D., Columbia University, 1970

Art (College of Communications and Fine Arts)

- Abrahamson, Roy, Associate Professor, Ed.D., Columbia University, 1965
 Addington, Aldon, Assistant Professor, M.F.A., Cranbrook Academy of Art, 1967
 Bernstein, Lawrence, Associate Professor, M.F.A., Cranbrook Academy of Art, 1953
 Boysen, William, Assistant Professor, M.F.A., University of Wisconsin, 1966
 Fink, Herbert L., *Director* and Professor, M.F.A., Yale University, 1958
 Graubner, Ernest, Lecturer, M.F.A., George Washington University, 1964
 Johnson, Evert, Lecturer, M.A., University of Iowa, 1954
 Kington, Brent, Professor, M.F.A., Cranbrook Academy of Art, 1961
 Littlefield, Lee, Instructor, M.A., University of New Mexico, 1968
 Paulson, Robert, Assistant Professor, M.F.A., University of Wisconsin, 1967
 Place, Ruth G., Instructor, B.A., New School for Social Research, 1959
 Sullivan, James E., Assistant Professor, M.A., University of California, Los Angeles, 1965
 Sullivan, Milton F., Professor, M.A., Columbia University, 1951
 Vergette, Nicholas, Professor, Diploma, University of London Institute of Education, England, 1951
 Walsh, Robert, Instructor, M.A., University of Iowa, 1969
 Walsh, Thomas J., Associate Professor, M.F.A., University of Michigan, 1962

Botany (College of Science)

- Ashby, William C., Professor, Ph.D., University of Chicago, 1950
 Kaeiser, Margaret, Associate Professor, Ph.D., University of Illinois, 1940
 Matten, Lawrence C., Associate Professor, Ph.D., Cornell University, 1965
 Mohlenbrock, Robert H., *Chairman* and Professor, Ph.D., Washington University, 1957
 Myers, Oval, Jr., Associate Professor, Ph.D., Cornell University, 1963
 Olah, Ladislao, Professor, Ph.D., Stephen Tisza University, Hungary, 1934
 Pappelis, Aristotel J., Professor, Ph.D., Iowa State University, 1957
 Robertson, Philip A., Assistant Professor, Ph.D., Colorado State University, 1968
 Schmid, Walter E., Professor, Ph.D., University of Wisconsin, 1961
 Tindall, Donald R., Associate Professor, Ph.D., University of Louisville, 1966
 Ugent, Donald, Assistant Professor, Ph.D., University of Wisconsin, 1966
 Verduin, Jacob, Professor, Ph.D., Iowa State University, 1947
 Voigt, John W., Professor, Ph.D., University of Nebraska, 1950
 Yopp, John H., Assistant Professor, Ph.D., University of Louisville, 1969

**Center for the Study of Crime, Delinquency, and Corrections
(College of Human Resources)**

- Alexander, Myrl E., Professor, B.A., Manchester College, 1930
 Anderson, Dennis B., Assistant Professor, Ed.D., University of Nebraska, 1970
 Dreher, Robert H., Associate Professor, LL.B., University of Illinois, 1940
 Eynon, Thomas G., Professor, Ph.D., Ohio State University, 1959
 Matthews, Charles V., *Director* and Associate Professor, M.A., University of Kansas City, 1951
 Rich, Vernon E., Associate Professor, Ph.D., Michigan State University, 1971

Chemistry and Biochemistry (College of Science)

- Arnold, Richard T., *Chairman* and Professor, Ph.D., University of Illinois, 1937
 BeMiller, James N., Professor, Ph.D., Purdue University, 1959
 Beyler, Roger E., Professor, Ph.D., University of Illinois, 1949
 Bolen, D. Wayne, Assistant Professor, Ph.D., Florida State University, 1969
 Brown, George E., Professor, Ph.D., Iowa State University, 1941
 Caskey, Albert L., Associate Professor, Ph.D., Iowa State University, 1961
 Cox, James A., Assistant Professor, Ph.D., University of Illinois, 1967
 Emptage, Michael R., Assistant Professor, Ph.D., Harvard University, 1965
 Geiger, William E. Jr., Assistant Professor, Ph.D., Cornell University, 1970

Gibbard, H. F., Assistant Professor, Ph.D., Massachusetts Institute of Technology, 1967
 Hadler, Herbert I., Associate Professor, Ph.D., University of Wisconsin, 1952
 Hadley, Elbert H., Professor, Ph.D., Duke University, 1940
 Hall, J. Herbert, Professor, Ph.D., University of Michigan, 1959
 Hinckley, Conrad C., Associate Professor, Ph.D., University of Texas, 1964
 Koster, D. F., Associate Professor, Ph.D., Texas A. & M. University, 1965
 Meyers, Cal Y., Professor, Ph.D., University of Illinois, 1951
 Musulin, Boris, Professor, Ph.D., Northwestern University, 1954
 Schmulbach, Charles D., Professor, Ph.D., University of Illinois, 1958
 Slocum, Donald W., Professor, Ph.D., New York University, 1963
 Smith, Gerard V., Associate Professor, Ph.D., University of Arkansas, 1959
 Sung, Michael T., Assistant Professor, Ph.D., University of Wisconsin, 1968
 Trimble, Russell F., Professor, Ph.D., Massachusetts Institute of Technology, 1948
 Tyrell, James, Associate Professor, Ph.D., University of Glasgow, Scotland, 1963
 Wotiz, John H., Professor, Ph.D., Ohio State University, 1948

Cinema and Photography (College of Communications and Fine Arts)

Blumenberg, Richard M., Assistant Professor, Ph.D., Ohio University, 1969
 Davis, Robert E., *Chairman* and Associate Professor, Ph.D., University of Iowa, 1965
 Gilmore, David A., Assistant Professor, M.F.A., Ohio University, 1969
 Horrell, C. William, Professor, Ed.D., Indiana University, 1955
 Mercer, John, Professor, Ph.D., University of Nebraska, 1952
 Swedlund, Charles A., Assistant Professor, M.S., Illinois Institute of Technology, 1958

Clothing and Textiles (College of Human Resources)

Berry, Thelma H., Professor, Ed.D., Columbia University, 1963
 Friend, Shirley, *Chairman* and Associate Professor, Ed.D., University of Arkansas, 1969
 Padgett, Rose, Professor, Ph.D., Purdue University, 1955

Community Development (College of Human Resources)

Bhattacharyya, Jnan, Assistant Professor, Ph.D., University of Delhi, India, 1969
 Delaney, H. Richard, Associate Professor, Ph.D., University of Missouri, 1967
 Knittle, Robert E., Research Associate, Ph.D., Southern Illinois University, 1967
 Poston, Richard, Research Professor, B.A., University of Montana, 1940
 Thomas, Richard M., Professor, D.Ed., University of California, Los Angeles, 1961
 Voth, Donald E., Assistant Professor, Ph.D., Cornell University, 1969
 Wakeley, Raymond E., Professor Emeritus, Ph.D., Cornell University, 1928

Computer Science (College of Liberal Arts)

Bahr, Knut A., Lecturer, D. Eng., University of Darmstadt, Germany, 1964
 Chaffee, Norman F., Assistant Professor, Ph.D., Pennsylvania State University, 1970
 Danhof, Kenneth J., Assistant Professor, Ph.D., Purdue University, 1969
 Guha, Ratan K., Assistant Professor, Ph.D., University of Texas, 1970
 Mark, Abraham M., *Chairman* and Professor, Ph.D., Cornell University, 1947
 Wright, William E., Assistant Professor, D.Sc., Washington University, 1972

Design (College of Human Resources)

Ashworth, Robert, Assistant Professor, Ph.D., Southern Illinois University, 1972
 Bender, Henry, Associate Professor, Ph.D., New York University, 1970

Ellner, Jack R., Professor, Ph.D., New York University, 1969
Fetter, William, *Chairman* and Lecturer, B.A., University of Illinois, 1952
Grosowsky, Harold, Lecturer (no degree listed)
Jerome, Michael, Lecturer, B.Arch., University of Capetown, South Africa, 1952
Johnson, Vern H., Lecturer, M.S., Southern Illinois University, 1962
Perk, H. F. William, Lecturer, A.B., University of California, Los Angeles, 1951
Pratt, Davis J., Lecturer (no degree listed)
Pratt, Elsa Kula, Lecturer (no degree listed)
Roan, Herbert, Lecturer (no degree listed)

Economics (School of Business)

Adams, Donald R., Jr., Associate Professor, Ph.D., University of Pennsylvania, 1967
Batra, Raveendra, Assistant Professor, Ph.D., Southern Illinois University, 1969
Blackorby, Charles, Associate Professor, Ph.D., Johns Hopkins University, 1967
Bohi, Douglas Ray, Associate Professor, Ph.D., Washington State University, 1967
Bunger, Byron M., Assistant Professor, Ph.D., University of Colorado, 1969
Cornwall, John L., Professor, Ph.D., Harvard University, 1958
Edelman, Milton T., Professor, Ph.D., University of Illinois, 1951
Ellis, Dennis F., Assistant Professor, Ph.D., Wayne State University, 1972
Foran, Terry G., Assistant Professor, Ph.D., Pennsylvania State University, 1970
Fryman, Richard Felix, Associate Professor, Ph.D., University of Illinois, 1967
Hickman, C. Addison, Professor, Ph.D., Univesrtiy of Iowa, 1942
Layer, Robert G., *Chairman* and Professor, Ph.D., Harvard University, 1952
Martinsek, Thomas A., Professor, Ph.D., Ohio State University, 1956
Pulsipher, Allan G., Associate Professor, Ph.D., Tulane University, 1971
Russell, Milton R., Professor, Ph.D., University of Oklahoma, 1963
Stalon, Charles G., Associate Professor, Ph.D., Purdue University, 1966
Stowe, Peter Skinner, Assistant Professor, Ph.D., Purdue University, 1969
Wiegand, G. Carl, Professor, Ph.D., Northwestern University, 1950

Educational Administration and Foundations (College of Education)

Armistead, Fred J., Professor, Ph.D., University of California, 1960
Bach, Jacob O., Professor Ph.D., University of Wisconsin, 1951
Bracewell, George, Professor, Ed.D., Washington University, 1952
Cruce, Donald G., Assistant Professor, Ed.D., Utah State University, 1971
Dennis, Lawrence J., Assistant Professor, Ph.D., Southern Illinois University, 1968
Dey, Raymond H., Professor, Ed.D., Washington University, 1952
Fishback, Woodson W., Associate Professor, Ph.D., University of Chicago, 1947
Jacobs, Robert, Professor, D.Ed., Wayne State University, 1949
Kaiser, Dale E., Associate Professor, Ph.D., University of Illinois, 1963
Lean, Arthur E., Professor, Ph.D., University of Michigan, 1948
McKenzie, William R., Professor, Ed.D., University of Denver, 1953
Moore, Malvin Jr., Professor, Ed.D., George Peabody College for Teachers, 1959
Parker, James C., Assistant Professor, Ed.D., University of Tennessee, 1971
Sasse, Edward B., *Chairman* and Associate Professor, Ph.D., University of Wisconsin, 1966
Sealey, Ronald W., Associate Professor, Ph.D., Syracuse University, 1971
Shelton, William E., Associate Professor, Ph.D., University of Chicago, 1950
Stuck, Dean L., Associate Professor, Ph.D., Iowa State University, 1968
Wohlwend, Herbert W., Associate Professor, Ph.D., Southern Illinois University, 1964

Electrical Sciences and Systems Engineering (School of Engineering and Technology)

Dodd, Curtis W., Associate Professor, Ph.D., Arizona State University, 1968
Dunning, E. Leon, Professor, Ph.D., University of Houston, 1967

Feiste, Vernold K., Associate Professor, Ph.D., University of Missouri, 1966
 Grismore, F. Lee, Jr., Associate Professor, Ph.D., Georgia Institute of Technology, 1970
 McCalla, Thomas M., Assistant Professor, Ph.D., Case Western Reserve University, 1965
 Pearson, Sonny W., Assistant Professor, Ph.D., University of Arkansas, 1968
 Smith, James G., *Chairman* and Professor, Ph.D., University of Missouri (Rolla), 1967

Elementary Education (College of Education)

Beattie, Ian D., Associate Professor, Ph.D., Southern Illinois University, 1969
 Bradfield, Luther E., *Chairman* and Associate Professor, Ed.D., Indiana University, 1953
 Brod, Ernest E., Professor, D.Ed., Colorado State College of Education, 1953
 Fishco, Daniel T., Associate Professor, D.Ed., Lehigh University, 1966
 Hill, Margaret K., Professor, Ed.D., Boston University, 1948
 Hungerford, Harold R., Assistant Professor, Ph.D., Southern Illinois University, 1970
 Lamb, Morris L., Assistant Professor, D.Ed., University of Oklahoma, 1970
 Lee, J. Murray, Professor, Ph.D., Columbia University, 1934
 Lindberg, Dormalee H., Assistant Professor, Ed.D., University of Missouri, 1969
 Malone, Willis E., Professor, Ph.D., Ohio State University, 1950
 Matthias, William, Jr., Associate Professor, Ed.D., University of Illinois, 1964
 Paige, Donald D., Associate Professor, Ed.D., Indiana University, 1966
 Quisenberry, Nancy L., Assistant Professor, Ed.D., Indiana University, 1971
 Randolph, Victor, Professor, Ph.D., George Peabody College for Teachers, 1942
 Shepherd, Terry R., Assistant Professor, Ph.D., University of Illinois, 1971
 Sloan, Fred A., Professor, Ed.D., George Peabody College for Teachers, 1959
 Swick, Kevin, Assistant Professor, Ph.D., University of Connecticut, 1970
 Verduin, John R. Jr., Professor, Ph.D., Michigan State University, 1962

Engineering Mechanics and Materials (School of Engineering and Technology)

Al-Rubayi, Najim, Associate Professor, Ph.D., University of Wisconsin, 1966
 Davis, Philip K., *Chairman* and Professor, Ph.D., University of Michigan, 1963
 Evers, James L., Assistant Professor, Ph.D., University of Alabama, 1969
 Nowacki, C. Raymond, Associate Professor, Ph.D., University of Illinois, 1965
 Sami, Sedat, Professor, Ph.D., University of Iowa, 1966
 Orthwein, William C., Professor, Ph.D., University of Michigan, 1959

English (College of Liberal Arts)

Appleby, Bruce C., Associate Professor, Ph.D., University of Iowa, 1967
 Benziger, James G., Professor, Ph.D., Princeton University, 1941
 Botts, Roderic C., Assistant Professor, Ph.D., Northwestern University, 1970
 Boyle, Ted R., Professor, Ph.D., University of Nebraska, 1962
 Brown, William J., Assistant Professor, Ph.D., Duke University, 1966
 Cohn, Alan M., Professor, A.M., Washington University, 1950
 Donow, Herbert, Assistant Professor, Ph.D., University of Iowa, 1966
 Epstein, Edmund L., Professor, Ph.D., Columbia University, 1967
 Evans, William H., Professor, D.Ed., Florida State University, 1961
 Friend, Jewell A., Assistant Professor, Ph.D., Southern Illinois University, 1970
 Gardner, John C., Professor, Ph.D., University of Iowa, 1958
 Goodin, George, Associate Professor, Ph.D., University of Illinois, 1962
 Griffin, Robert P., Associate Professor, Ph.D., University of Connecticut, 1965
 Hatton, Thomas J., Associate Professor, Ph.D., University of Nebraska, 1966
 Hillegas, Mark, Professor, Ph.D., Columbia University, 1957
 Howell, John M., Associate Professor, Ph.D., Tulane University, 1963
 Hurley, Paul, Professor, Ph.D., Duke University, 1962
 Kvernes, David M., Assistant Professor, Ph.D., University of Minnesota, 1967
 Lawson, Richard A., Associate Professor, Ph.D., Tulane University, 1966
 Leonard, John J., Associate Professor, M.A., University of Iowa, 1941

Morrill, Paul H., Associate Professor, Ph.D., Northwestern University, 1956
 Moore, Harry T., Research Professor, Ph.D., Boston University, 1951
 Moss, Sidney P., Professor, Ph.D., University of Illinois, 1954
 Partlow, Robert B. Jr., Professor, Ph.D., Harvard University, 1955
 Peterson, Richard F., Assistant Professor, Ph.D., Kent State University, 1969
 Piper, Henry Dan, Professor, Ph.D., University of Pennsylvania, 1950
 Rainbow, Raymond S., Associate Professor, Ph.D., University of Chicago, 1959
 Raizis, Byron, Associate Professor, Ph.D., New York University, 1966
 Rudnick, Hans, Assistant Professor, Ph.D., University of Freiburg, Germany, 1967
 Schonhorn, Manuel, Associate Professor, Ph.D., University of Pennsylvania, 1963
 Schultz, Howard, Professor, Ph.D., Harvard University, 1940
 Simone, William E., *Chairman* and Professor, Ph.D., University of Pennsylvania, 1950
 Stibitz, Earle, Professor, Ph.D., University of Michigan, 1951
 Taylor, Larry E., Associate Professor, Ph.D., University of Oklahoma, 1969
 Tenney, Charles, University Professor, Ph.D., University of Oregon, 1931
 Vieth, David M., Professor, Ph.D., Yale University, 1953
 Webb, Howard W. Jr., Professor, Ph.D., University of Iowa, 1953

Family Economics and Management (College of Human Resources)

Brooks, Thomas M., Professor, Ph.D., Pennsylvania State University, 1961
 Craig, Karen E., *Chairman* and Assistant Professor, Ph.D., Purdue University, 1969

Finance (School of Business)

Elsaid, Hussein, Associate Professor, Ph.D., University of Illinois, 1968
 Sprecher, Ronald, Assistant Professor, Ph.D., University of Illinois, 1969
 Vaughn, Donald Earl, Professor, Ph.D., University of Texas, 1961
 Waters, Gola, Associate Professor, Ph.D., Southern Illinois University, 1970
 Winn, Edward L., *Chairman* and Professor, D.B.A., Indiana University, 1965

Food and Nutrition (College of Human Resources)

Harper, Jennie M., Professor, Ph.D., Cornell University, 1941
 Konishi, Frank, *Chairman* and Professor, Ph.D., Cornell University, 1958
 Payne, Irene A., Associate Professor, Ph.D., Cornell University, 1960
 Wolfe, Pohle, Associate Professor, A.M., University of Northern Colorado, 1964

Foreign Languages (College of Liberal Arts)

Anderson, Keith, Assistant Professor, Ph.D., University of Colorado, 1970
 Anderson, Vernon L., Associate Professor, Ph.D., Stanford University, 1954
 Bork, A. W., Professor, Doctor en Letras, National University of Mexico, 1944
 Canfield, D. Lincoln, Visiting Professor, Ph.D., Columbia University, 1934
 Chen, Ching-ho, Professor, Litt.D., Keio University, Tokyo, Japan, 1966
 French, Howard, Associate Professor, Ph.D., Indiana University, 1952
 Gobert, David L., Professor, Ph.D., University of Iowa, 1960
 Hartman, Steven Lee, Assistant Professor, Ph.D., University of Wisconsin, 1971
 Hartwig, Hellmut A., Professor, Ph.D., University of Illinois, 1943
 Hoach, Nguyen K., Professor, Doctorat Es Lettres, Sorbonne, Paris, France, 1955
 Kilker, James, Associate Professor, Ph.D., University of Missouri, 1961
 Kupcek, Joseph R., Professor, Ph.D., University of Bratislava, Czechoslovakia, 1943
 Liedloff, Helmut, Associate Professor, Ph.D., Philipps University, Germany, 1956
 McBride, Charles, Associate Professor, Ph.D., University of Texas, 1968
 Meinhardt, Warren L., Assistant Professor, Ph.D., University of California, Berkeley, 1960

O'Brien, Joan V., Assistant Professor, Ph.D., Fordham University, 1961
 O'Meara, Maurice, Assistant Professor, Ph.D., University of Iowa, 1967
 Orehwa, Olga, Assistant Professor, Ph.D., Ukrainian Free University, Germany, 1970
 Shankovsky, Igor, Assistant Professor, Ph.D., Ukrainian Free University, Germany, 1968
 Southworth, Marie-Jose, Assistant Professor, Ph.D., University of Pennsylvania, 1970
 Speck, Charles, Assistant Professor, Laurea in Diritto Canonico, Pontifical Lateran U., Italy, 1963
 Tai, James H-Y, Assistant Professor, Ph.D., Indiana University, 1970
 Timpe, Eugene, *Chairman* and Professor, Ph.D., University of Southern California, 1960
 Ulner, Arnold R., Assistant Professor, Ph.D., University of Missouri, 1972
 Vogely, Maxine, Assistant Professor, Ph.D., University of Illinois, 1969
 Woodbridge, Hensley C., Professor, M.S.L.S., University of Illinois, 1951

Forestry (School of Agriculture)

Andresen, John W., Professor, Ph.D., Rutgers University, 1959
 Bey, Calvin F., Adjunct Assistant Professor, Ph.D., Iowa State University, 1970
 Budelsky, Carl A., Assistant Professor, Ph.D., University of Arizona, 1969
 Chapman, Arthur G., Adjunct Professor, Ph.D., Ohio State University, 1933
 Chen, Peter, Adjunct Assistant Professor, Ph.D., University of Minnesota, 1968
 Chilman, Kenneth C., Associate Professor, Ph.D., University of Michigan, 1972
 Ferrell, Raymond S., Assistant Professor, Ph.D., Iowa State University, 1970
 Fralish, James S., Assistant Professor, Ph.D., University of Wisconsin, 1970
 Funk, David, Adjunct Assistant Professor, Ph.D., Michigan State University, 1971
 Hatch, Charles R., Assistant Professor, Ph.D., University of Wisconsin, 1971
 Losche, Craig K., Adjunct Associate Professor, Ph.D., North Carolina State University, 1967
 McCurdy, Dwight R., Associate Professor, Ph.D., Ohio State University, 1964
 Moslemi, Ali A., *Acting Chairman* and Associate Professor, Ph.D., Michigan State University, 1964
 Phares, Robert, Adjunct Associate Professor, Ph.D., Iowa State University, 1964
 Rosen, Howard N., Adjunct Assistant Professor, Ph.D., Northwestern University, 1969
 Roth, Paul L., Assistant Professor, Ph.D., Kansas State University, 1968
 Weaver, George T., Assistant Professor, Ph.D., University of Tennessee, 1972
 Yambert, Paul A., Professor, Ph.D., University of Michigan, 1961

Geography (College of Liberal Arts)

Arey, David G., Associate Professor, Ph.D., Clark University, 1969
 Baumann, Duane D., Associate Professor, Ph.D., Clark University, 1968
 Beazley, Ronald I., Professor, Ph.D., Purdue University, 1954
 Carter, Douglas B., *Chairman* and Professor, Ph.D., University of Washington, 1957
 Christensen, David E., Professor, Ph.D., University of Chicago, 1956
 Irwin, Daniel R., Assistant Professor, Ph.D., Syracuse University, 1972
 Jones, David L., Professor, Ph.D., Pennsylvania State University, 1960
 Pennington, Campbell, Professor, Ph.D., University of California, Berkeley, 1959
 Sharpe, David M., Associate Professor, Ph.D., Southern Illinois University, 1968
 Thomas, Frank, Professor, Ph.D., Northwestern University, 1960

Geology (College of Science)

Cohen, Arthur, Assistant Professor, Ph.D., Pennsylvania State University, 1968
 Davis, Richard, Assistant Professor, Ph.D., University of Arizona, 1967
 Dutcher, Russell, *Chairman* and Professor, Ph.D., Pennsylvania State University, 1960
 Ethridge, Frank, Assistant Professor, Ph.D., Texas A. & M. University, 1970
 Fang, Jen-Ho, Professor, Ph.D., Pennsylvania State University, 1961

Frauenfelder, George, Associate Professor, Ph.D., University of Missouri, 1964
 Harris, Stanley E. Jr., Professor, Ph.D., University of Iowa, 1947
 Hood, William C., Associate Professor, Ph.D., Montana State University, 1964
 Ritter, Dale F., Professor, Ph.D., Princeton University, 1964
 Robinson, Paul D., Instructor, M.S., Southern Illinois University, 1963
 Utgaard, John E., Associate Professor, Ph.D., Indiana University, 1963

Government (College of Liberal Arts)

Alexander, Orville, Professor, Ph.D., University of Iowa, 1936
 Baker, John H., Associate Professor, Ph.D., Princeton University, 1961
 Chou, Ikua, Professor, Ph.D., Fletcher School of Law and Diplomacy, 1949
 Dale, Richard, Associate Professor, Ph.D., Princeton University, 1962
 Dreher, Robert, Associate Professor, LL.B., University of Illinois, 1940
 Derge, David R., Professor, Ph.D., Northwestern University, 1955
 Everson, David, Assistant Professor, Ph.D., Indiana University, 1969
 Garner, William, Associate Professor, Ph.D., Tulane University, 1963
 Goodsell, Charles T., Professor, Ph.D., Harvard University, 1961
 Hanson, Earl, Professor, Ph.D., University of Illinois, 1948
 Hardenberg, William S., Associate Professor, Ph.D., University of Illinois, 1954
 Jackson, John S. III, Assistant Professor, Ph.D., Vanderbilt University, 1971
 Jacobini, Horace B., Professor, Ph.D., University of Kansas, 1951
 Kamarasy, Egon K., Assistant Professor, Doctor Politices, Budapest University, Hungary, 1942
 Kenney, David, Professor, Ph.D., University of Illinois, 1952
 Klingberg, Frank L., Professor, Ph.D., University of Chicago, 1938
 Landecker, Manfred, Associate Professor, Ph.D., Johns Hopkins University, 1965
 Long, Samuel, Assistant Professor, B.S., University of Illinois, 1950
 Mace, George R., Associate Professor, Ph.D., Claremont Graduate School, 1963
 Miller, Roy E., Assistant Professor, Ph.D., University of Illinois, 1971
 McGrath, Robert A., Professor, Ph.D., University of Iowa, 1947
 Morris, Milton, Assistant Professor, Ph.D., University of Maryland, 1970
 Morton, Ward M., Professor, Ph.D., University of Texas, 1941
 Nelson, Randall H., *Chairman* and Professor, Ph.D., University of Michigan, 1956
 Paine, Joann, Associate Professor, Ph.D., University of Oregon, 1967
 Ridgeway, Marion, Professor, Ph.D., University of Illinois, 1952
 Sappenfield, Max W., Professor, Ph.D., University of Illinois, 1935
 Shade, William, Assistant Professor, Ph.D., University of Florida, 1971
 Stauber, Leland G., Associate Professor, Ph.D., Harvard University, 1964
 Turner, Max W., Professor, Ph.D., University of Iowa, 1947
 VanDerSlik, Jack R., Associate Professor, Ph.D., Michigan State University, 1967
 Wasby, Stephen L., Associate Professor, Ph.D., University of Oregon, 1962

Guidance and Educational Psychology (College of Education)

Altekruse, Michael K., Associate Professor, Ed.D., Indiana University, 1967
 Amble, Bruce R., Associate Professor, Ph.D., University of Iowa, 1963
 Beggs, Donald L., Professor, Ph.D., University of Iowa, 1966
 Bradley, Richard, Associate Professor, Ph.D., University of Wisconsin, 1968
 Cody, John J., *Chairman* and Professor, Ph.D., University of Wisconsin, 1961
 Deichmann, John, Assistant Professor, Ph.D., St. Louis University, 1969
 DeWeese, Harold, Professor, D.Ed., University of Illinois, 1959
 Elmore, Patricia B., Assistant Professor, Ph.D., Southern Illinois University, 1970
 Evans, John R., Assistant Professor, Ph.D., Southern Illinois University, 1968
 Graff, Robert W., Associate Professor, Ed.D., State University of New York at Buffalo, 1968
 Grenfell, John E., Professor, Ed.D., Oregon State University, 1966
 Kelly, Francis J., Professor, Ph.D., University of Notre Dame, 1963
 Lewis, Ernest, Assistant Professor, Ph.D., Southern Illinois University, 1971
 Lindsey, Jefferson F., Jr., Professor, Ed.D., University of Texas, 1962
 McNeil, Keith Alan, Associate Professor, Ph.D., University of Texas, 1967
 Meek, Clinton R., Professor, Ph.D., George Peabody College for Teachers, 1954

Miles, David, Assistant Professor, Ph.D., Southern Illinois University, 1967
 Miller, William G., Associate Professor, Ph.D., University of Iowa, 1967
 Mouw, John T., Associate Professor, Ed.D., University of South Dakota, 1968
 Rector, Alice, Associate Professor, Ed.D., Washington University, 1953
 Renzaglia, Guy A., Professor, Ph.D., University of Minnesota, 1952
 Tyler, Thomas A., Associate Professor, Ph.D., University of Chicago, 1968
 White, Gordon W., Assistant Professor, Ph.D., University of Iowa, 1969
 Williams, Reed G., Assistant Professor, Ph.D., Indiana University, 1970
 Yates, J. W., Professor, Ed.D., University of Missouri, 1951

Health Education (College of Education)

Aaron, James E., Associate Professor, Ed.D., New York University, 1960
 Amadio, John B., Assistant Professor, Ph.D., University of Oklahoma, 1970
 Boydston, Donald N., *Chairman* and Professor, D.Ed., Columbia University, 1949
 Casey, Leslie R., Associate Professor, Ed.D., Columbia University, 1956
 Grissom, Deward, Professor, D.Ed., Columbia University, 1952
 Harris, Eileen, Assistant Professor, Ph.D., Southern Illinois University, 1970
 LeFevre, John R., Professor, D.Ed., Columbia University, 1950
 Richardson, Charles E., Professor, Ed.D., University of California, Los Angeles, 1959
 Ritzel, Dale O., Assistant Professor, Ph.D., Southern Illinois University, 1970
 Russell, Robert D., Professor, Ed.D., Stanford University, 1954
 Smith, Donald L., Assistant Professor, Ph.D., Michigan State University, 1971
 Vaughan, Andrew T., Professor, D.Ed., Columbia University, 1958
 Vincent, Raymond J., Associate Professor, Ph.D., Southern Illinois University, 1968

Higher Education (College of Education)

Caldwell, Oliver J., Professor, A.M., Oberlin College, 1927
 Casebeer, Arthur, Associate Professor, Ed.D., Oregon State University, 1963
 Clark, Elmer J., Professor, Ph.D., University of Michigan, 1949
 Davis, I. Clark, Professor, Ed.D., Indiana University, 1956
 Graham, Jack W., Professor, Ph.D., Purdue University, 1965
 Hawley, John, Professor, Ph.D., University of Michigan, 1957
 Jung, Loren B., Associate Professor, Ph.D., Southern Illinois University, 1969
 Keene, Roland, Associate Professor, Ed.D., Washington University, 1962
 King, John, *Chairman* and Professor, Ph.D., Cornell University, 1941
 Swinburne, Bruce, Assistant Professor, Ed.D., Indiana University, 1970
 Tolle, Donald J., Professor, D.Ed., Florida State University, 1957
 Zimmerman, Elwyn, Assistant Professor, Ph.D., Michigan State University, 1963

History (College of Liberal Arts)

Adams, George W., Professor, Ph.D., Harvard University, 1946
 Allen, Howard, Associate Professor, Ph.D., University of Washington, 1959
 Ammon, Harry, Professor, Ph.D., University of Virginia, 1948
 Barton, H. Arnold, Associate Professor, Ph.D., Princeton University, 1962
 Batinski, Michael, Assistant Professor, Ph.D., Northwestern University, 1969
 Brehm, Donald L., Assistant Professor, Ph.D., St. Louis University, 1968
 Carrott, M. Browning, *Chairman* and Associate Professor, Ph.D., Northwestern University, 1966
 Cherry, George L., Professor, Ph.D., Northwestern University, 1938
 Clifford, John, Associate Professor, Ph.D., University of Iowa, 1954
 Conrad, David E., Associate Professor, Ph.D., University of Oklahoma, 1962
 Detwiler, Donald, Associate Professor, Ph.D., Göttingen University, Germany, 1961
 Dotson, John E., Assistant Professor, Ph.D., Johns Hopkins University, 1969
 Fladeland, Betty, Professor, Ph.D., University of Michigan, 1952
 Gardiner, C. Harvey, Research Professor, Ph.D., University of Michigan, 1945
 Gold, Robert, Associate Professor, Ph.D., University of Iowa, 1964
 McFarlin, Harold, Assistant Professor, Ph.D., Indiana University, 1971

Murphy, James B., Assistant Professor, Ph.D., Louisiana State University and A. & M. College, 1968
 O'Day, Edward, Instructor, A.M., Indiana University, 1956
 Shelby, Lonnie R., Professor, Ph.D., University of North Carolina, 1962
 Simon, John Y., Professor, Ph.D., Harvard University, 1961
 Trani, Eugene P., Associate Professor, Ph.D., Indiana University, 1966
 Vyverberg, Henry S., Associate Professor, Ph.D., Harvard University, 1950
 Werlich, David P., Assistant Professor, Ph.D., University of Minnesota, 1968
 Wu, Tien-Wei, Associate Professor, Ph.D., University of Maryland, 1964
 Zucker, Stanley, Assistant Professor, Ph.D., University of Wisconsin, 1968

Home Economics Education (College of Education)

Carter, Rose Mary, Assistant Professor, Ph.D., Purdue University, 1970
 Eddleman, Edna Jacqueline, Assistant Professor, Ph.D., Southern Illinois University, 1970
 Fults, Anna Carol, *Chairman* and Professor, Ph.D., Ohio State University, 1946
 Keenan, Dorothy, Professor, D.Ed., University of Illinois, 1962

Instructional Materials (College of Education)

Bauner, Ruth, Associate Professor, M.S., University of Illinois, 1956
 Butts, Gordon K., *Chairman* and Professor, Ed.D., Indiana University, 1956
 Dale, Doris, Assistant Professor, D.L.S., Columbia University, 1968
 Fletcher, Kathleen, Associate Professor, M.S., University of Illinois, 1947
 Ingli, Donald A., Associate Professor, Ph.D., University of Wisconsin, 1961
 Jurgemeyer, Frederick, Assistant Professor, D.Ed., University of Oklahoma, 1970
 Charles Klasek, Assistant Professor, Ph.D., University of Nebraska, 1971
 Spigle, Irving, Associate Professor, Ed.D., Indiana University, 1955
 Planinc, Carl, Assistant Professor, Ed.D., Indiana University, 1967
 Wendt, Paul R., Professor, Ph.D., University of Minnesota, 1948
 Winsor, Donald, Associate Professor, Ed.D., University of Florida, 1961

Interior Design (College of Human Resources)

Lougeay, Paul, *Chairman* and Associate Professor, B.S., University of Illinois, 1950
 Stewart, Lucy, Assistant Professor, M.S., Southern Illinois University, 1964

Journalism (College of Communications and Fine Arts)

Atwood, Erwin, Associate Professor, Ph.D., Johns Hopkins University, 1965
 Brown, George C., Associate Professor, Ph.D., Southern Illinois University, 1963
 Chu, Godwin, Professor, Ph.D., Stanford University, 1964
 Ford, James L. C., Professor, Ph.D., University of Minnesota, 1948
 Grotta, Gerald, Associate Professor, Ph.D., Southern Illinois University, 1970
 Gruny, C. Richard, Assistant Professor, L.L.B., University of Illinois, 1959
 Hart, Jim A., Professor, Ph.D., University of Missouri, 1959
 Lawhorne, Clifton O., Associate Professor, Ph.D., Southern Illinois University, 1968
 Long, Howard R., Professor, Ph.D., University of Missouri, 1948
 Lowry, Dennis T., Assistant Professor, Ph.D., University of Iowa, 1972
 McCoy, Ralph, Professor, Ph.D., University of Illinois, 1956
 Rice, W. Manion, Associate Professor, Ph.D., Southern Illinois University, 1967
 Rimerman, Marvin, Assistant Professor, D.S.Sc., Syracuse University, 1965
 Rucker, Bryce, *Director* and Professor, Ph.D., University of Missouri, 1959
 Stonecipher, Harry, Assistant Professor, Ph.D., Southern Illinois University, 1971
 Van Turbergen, G. Norman, Assistant Professor, Ph.D., University of Iowa, 1968

Linguistics (College of Liberal Arts)

Carrell, Patricia, Associate Professor, Ph.D., University of Texas, 1968

Gilbert, Glenn G., Associate Professor, Ph.D., Harvard University, 1963
 Hoa, Nguyen Dinh, Professor, Ph.D., New York University, 1956
 Katranides, Aristotle, Assistant Professor, Ph.D., Indiana University, 1965
 Parish, Charles, Professor, Ph.D., University of New Mexico, 1965
 Redden, James, *Chairman* and Professor, Ph.D., Indiana University, 1965

Marketing (School of Business)

Adams, Kendall, Professor, Ph.D., Michigan State University, 1962
 Andersen, R. Clifton, Professor, D.B.A., Indiana University, 1960
 Dommermuth, William, *Chairman* and Professor, Ph.D., Northwestern University, 1964
 Hindersman, Charles H., Professor, D.B.A., Indiana University, 1959
 James, Donald, Assistant Professor, D.B.A., University of Colorado, 1970
 Moore, James R., Assistant Professor, Ph.D., University of Illinois, 1972
 Perry, Donald, Associate Professor, Ph.D., University of Illinois, 1966
 Powell, Andrew, Associate Professor, Ph.D., University of Michigan, 1968

Mathematics (College of Liberal Arts)

Artemiadis, Nicholas, Professor, Docteur ès Sciences, University of Paris, France, 1957
 Baartmans, Alphonso, Assistant Professor, Ph.D., Michigan State University, 1967
 Biesterfeldt, Herman, Associate Professor, Ph.D., Pennsylvania State University, 1963
 Bouwsma, Ward D., Associate Professor, Ph.D., University of Michigan, 1962
 Burton, Theodore, Professor, Ph.D., Washington State University, 1964
 Crenshaw, James, Assistant Professor, Ph.D., University of Illinois, 1967
 Danhof, Kenneth, Assistant Professor, Ph.D., Purdue University, 1969
 Foland, Neal E., *Chairman* and Professor, Ph.D., University of Missouri, 1961
 Gates, Leslie D., Associate Professor, Ph.D., Iowa State University, 1952
 Gregory, John, Assistant Professor, Ph.D., University of California, Los Angeles, 1969
 Grimmer, Ronald, Associate Professor, Ph.D., University of Iowa, 1967
 Hooker, John, Assistant Professor, Ph.D., University of Oklahoma, 1967
 Hunsaker, Worthen, Assistant Professor, Ph.D., Washington State University, 1966
 Kammler, David, Assistant Professor, Ph.D., University of Michigan, 1971
 Kirk, Ronald, Assistant Professor, Ph.D., California Institute of Technology, 1968
 Koch, Charles F., Assistant Professor, Ph.D., University of Illinois, 1961
 Kuipers, Lauwerens, Professor, D.Sc., Free University, Amsterdam, the Netherlands, 1947
 Langenhop, Carl E., Professor, Ph.D., Iowa State University, 1948
 Maxwell, Charles N., Professor, Ph.D., University of Illinois, 1955
 Millman, Richard, Assistant Professor, Ph.D., Cornell University, 1971
 Moore, Robert A., Associate Professor, Ph.D., Indiana University, 1962
 Nathanson, Melvyn, Assistant Professor, Ph.D., University of Rochester, 1971
 Niederreiter, Harald, Associate Professor, Ph.D., University of Vienna, Austria, 1969
 Olmsted, John M. H., Professor, Ph.D., Princeton University, 1940
 Paine, Thomas, Assistant Professor, Ph.D., University of Oregon, 1966
 Panchapakansan, Sub, Assistant Professor, Ph.D., Purdue University, 1969
 Parker, George, Assistant Professor, Ph.D., University of California, San Diego, 1971
 Patula, William, Assistant Professor, Ph.D., Carnegie-Mellon University, 1971
 Pedersen, Franklin, Assistant Professor, Ph.D., Tulane University, 1967
 Pedersen, Katherine, Assistant Professor, Ph.D., Tulane University, 1969
 Seldin, Jonathan, Assistant Professor, D.Math, University of Amsterdam, The Netherlands, 1968
 Shock, Robert C., Assistant Professor, Ph.D., University of North Carolina, 1969
 Skalsky, Michael, Professor, Doctor of Natural Sciences, University of Göttingen, Germany, 1949
 Snyder, Herbert H., Professor, Ph.D., Lehigh University, 1965

Starks, Thomas H., Associate Professor, Ph.D., Virginia Polytechnic Institute, 1959
 Townsend, Carl G., Associate Professor, Ph.D., Washington State University, 1965
 Wilson, Joseph C., Professor, Ph.D., Louisiana State University, 1954
 Wong, Chi Song, Assistant Professor, Ph.D., University of Illinois, 1969

Microbiology (College of Science)

Gilmore, Richard, Assistant Professor, Ph.D., University of California, Berkeley, 1966
 Lindegren, Carl C., Emeritus, Professor, Ph.D., California Institute of Technology, 1931
 McLary, Dan O., Assistant Professor, Ph.D., Washington University, St. Louis, Mo.
 Ogur, Maurice, *Chairman* and Professor, Ph.D., Columbia University, 1948
 Rouhandeh, Hassan, Professor, Ph.D., Kansas State University, 1959
 Schechmeister, Isaac L., Associate Professor, Ph.D., University of California, Berkeley, 1949

Molecular Science (Graduate School)

Amoros, J. L., Professor, Ph.D., University of Madrid, Spain, 1945
 Beers, B. L., Assistant Professor, Ph.D., University of Maryland, 1970
 Borst, W. L., Assistant Professor, Ph.D., University of California, Berkeley, 1968
 Carrell, J. C., Assistant Professor, Ph.D., University of Texas, 1968
 Chang-Fang, C. C., Assistant Professor, Ph.D., Duke University, 1961
 Chen, J. W., Professor, Ph.D., University of Illinois, 1959
 Cutnell, J. D., Assistant Professor, Ph.D., University of Wisconsin, 1967
 Davis, P. K., Professor, Ph.D., University of Michigan, 1963
 Davis, R. W., Assistant Professor, Ph.D., University of Arizona, 1967
 Dunagan, T. T., Professor, Ph.D., Purdue University, 1960
 Fang, J. H., Professor, Ph.D., Pennsylvania State University, 1961
 Feiste, V. K., Associate Professor, Ph.D., University of Missouri, 1966
 Foglio, M. E., Associate Professor, Ph.D., University of Bristol, England, 1962
 Grismore, F. L., Associate Professor, Ph.D., Georgia Institute of Technology, 1970
 Gruber, B. J., Professor, Ph.D., University of Vienna, Austria, 1962
 Haas, H. J., Professor, Ph.D., University of Göttingen, Germany, 1954
 Hadler, H. I., Associate Professor, Ph.D., University of Wisconsin, 1952
 Henneberger, W. C., Professor, Ph.D., University of Göttingen, Germany, 1959
 Hinckley, C. C., Associate Professor, Ph.D., University of Texas, 1964
 Huang, H. W., Assistant Professor, Ph.D., Cornell University, 1967
 Johnson, K. W., Assistant Professor, Ph.D., Ohio State University, 1967
 Lauchner, J. W., Professor, Ph.D., University of Illinois, 1956
 Marshall, L. C., Professor, Ph.D., University of California, Berkeley, 1929
 Meyers, C. Y., Professor, Ph.D., University of Illinois, 1951
 Musulin, B., Professor, Ph.D., Northwestern University, 1954
 Nickle, H. H., Associate Professor, Ph.D., Columbia University, 1956
 Pearson, E. F., Assistant Professor, Ph.D., Duke University, 1968
 Richardson, A. W., Professor, Ph.D., University of Iowa, 1949
 Sami, Sedat, Professor, Ph.D., University of Iowa, 1966
 Sanders, F. C. Jr., Assistant Professor, Ph.D., University of Texas, 1968
 Saporoschenko, M., Associate Professor, Ph.D., Washington University, 1958
 Schlecht, R. G., Associate Professor, Ph.D., University of California, Berkeley, 1964
 Smith, G. V., Associate Professor, Ph.D., University of Arkansas, 1959
 Smith, J. G., Professor, Ph.D., University of Missouri (Rolla), 1967
 Snyder, H. H., Professor, Ph.D., Lehigh University, 1965
 Utgaard, J. E., Associate Professor, Ph.D., Indiana University, 1963
 Watson, R. E., Professor, Ph.D., University of Illinois, 1932
 Zimmerman, J. R., Professor, Ph.D., Ohio State University, 1949
 Zitter, R. N., Professor, Ph.D., University of Chicago, 1962

Music (College of Communications and Fine Arts)

- Barwick, Steven, Professor, Ph.D., Harvard University, 1949
 Bateman, Marianne Webb, Associate Professor, M.M., University of Michigan, 1959
 Boe, John M., Associate Professor, Ph.D., Northwestern University, 1969
 Bottje, Will Gay, Professor, A.Mus.D., Eastman School of Music, University of Rochester, 1955
 Eddins, John, Assistant Professor, Ph.D., Florida State University, 1966
 Floyd, Samuel A. Jr., Assistant Professor, Ph.D., Southern Illinois University, 1969
 Gordon, Roderick, Professor, Ph.D., University of Wisconsin, 1953
 Grizzel, Mary Jane, Assistant Professor, M.M., Eastman School of Music, University of Rochester, 1943
 Hartline, Elizabeth, Assistant Professor, M.M., Northwestern University, 1936
 House, Robert, *Director* and Professor, Ed.D., University of Illinois, 1954
 Hussey, George, Associate Professor, M.A.Ed., Washington University, 1963
 Intravaia, Lawrence, Associate Professor, D.M.A., Boston University, 1962
 Kageff, Burt, Assistant Professor, A.M., University of Missouri, 1962
 Kingsbury, Robert, Associate Professor, M.M., Northwestern University, 1952
 Koenigstein, Nick, Assistant Professor, M.M., West Virginia University, 1956
 Lawrence, Marjorie, Professor
 McHugh, Catherine, Professor, Ed.D., Columbia University, 1959
 Mueller, Robert, Professor, Ph.D., Indiana University, 1954
 Nadaf, George, Assistant Professor, M.M., Manhattan School of Music
 Oldfield, W. Alan, Assistant Professor, Ph.D., North Texas State University, 1969
 Olsson, Phillip, Professor, M.M., Chicago Conservatory, 1949
 Poulos, Helen, Assistant Professor, D.Mus., Indiana University, 1971
 Resnick, Robert, Associate Professor, M.M., University of Wichita, 1949
 Siener, Melvin, Associate Professor, M.A., University of Iowa, 1954
 Stiman, Harold, Assistant Professor, M.S., University of Illinois, 1957
 Stiman, Gene, Assistant Professor, M.S.M.E., University of Illinois, 1957
 Strawn, Richard, Assistant Professor, M.Mus., Indiana University, 1961
 Stroud, James, Assistant Professor, M.M., Hartt College of Music, 1963
 Taylor, Charles, Associate Professor, D.Ed., Columbia University, 1950
 Underwood, Jervis, Associate Professor, Ph.D., North Texas State University, 1970
 Wallace, Mary E., Associate Professor, M.S., University of Illinois, 1954
 Werner, Kent, Associate Professor, Ph.D., University of Iowa, 1966

Occupational Education (College of Education)

- Bailey, Larry J., Associate Professor, Ed.D., University of Illinois, 1968
 Bittle, R. E., Professor, M.Ed., Mississippi Southern College, 1954
 Bortz, Richard F., Associate Professor, Ph.D., University of Minnesota, 1967
 Erickson, John H., Professor, D.Ed., Pennsylvania State University, 1953
 Jenkins, James, Associate Professor, D.Ed., Pennsylvania State University, 1955
 Nystrom, Dennis, Assistant Professor, Ed.D., Texas A. & M. University, 1969
 Ramp, Wayne S., Professor, Ed.D., Bradley University, 1956
 Rosenbarger, Maxine, Associate Professor, Southern Illinois University, 1970
 Stadt, Ronald W., *Chairman* and Professor, Ed.D., University of Illinois, 1962
 Sullivan, James A., Associate Professor, Ed.D., West Virginia University, 1967
 Weisman, Lawrence, Assistant Professor, Ph.D., Florida State University, 1972

Philosophy (College of Liberal Arts)

- Audi, Michael N., Assistant Professor, Ph.D., Johns Hopkins University, 1970
 Clarke, David S. Jr., Associate Professor, Ph.D., Emory University, 1964
 Diefenbeck, James A., Professor, Ph.D., Harvard University, 1950
 Eames, Elizabeth, Professor, Ph.D., Bryn Mawr College, 1951
 Eames, S. Morris, Professor, Ph.D., University of Chicago, 1958
 Frondizi, Risieri, Professor, Ph.D., National University of Mexico, 1950

Gillan, Garth, Associate Professor, Ph.D., Duquesne University, 1966
 Hahn, Lewis E., Professor, Ph.D., University of California, Berkeley, 1939
 Hayward, John, Professor, Ph.D., University of Chicago, 1949
 Howie, John, Associate Professor, Ph.D., Boston University, 1965
 Kelly, Matthew J., Associate Professor, Ph.D., University of Notre Dame, 1963
 Leys, Wayne A. R., Professor, Ph.D., University of Chicago, 1930
 Liu, Shu-Hsien, Associate Professor, Ph.D., Southern Illinois University, 1966
 McClure, George T., Professor, Ph.D., Ohio State University, 1958
 Mijuskovic, Ben, Assistant Professor, Ph.D., University of California, San Diego, 1972
 Moore, Willis, Professor, Ph.D., University of California, Berkeley, 1936
 Plochmann, George K., Professor, Ph.D., University of Chicago, 1950
 Schilpp, Paul, Visiting Professor, Ph.D., Stanford University, 1936
 Tenney, Charles D., University Professor, Ph.D., University of Oregon, 1931

Physical Education for Men (College of Education)

Ackerman, Kenneth, Assistant Professor, M.A., Michigan State University, 1959
 Carroll, Peter, Assistant Professor, Ph.D., Pennsylvania State University, 1970
 Good, Larry, Associate Professor, Ed.D., Temple University, 1968
 Franklin, C. C., Assistant Professor, M.S.Ed., Indiana University, 1946
 Knowlton, Ronald G., Associate Professor, Ph.D., University of Illinois, 1961
 Shea, Edward J., *Chairman* and Professor, Ph.D., New York University, 1955
 Wilkinson, James J., Associate Professor, D.P.Ed., Indiana University, 1958

Physical Education for Women (College of Education)

Davies, Dorothy, Professor, Ed.D., University of Cincinnati, 1944
 Gordon, Lonny J., Assistant Professor, M.F.A., University of Wisconsin, 1967
 Potter, Marjorie Bond, Associate Professor, Ph.D., University of Southern California, 1958
 Thorpe, Joanne, *Chairman* and Professor, Ph.D., Texas Woman's University, 1964
 West, Charlotte, Associate Professor, Ph.D., University of Wisconsin, 1969
 Zimmerman, Helen, Professor, Ph.D., University of Wisconsin, 1951

Physics (College of Science)

Beers, Brian L., Assistant Professor, Ph.D., University of Maryland, 1970
 Borst, Walter L., Assistant Professor, Ph.D., University of California, 1968
 Bose, Subir K., Associate Professor, Ph.D., University of Allahabad, India, 1967
 Carrell, Craig, Assistant Professor, Ph.D., University of Texas, 1968
 Chang-Fang, C. C., Assistant Professor, Ph.D., Duke University, 1961
 Cutnell, John D., Assistant Professor, Ph.D., University of Wisconsin, 1967
 Foglio, Mario E., Associate Professor, Ph.D., University of Bristol, England, 1962
 Gruber, Bruno J., Professor, Ph.D., University of Vienna, Austria, 1962
 Henneberger, Walter G., Professor, Ph.D., Göttingen University, Germany, 1959
 Huang, Huey W., Assistant Professor, Ph.D., Cornell University, 1967
 Johnson, Kenneth W., Assistant Professor, Ph.D., Ohio State University, 1967
 Marshall, Lauriston C., Professor, Ph.D., University of California, Berkeley, 1929
 Nickell, William E., Professor, Ph.D., University of Iowa, 1954
 Nickle, Harry H., Associate Professor, Ph.D., Columbia University, 1960
 Pearson, Edwin F., Assistant Professor, Ph.D., Duke University, 1968
 Sanders, Frank C., Jr., Assistant Professor, Ph.D., University of Texas, 1968
 Saporoschenko, Mykola, Associate Professor, Ph.D., Washington University, 1958
 Schlecht, Richard G., Associate Professor, Ph.D., University of California, Berkeley, 1964
 Watson, Richard E., Professor, Ph.D., University of Illinois, 1938
 Zimmerman, John R., *Chairman* and Professor, Ph.D., Ohio State University, 1949
 Zitter, Robert N., Professor, Ph.D., University of Chicago, 1962

Physiology (College of Science)

Dunagan, Tom T., Professor, Ph.D., Purdue University, 1960
Foote, Florence M., Professor, Ph.D., University of Iowa, 1940
Gass, George H., Professor, Ph.D., Ohio State University, 1955
Kaplan, Harold, Professor, Ph.D., Harvard University, 1933
Miller, Donald M., Associate Professor, Ph.D., University of Illinois, 1965
Richardson, Alfred W., Professor, Ph.D., University of Iowa, 1949
Stacy, Ralph W., *Chairman* and Professor, Ph.D., Ohio State University, 1948
Timmons, Edward, Associate Professor, D.V.M., University of Georgia, 1963
Warner, Alexander, Assistant Professor, Ph.D., Kent State University, 1970

Plant Industries (School of Agriculture)

Blake, Roland C., Adjunct Professor, Ph.D., University of Minnesota, 1954
Coorts, Gerald D., *Chairman* and Professor, Ph.D., University of Illinois, 1964
Elkins, Donald M., Associate Professor, Ph.D., Auburn University, 1967
Hillyer, Irvin G., Professor, Ph.D., Michigan State University, 1956
Hull, J. W., Adjunct Professor, Ph.D., University of Maryland, 1957
Jones, Joe H., Associate Professor, Ph.D., Ohio State University, 1960
Kapusta, George, Instructor, M.S., University of Minnesota, 1957
Leasure, J. K., Professor, Ph.D., University of Illinois, 1953
Mowry, James B., Professor, Ph.D., Rutgers University, 1951
Myers, Oval, Associate Professor, Ph.D., Cornell University, 1963
Nemec, Stanley, Adjunct Assistant Professor, Ph.D., Oregon State University, 1967
Olsen, Farrel J., Associate Professor, Ph.D., Rutgers University, 1961
Portz, Herbert L., Professor, Ph.D., University of Illinois, 1954
Sachell, Donald P., Lecturer, Ph.D., North Carolina State University, 1951
Stucky, Donald J., Assistant Professor, Ph.D., Purdue University, 1963
Tweedy, James A., Associate Professor, Ph.D., Michigan State University, 1966
Varsa, Edward C., Assistant Professor, Ph.D., Michigan State University, 1970

Psychology (College of Liberal Arts)

Bekker, L. DeMoyné, Assistant Professor, Ph.D., Ohio State University, 1968
Buck, Terence, Associate Professor, Ph.D., University of Missouri, 1968
Brutten, Gene J., Professor, Ph.D., University of Illinois, 1957
Carrier, Neil A., Professor, Ph.D., University of Michigan, 1956
Depue, Richard A., Assistant Professor, Ph.D., University of Oklahoma, 1971
Donnerstein, Edward, Assistant Professor, Ph.D., Florida State University, 1972
Ehrenfreund, David, *Chairman* and Professor, Ph.D., University of Iowa, 1947
Harren, Vincent A., Associate Professor, Ph.D., University of Texas, 1964
Irwin, Donald A., Assistant Professor, Ph.D., University of Iowa, 1968
Levitt, Robert A., Associate Professor, Ph.D., University of Florida, 1965
Lit, Alfred, Professor, Ph.D., Columbia University, 1948
McHose, James H., Professor, Ph.D., University of Iowa, 1961
McNeel, Steven, Assistant Professor, Ph.D., University of California, Santa Barbara, 1969
Meltzer, Donald, Associate Professor, Ph.D., University of Pittsburgh, 1963
Mitchell, Thomas O., Assistant Professor, Ph.D., University of Colorado, 1969
Molfese, Dennis, Assistant Professor, Ph.D., Pennsylvania State University, 1972
O'Donnell, James P., Associate Professor, Ph.D., University of Pittsburgh, 1965
Pitz, Gordon, Professor, Ph.D., Carnegie Institute of Technology, 1963
Purcell, Thomas D., Associate Professor, Ph.D., Southern Illinois University, 1965
Rader, Gordon, Associate Professor, Ph.D., Yale University, 1956
Radtke, Robert C., Associate Professor, Ph.D., University of Iowa, 1963
Rafferty, Janet, Professor, Ph.D., Ohio State University, 1952
Rimm, David C., Associate Professor, Ph.D., Stanford University, 1965
Ringuette, Eugene, Associate Professor, Ph.D., Purdue University, 1963

Schill, Thomas R., Professor, Ph.D., Oklahoma State University, 1963
Schmeck, Ronald R., Associate Professor, Ph.D., Ohio University, 1969
Shoemaker, Donald J., Professor, Ph.D., Ohio State University, 1965
Snyder, John, Associate Professor, Ph.D., Loyola University, 1965
Somervill, John, Assistant Professor, Ph.D., University of Arkansas, 1970
Westberg, William C., Professor, Ph.D., Pennsylvania State University, 1948

Radio-Television (College of Communications and Fine Arts)

Dybvig, Homer E., Associate Professor, Ph.D., Southern Illinois University, 1970
Hildreth, Richard, Instructor, M.S., Syracuse University, 1968
Kurtz, John L., Assistant Professor, M.S., Southern Illinois University, 1967
Lynch, Charles T., Assistant Professor, Ph.D., Southern Illinois University, 1972
Norwood, Donald, Assistant Professor, A.M., West Virginia University, 1966
Olson, Thomas O., Associate Professor, Ph.D., Wayne State University, 1966
Robbins, Buren C., Associate Professor, M.A., University of Iowa, 1935
Shipley, Charles W., Professor, Ph.D., Florida State University, 1971

Recreation and Outdoor Education (College of Education)

Freeberg, William H., Professor, D.Rec., Indiana University, 1950
Nowak, Paul, Assistant Professor, Ph.D., University of Michigan, 1969
O'Brien, William E., *Chairman* and Associate Professor, D.Rec., Indiana University, 1967
Taylor, Loren, Professor, D.Ed., Columbia University, 1957
Yambert, Paul, Professor, Ph.D., University of Michigan, 1961

Rehabilitation (College of Human Resources)

Allen, Harry A., Assistant Professor, Ed.D., University of Arkansas, 1971
Azrin, Nathan H., Professor, Ph.D., Harvard University, 1956
Campbell, Robert L., Associate Professor, Ph.D., University of Alabama, 1967
Dickey, Thomas W., Assistant Professor, M.A., Southern Illinois University, 1964
Gardner, Margaret S., Associate Professor, Ph.D., Northwestern University, 1960
Grenfell, John E., Professor, Ed.D., Oregon State University, 1966
Hake, Don F., Associate Professor, Ph.D., Southern Illinois University, 1963
Lee, Robert E., Associate Professor, M.A., University of Minnesota, 1958
Miranti, Joseph P., Professor, M.D., Loyola University, 1950
Poppen, Roger, Assistant Professor, Ph.D., Stanford University, 1968
Renzaglia, Guy A., *Director* and Professor, Ph.D., University of Minnesota, 1952
Rubin, Harris B., Associate Professor, Ph.D., University of Chicago, 1965
Sanders, Richard M., Associate Professor, Ph.D., University of North Carolina, 1966
Schumacher, Brockman, Associate Professor, Ph.D., Washington University, 1969
Viecili, Louis, Assistant Professor, M.S.Ed., Southern Illinois University, 1959

Secondary Education (College of Education)

Adams, Frank C., Associate Professor, Ph.D., Southern Illinois University, 1962
Aikman, Arthur L., Associate Professor, Ph.D., Southern Illinois University, 1965
Alston, Melvin O., Professor, Ed.D., Columbia University, 1945
Boydston, Joann, Associate Professor, Ph.D., Columbia University, 1950
Buser, Robert L., *Chairman* and Professor, Ed.D., Indiana University, 1966
DeJarnett, Raymond, Associate Professor, Ph.D., Southern Illinois University, 1964
Dixon, Billy G., Associate Professor, Ph.D., Southern Illinois University, 1967
Dusenbery, Miriam C., Professor, Ph.D., University of Iowa, 1964
Edwards, Troy W., Professor, Ed.D., Indiana University, 1954
Fligor, Ross J., Professor, Ph.D., Michigan State University, 1953

Jackson, Michael, Assistant Professor, Ed.D., University of Florida, 1971
 James, Helen, Assistant Professor, Ph.D., University of Colorado, 1970
 Keene, Roland, Associate Professor, Ph.D., Washington University, 1962
 Keefer, Daryle E., Professor, Ph.D., Northwestern University, 1946
 Mees, John D., Professor, Ed.D., Indiana University, 1950
 Miller, Harry, Assistant Professor, Ed.D., University of Nebraska, 1970
 Planinc, Carl, Assistant Professor, Ed.D., Indiana University, 1967

Secretarial and Business Education (School of Business)

Bauernfeind, Harry B., Professor, M.A., Northwestern University, 1943
 Buboltz, Van A., Assistant Professor, M.A.Ed., Northwestern University, 1937
 Jacobson, Harry E., Assistant Professor, Ph.D., Southern Illinois University, 1969
 Rahe, Harves C., *Chairman* and Professor, Ed.D., Indiana University, 1950

Sociology (College of Liberal Arts)

Alix, Ernest K., Associate Professor, Ph.D., Southern Illinois University, 1966
 Brooks, Melvin S., Associate Professor, Ph.D., University of Wisconsin, 1941
 Gaston, Jerry C., Associate Professor, Ph.D., Yale University, 1969
 Hawkes, Roland K., Assistant Professor, Ph.D., Johns Hopkins University, 1967
 Johnson, Elmer, Professor, Ph.D., University of Wisconsin, 1950
 Lantz, Herman R., Professor, Ph.D., Ohio State University, 1950
 Lemert, Charles C., Assistant Professor, Ph.D., Harvard University, 1972
 Martin, Thomas W., Assistant Professor, Ph.D., University of Oregon, 1966
 Munch, Peter A., Professor, Ph.D., University of Oslo, Norway, 1946
 Nall, Frank C. II, Associate Professor, Ph.D., Michigan State University, 1959
 Rainey, Michael L., Assistant Professor, Ph.D., Yale University, 1971
 Rossell, Robert D., Associate Professor, Ph.D., Yale University, 1966
 Snyder, Charles R., *Chairman* and Professor, Ph.D., Yale University, 1964

Special Education (College of Education)

Casey, John, Associate Professor, Ed.D., Indiana University, 1963
 Crowner, James, *Chairman* and Professor, Ph.D., Michigan State University, 1960
 Hisama, Toshiaki, Assistant Professor, Ph.D., University of Oregon, 1971
 Joiner, Lee, Associate Professor, Ph.D., Michigan State University, 1966
 Juul, Kristen, Professor, Ed.D., Wayne State University, 1953
 Morgan, Howard, Professor, Ed.D., Wayne State University, 1962
 Rainey, Dan, Instructor, M.S. in Ed., Southern Illinois University, 1956
 Stephens, Wyatt, Associate Professor, Ph.D., University of Oklahoma, 1963

Speech (College of Communications and Fine Arts)

Bradley, Earl E., Professor, Ph.D., Northwestern University, 1950
 Breniman, Lester R., Associate Professor, Ph.D., Ohio State University, 1953
 Fish, Robert S., Assistant Professor, Ph.D., University of Oklahoma, 1970
 Hamilton, Lyle M., Assistant Professor, Ph.D., Southern Illinois University, 1970
 Hibbs, R. Paul, Professor, M.A., University of Wisconsin, 1942
 Higginbotham, Dorothy C., Professor, Ph.D., Northwestern University, 1961
 Jennings, Russell W., Associate Professor, Ph.D., Southern Illinois University, 1968
 Kleinau, Marion, Professor, Ph.D., University of Wisconsin, 1961
 Micken, Ralph A., *Chairman* and Professor, Ph.D., Northwestern University, 1948
 Pace, Thomas J., Professor, Ph.D., University of Denver, 1957
 Potter, David, Professor, Ph.D., Columbia University, 1943
 Sanders, Keith R., Associate Professor, Ph.D., University of Pittsburgh, 1968
 Smith, William D., Associate Professor, Ph.D., Southern Illinois University, 1964

Speech Pathology and Audiology (College of Communications and Fine Arts)

Anderson, John O., Professor, Ph.D., Ohio State University, 1950
 Blache, Steven E., Assistant Professor, Ph.D., Ohio University, 1970
 Brackett, I. P., Professor, Ph.D., Northwestern University, 1947
 Brutten, Gene J., Professor, Ph.D., University of Illinois, 1957
 Copeland, Alfred B., Associate Professor, Ph.D., University of Washington, 1964
 Hoshiko, Michael, Professor, Ph.D., Purdue University, 1957
 McFarland, William, Assistant Professor, Ph.D., University of Washington, 1969
 Moncur, John P., *Chairman* and Professor, Ph.D., Stanford University, 1950
 Pace, Sue Ann, Associate Professor, Ph.D., Northwestern University, 1966

Technology (School of Engineering and Technology)

Besterfield, Dale, Assistant Professor, Ph.D., Southern Illinois University, 1971
 Dunning, E. L., *Chairman* and Professor, Ph.D., University of Houston, 1967
 Johnson, Marvin E., Professor, Ed.D., University of Missouri, 1959
 Klopp, Mark E., Associate Professor, M.S.Ed., Pennsylvania State University, 1954
 Moeller, Merrill C., Associate Professor, M.S., Kansas State College of Agriculture and Applied Science, 1951

Theater (College of Communications and Fine Arts)

Browne, Terry W., Assistant Professor, Ph.D., Florida State University, 1970
 Gordon, Lonny J., Assistant Professor, M.F.A., University of Wisconsin, 1967
 Harrison, Eelin S., Associate Professor, Ph.D., Louisiana State University, 1968
 Marshall, Herbert, Professor, Diploma Graduate, Higher Institute of Cinema and Photography, Moscow, 1935
 McLeod, Archibald, *Chairman* and Professor, Ph.D., Cornell University, 1943
 Moe, Christian, Professor, Ph.D., Cornell University, 1958
 Payne, Darwin, Associate Professor, M.F.A., Southern Illinois University, 1955

Thermal and Environmental Engineering (School of Engineering and Technology)

Chen, Juh W., *Chairman* and Professor, Ph.D., University of Illinois, 1959
 Hesketh, Howard E., Associate Professor, Ph.D., Pennsylvania State University, 1968
 Jefferson, Thomas B., Professor, Ph.D., Purdue University, 1955
 Kent, Albert C., Associate Professor, Ph.D., Kansas State University, 1968
 Muchmore, Charles, Assistant Professor, Ph.D., Southern Illinois University, 1970
 Prensner, Douglas S., Assistant Professor, Ph.D., University of Illinois, 1968

Zoology (College of Science)

Anthoney, Terence R., Assistant Professor, M.D., University of Chicago, 1968
 Beatty, Joseph A., Associate Professor, Ph.D., Harvard University, 1969
 Blackwelder, Richard E., Professor, Ph.D., Stanford University, 1934
 Brandon, Ronald A., Associate Professor, Ph.D., University of Illinois, 1962
 Dyer, William G., Associate Professor, Ph.D., Colorado State University, 1965
 Englert, DuWayne C., Associate Professor, Ph.D., Purdue University, 1964
 Fisher, Harvey I., Professor, Ph.D., University of California, Berkeley, 1942
 Galbreath, Edwin C., Professor, Ph.D., University of Kansas, 1951
 Garoian, George, *Chairman* and Associate Professor, Ph.D., University of Illinois, 1956
 George, William, Associate Professor, Ph.D., University of Arizona, 1961
 Haas, Hermann J., Professor, Ph.D., University of Göttingen, Germany, 1954

Heidinger, Roy C., Assistant Professor, Ph.D., Southern Illinois University, 1970
Jewell, Samuel R., Professor, Ph.D., Colorado State University, 1972
Klimstra, Willard D., Professor, Ph.D., Iowa State University, 1949
LeFebvre, Eugene, Associate Professor, Ph.D., University of Minnesota, 1962
Lewis, William M., Professor, Ph.D., Iowa State University, 1949
Martan, Jan, Associate Professor, Ph.D., University of Oregon, 1963
McPherson, John E., Assistant Professor, Ph.D., Michigan State University,
1968
Petersen, Bruce W., Assistant Professor, Ph.D., University of Colorado, 1968
Shepherd, Benjamin A., Assistant Professor, Ph.D., Kansas State University,
1970
Stahl, John B., Associate Professor, Ph.D., Indiana University, 1958
Stains, Howard J., Professor, Ph.D., University of Kansas, 1955
Waring, George H., Associate Professor, Ph.D., Colorado State University, 1966

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