1998

1998-1999 Southern Illinois University Bulletin Carbondale Campus (Mechanical Engineering and Energy Processes)

Southern Illinois University Carbondale

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Bulletin

Mechanical Engineering and Energy Processes 1998-99

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Approved 1998 - 1999 University Calendar

Summer Session, 1998

Eight-Week Session Begins	Monday, June 15, 7:30 A.M.
Independence Day Holiday	Friday, July 3
Final Examinations	Thursday, August 6 and Friday, August 7
Commencement	Saturday, August 8

Fall Semester, 1998

Semester Classes Begin	Monday, August 24
Labor Day Holiday	Monday, September 7
Fall Recess	Thursday, October 29 - Sunday, November 1
Thanksgiving Vacation	Saturday, November 21, 12 Noon - Sunday, November 29
Final Examinations	Monday, December 14 - Friday, December 18
Commencement	Saturday, December 19

Spring Semester, 1999

Martin Luther King, Jr.'s Birthday Holiday	Monday, January 18
Semester Classes Begin	Tuesday, January 19
Spring Vacation	Saturday, March 13, 12 Noon - Sunday, March 21
Honor's Day	Sunday, April 11
Final Examinations	Monday, May 10 - Friday, May 14
Commencement	Friday, May 14, Saturday, May 15

All breaks begin officially at 10:00 p.m. the night before and end at 7:30 a.m. the morning after the respective beginning and ending dates listed, unless otherwise noted.

Accommodating Religious Observances of Students

Southern Illinois University at Carbondale will make reasonable accommodation for individual student religious observances. The *Policy Accommodating Religious Observances of Students* appears in its entirety in Chapter 7.

Mechanical Engineering and Energy Processes

(Department, Major [Mechanical Engineering], Courses)

The Department of Mechanical Engineering and Energy Processes offers the Mechanical Engineering major which is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

MECHANICAL ENGINEERING

Mechanical engineering is one of the broadest fields of engineering. Mechanical engineers learn measurement and instrumentation, computer-aided design, computer simulation, computer control, combustion and engine analysis. They learn to design thermal systems for mechanical and electrical equipment including heating, ventilating, air conditioning and refrigeration. Students learn how to design and produce new materials for advanced engineering applications. Courses are also offered in subjects related to the chemical processes and environmental control industries. Graduates are highly sought after in a variety of industries such as automotive, aerospace and manufacturing.

Bachelor of Science Degree, College of Engineering

University Core Curriculum Requirements	41
Foundations	12
English 101, 102, Speech Communication 101 and substitute Mathematics	
Disciplinary Studies	23
Fine Arts	3
Human Health	2
Humanities	6[2]
Social Science	6[2]
Science (substitute Physics and Chemistry)	6
Integrative Studies	6
Multicultural	3[2]
Interdisciplinary	3[2]
Requirements for Major in Mechanical Engineering	(9) + 85[1]
Basic Sciences	(6) + 9
Chemistry 200, 201, 210	
Physics 205a,b, 255a,b	
Mathematics Analysis	(3) + 14
Mathematics 150, 250, 251, 305	(3) + 11
Engineering 351	3
Mechanical Engineering	62
General: Engineering 102, 222a, 400, and Mechanical Engineering 101a,b and 361	8
Engineering Sciences	28
Engineering 260a, 300, 311, 312, 313 and 335; Mechanical Engineering 261, 302, 309 and either 301 or 400	
Mechanical Engineering 411, 436, 475, 495a,b	12
Engineering Laboratory	3
Mechanical Engineering 401, 403 and 437	
Elective Engineering Design Courses	11[3]
Total	126

[1]Courses in parenthesis will also apply toward 9 hours of University Core Curriculum, making a total of 41 in that area.
[2]See department guidelines for courses that form a required sequence.
[3]See department guidelines for appropriate electives.

Mechanical Engineering Curricular Guide

First Year	Fall	Spring
Core Human Health [1]	-	2
CHEM 200, 201	4	-
CHEM 210	-	3
ENGL 101, 102	3	3
ENGR 102	2	-
MATH 150, 250	4	4
ME 101a	0	-
ME 101b	2	-
PHYS 205a, 255a	-	4
Total	15	16

Second Year	Fall	Spring
Core Humanities[1]	-	3
Core Social Science[1]	3	-
ENGR 222a	2	-
ENGR 260a, ENGR 311	2	3
MATH 251, 305	3	3
ME 261	-	3
ME 361	-	1
PHYS 205b, 255b	4	-
SPCM 101	3	-
ENGR 300	-	3
Total	17	16

Third Year	Fall	Spring
Core Fine Arts [1]	-	3
Core Social Science[1]	3	-
ME 302	-	3
ENGR 312	3	-
ENGR 313	3	-
ENGR 335	3	-
ENGR 351	3	-
ME 309	2	-
ME 301 or 400	-	3
ME 403	-	1
ME Design Elective	-	6
Total	17	16

Fourth Year	Fall	Spring
Core Humanities[1]	3	-
Core Integrative Studies[1]	-	6
ENGR 400	-	1
ME 401	1	-
ME 411	2	-
ME 436	3	-
ME 437	-	1
ME 475	3	-
ME 495a,b	1	3
ME Design Elective	3	2
Total	16	13

[1] See University Core Curriculum.

Mechanical Engineering Courses (ME)

Safety glasses, an electronic calculator, and textbooks are required of all mechanical engineering students.

101A-0 Computer Tools for Engineering Reporting. Use of PC-based word-processor, spreadsheet and data management programs for engineering reporting. Statistical interpretation of experimental data. Proficiency in using each type of reporting skill-tool will be required. Pass/Fail grading. Prerequisite: enrollment in mechanical engineering.

101B-2 Introduction to Mechanical Engineering. Introduction to engineering fields and to mechanical engineering. Activities which provide the student with tools for greater academic success, professional awareness, teamwork and engineering success are explored. Introduction to design principles and creativity. Use of creativity and design principles in class projects. Prerequisite: enrollment in mechanical engineering, Mathematics 111 or equivalent, Mechanical Engineering 101a or concurrent enrollment.

261-3 Mechanical Engineering Dynamics. Fundamentals of particle and rigid body dynamics. Kinematics and kinetics of a single particle and system of particles. Application of Newton's laws and energy and moment principles in solving problems involving particles or rigid bodies in planar motion. Introduction to kinetics of rigid bodies in three dimensions. Prerequisite: Engineering 260a.

301-3 Engineering Thermodynamics II. Combined first and second law analysis; availability and reversability. Third Law. General thermodynamic relations. Reactive systems. Thermodynamic equilibrium. Phase Rule. Applications. Thermodynamics of one dimensional fluid flow. Prerequisite: Engineering 300.

302-3 Engineering Heat Transfer. Fundamentals of heat transfer by conduction, convection and radiation. Applications of theory to engineering systems. Prerequisite: Engineering 300, 313 and Mathematics 305.

309-2 Mechanical Analysis and Design. Kinematics and kinetics of inter-connected bodies. Principles of kinematics and force analyses of planar machinery. Analytical and numerical techniques for finding displacement, velocity and acceleration. Design of linkage, cam-follower mechanisms and gear trains. Prerequisite: 261 and Engineering 222a.

361-1 Engineering Economics. Present, future and annual worth, rate of return and incremental rate of return methods of comparing alternative engineering projects and designs; bonds, depreciation and tax considerations. Application of basic statistical concepts and spreadsheets for problem solutions. Professional engineering examinations include these course materials. Prerequisite: 101a,b or equivalent.

392-1 to 6 Mechanical Engineering Cooperative Education. Supervised work experience in industry, government or professional organization. Students work with on-site supervisor and faculty advisor. Reports are required from the student and the employer. Hours do not count toward degree requirements. Mandatory Pass/Fail. Prerequisite: sophomore standing.

393-1 to 12 Internship in Mechanical Engineering. Credit for documented work experience as an intern in an engineering occupation or an engineering-related occupation. Work assignments must have been professional service in the mechanical engineering field. Hours do not count toward degree requirements. Mandatory Pass/Fail. Prerequisite: satisfactory completion of twelve hours of Engineering and/or Mechanical Engineering courses.

400-3 Power and Refrigeration Cycles. Use of engineering thermodynamics in analysis of power and refrigeration cycles. Detailed treatment of various gas and vapor power cycles including combined gas and steam cycles. Thermodynamics of combustion. Gas and vapor refrigeration cycles. First and Second Law analysis and turbo-machinery. Prerequisite: Engineering 300.

401-1 Thermal Measurements Laboratory. Study of basic measurements used in the thermal sciences. Calibration techniques for temperature and pressure sensors. Thermal measurements under transient and steady-state conditions. Applications include conduction, convection and radiation experiments. Uncertainty analysis. The handling and reduction of data. Prerequisite: 302.

402-3 Heat Exchange Equipment Design. Engineering design of heat exchange equipment such as boilers, evaporators, cooling towers, furnaces and systems involving combinations of conduction, convection and radiation mechanisms. Emphasis is placed on application of basic principles of heat transfer and fluid mechanics to the design of heat exchange equipment. Students are encouraged to work open-ended problems with multiple possible solutions. Prerequisite: 302.

403-1 Mechanical Engineering Measurements Laboratory. Laboratory to familiarize students with the use of instruments to measure time, distance, velocity, acceleration, strain, fluid flow, and turbulence. Instruments include micrometers, laser distance meters, stroboscopes, oscilloscopes, incremental rotary encoder, LVDT, load cells, accelerometers, analog/digital convertors, pressure transducers, and related equipment. Prerequisite: Engineering 311.

404-4 Optimization of Process Systems. Simulation and optimization of process systems based upon engineering science and economic fundamentals. Analysis and correlation of experimental engineering data and use of correlated data in simulation, design and decision making. Design of systems using economics and continuous and discrete optimization methods encountered in engineering practice. Use of the computer is required. Prerequisite: Engineering 361, Mathematics 305 and senior standing in engineering.

405-3 Internal Combustion Engines and Gas Turbines. Operation and performance characteristics of Otto, Diesel, Wankel engines and gas turbines. Methods of engine testing, types of fuels and their characteristics, fuel metering systems, engine combustion analysis as related to engine performance, fuel characteristics and air pollution, exhaust gas analysis, and air pollution control. Prerequisite: Engineering 300.

406-3 Thermal Systems Design. Applications of the principles of engineering analysis to the design of thermal systems. Consideration of such systems as refrigeration, air conditioning, spacecraft thermal control and cogeneration. Numerical analysis and solution of an open-minded design problem. Prerequisite: 302, Engineering 351.

408-3 Energy Conversion Systems. Principles of advanced energy conversion systems; nuclear power plants, combined cycles, magnetohydromagnetics, cogeneration (electricity and process steam), and heat pumps. Constraints on design and use of energy conversion systems; energy resources, environmental effects, and economics. Prerequisite: 301 or 400.

410-3 Applied Chemical Thermodynamics and Kinetics. Designed for students interested in chemical and environmental processes and materials science. Topics covered include applications of the Second and Third Laws of Thermodynamics, solution theory, phase equilibria, sources and uses of thermodynamic data, classical reaction rate theory, kinetic mechanisms and the determination of rate-determining steps in chemical reactions. Prerequisite: Chemistry 200, 201, Engineering 300 or consent of instructor.

411-2 Manufacturing Methods for Engineering Materials. Overview of manufacturing processes with emphasis on the fabrication of materials from the processing and equipment viewpoint. This course presents a broad study of the many manufacturing processes utilized in the production of a wide variety of products and components. Insight into the multitude of processing factors which influence the practical design of manufactured parts to achieve the advantages of maximum economy, accuracy and automation in everyday production. Not for graduate credit. Prerequisite: Engineering 311 and 312.

414-3 Noise and Vibration Control. Principles of engineering acoustics and vibration and their application to noise and vibration control techniques. Laboratory experience demonstrates techniques for control and reduction of vibration and noise. Prerequisite: 436 and consent of instructor.

416-3 Air Pollution Control. Engineering control theory, procedure, equipment, and economics related to control of particulate, gaseous, and toxic air emissions. The environmental impacts due both to controlling and not controlling emissions are considered. Understanding of the basics is evaluated as students design control equipment, specify and troubleshoot control systems and predict the impacts for each major type of control system. Prerequisite: Senior standing.

418-1 Air Quality Laboratory. This laboratory consists of design, construction, and use of systems to measure and analyze ambient atmospheric pollution. Safety glasses required. Prerequisite: concurrent enrollment in 416.

419-3 Hazardous Waste Incineration. Incineration techniques, procedures and systems are presented for solid waste disposal and for remedial site clean-up activities. This includes regulations, waste handling, emission controls and residue disposal. Thermodynamics, chemistry and equipment are discussed, including heat recovery. Prerequisite: 416 or consent of instructor.

422-3 Applied Fluid Mechanics for Mechanical Engineers. Applications of fluid mechanics in internal and external flows. The mathematical basis for inviscid and viscous flows calculations is developed with application to pipe and duct flows; external flow about bodies; drag determination; turbomachinery; and reaction propulsion systems. Semester design project of a fluid mechanical system. Prerequisite: Engineering 300, 313 and Mathematics 305.

423-3 Compressible Flows. Foundation of high speed fluid mechanics and thermodynamics. One-dimensional flow, isentropic flow, shock waves and nozzle and diffuser flows. Flow in ducts with friction and heat transfer. Prandtl-Meyer flow. Compressibility effects in reaction propulsion systems. Semester design project. Prerequisite: Engineering 300, 313.

430-3 Kinematic Synthesis. Kinematic synthesis of linkages, single loop and multiple loop mechanisms and geared linkages. Vector synthesis of spatial mechanism and its computer simulation. Prerequisite: 309.

435-3 Design of Mass Transfer Processes. Design principles of mass transfer processes. The rate mechanism of molecular, convective and interphase mass diffusion. The design of selected industrial mass transport process operations such as absorption, humidification, water-cooling, drying and distillation. Prerequisite: 302.

436-3 Mechanical Engineering Control. Analysis and design of controls for mechanical engineering systems: mechanical, electrical thermal, fluid and combinations of these. Prerequisite: 261 or Engineering 260b; 300, 335, 351.
437-1 Mechanical Engineering Controls Laboratory. Application of control principles to mechanical engineering systems. Speed and position control using computer-based instrumentation. Pneumatic control. Temperature and flow sensing and control. Automatic control of servo systems. Process control and Programmable Logic Controller (PLC) applications. Prerequisite: 436 and senior standing.
440-3 Heating, Ventilating, and Air Conditioning Systems Design. Principles of human thermal comfort. Heating and cooling load analysis. HVAC system design. Air conditioning processes. Prerequisite: 302.
442-3 Passive Solar Design. Design of solar heating systems for residence with emphasis on passive systems. Heat flow and heat loss. Estimating heat loss and heating requirements of buildings. Energy conserving building design. Predicting performance and economics of a system. Prerequisite: 302.
446-3 Energy Management. Fundamentals and various levels of analysis for energy management of commercial buildings and industrial processes and buildings. Use of energy management systems and economic evaluations are required in course projects. Prerequisite: 302.
448-2 to 3 Refrigeration Equipment Design. The role of refrigeration equipment and systems in producing conditioned air to a controlled environment. Compressor fundamentals and design. Cooling equipment: heat pump, absorption units, vapor compression chillers. Heating equipment: boilers, furnaces, heat pump. Alternate refrigerants. Simulation of refrigeration components and systems. Prerequisite: 302, Engineering 300, 313.
462-3 Physical Metallurgy. Structure of metals. Dislocation theory and plasticity. Solid state diffusion. Thermodynamics of solutions and phase diagrams. Phase transformations. Fracture mechanics. Creep and fatigue. Prerequisite: Engineering 312.
463-3 Introduction to Ceramics. Structure and physical properties, mechanical properties, processing and design of ceramics. Prerequisite: Engineering 312 or equivalent.
470-3 Mechanical System Vibrations. Linear Vibration analysis of mechanical systems. Design of mechanical systems to include effects of vibration. Prerequisite: Engineering 260b and 351, Mathematics 305.
472-3 Materials Selection for Design. Interaction of material design process with material selection criteria. Comparison of materials properties, processes and fabrication. Project work includes design models, material selection rationale, oral presentation of projects, construction of mock-up models, and theoretical design problems in the area of the student's specialization. Prerequisite: Engineering 222a, 312.
475-3 Machine Design I. Design of machines using bearings, belts, clutches, chains and brakes. Develops application of the theory of fatigue, power transmission and lubrication to the analysis and design of machine elements. Prerequisite: Engineering 311, 351.
476-3 Machine Design II. Design of machines using gears, springs, screws and fasteners, and adhesives. Matching power sources to driven machines. Prerequisite: 475.
477-3 Fundamentals of Computer-Aided Design and Manufacturing. Introduction to the concepts of computer-aided design and manufacturing (CAD/CAM). Subjects include computer graphics, geometric modeling, engineering analysis with FEM, design optimization, computer numerical controls, project planning, and computer integrated manufacturing. (CIM). Students are required to use computer packages for projects. Prerequisite: 475 or consent of instructor.
492-1 to 5 Special Problems in Engineering. Engineering topics and problems selected by either the instructor or the student with the approval of the instructor. Five hours maximum course credit. Not for graduate credit. Prerequisite: senior standing and consent of instructor.
495-4 (1,3) Mechanical Engineering Design. (a) Project development skills, feasibility and cost-benefit analysis, ethical issues, professionalism, preliminary design, identification of tasks, assignment of tasks to project team members, coordination of interdisciplinary team effort, development of final proposal, oral presentation of final proposal. Prerequisite: Senior standing in mechanical engineering (second to last semester) **(b)** Development of the final design, hardware implementation of the final design (if the project warrants), documentation of all stages of design, project coordination, documentation of the testing and evaluating of the design, cost estimating, scheduling, and written, oral, and poster presentation of the final design. Not for graduate credit. Prerequisite: Mechanical Engineering 495a, (last semester), Engineering 351; Engineering 361 or Mechanical Engineering 361; and one of Mechanical Engineering 301, 310 or 400.

Faculty and Their Research

SIUC mechanical engineering faculty members are graduates of major universities across the United States. These faculty members are largely responsible for teaching the department's undergraduate courses. Many are also active researchers, working to advance the state of the art in their specialized disciplines.

They are among the nation's leading experts in the design of new clean coal technologies, computer, computer simulation of general flexible multi-body systems, ceramic composite and carbon composite materials, internal combustion engines, thermal systems, and tribology. At SIUC, students have the opportunity to learn directly from the people who are making the discoveries. All new students are assigned faculty mentors for career guidance during their undergraduate studies at SIUC.

Agrawal, Om, Associate Professor, Ph.D., University of Illinois-Chicago, 1984; 1985. Computer-aided analysis and design of rigid/flexible multibody systems, numerical analysis, finite element methods, and continuum mechanics, CAD/Simulation of mechanical systems.

Blackburn, James W., Associate Professor, Ph.D., University of Tennessee, Knoxville, 1988; 1995. Biokinetics, biotechnology, chemical and bioprocesses reduction and control of organic wastes/by-products; pollution prevention through tuning complex chemical processes and bioprocesses, bioprocess treatment of waste and wastewater, scale-up and application of bioremediation processes, reduction or control of organic air emissions.

Blankenship, Michael, Visiting Instructor, Ph.D., Southern Illinois University at Carbondale, 1997, 1992. Coal conversion, chemical and physical cleaning of coal.

Byrne, Christopher E., Assistant Professor, Ph.D., Johns Hopkins University, 1996; 1997. Friction materials, carbon composites, nondestructive evaluation, composite processing.

Chen, Juh W., Professor and *Dean*, Ph.D., University of Illinois, 1959; 1965. Process analysis and kinetics, sonocatalysis, coal conversion processes, supercritical extraction.

Chu, Tsuchin P., Associate Professor, Ph.D., University of South Carolina, 1982; 1990. CAD/CAM, imaging systems, mechanical vibrations, computer graphics, machine vision, optical methods in experimental mechanics and manufacturing, image processing.

Don, Jarlen, Associate Professor, Ph.D., Ohio State University, 1982; 1985. Materials creep and creep fatigue, surface phenomena, carbon-carbon composites, composite materials, friction materials.

Farhang, Kambiz, Associate Professor, Ph.D., Purdue University, 1989; 1990. CAD/CAM, controls, vibrations, kinematics, dynamics, control and stability of flexible and rigid-body mechanical, electromechanical, mechanical-drive systems; manufacturing processes and process control.

Helmer, Wayne A., Professor, Ph.D., Purdue University, 1974; 1974. Rapid prototyping, refrigeration, heat transfer, fluid bed combustion, energy conservation, solar energy, direct contact heat transfer, ethics.

Hesketh, Howard E., Professor, *Emeritus,* Ph.D., Pennsylvania State University, 1968; 1968. Air pollution control, hazardous materials management, fluid bed combustion, material handling, engineering economics.

Hippo, Edwin J., Professor, Ph.D., Pennsylvania State University, 1977; 1984. Coal Liquefaction, coal conversion, chemical and physical cleaning of coal, coal structure, carbon materials, STM.

Jefferson, Thomas B., Professor, *Emeritus,* Ph.D., Purdue University, 1955; 1969.

Kent, Albert C., Professor, *Emeritus,* Ph.D., Kansas State University, 1968; 1966. Thermal environmental control, energy conservation, solar, heat transfer, coal cleaning.

Khonsari, Michael M., Professor and *Chair*; Ph.D., University of Texas at Austin, 1983; 1996. Tribology (lubrication, friction and wear), heat transfer, numerical analysis, machinery performance analysis.

Koc, Rasit, Associate Professor, Ph.D., University of Missouri-Rolla, 1989; 1994. Ceramic materials, powder processing, nonstoichiometry of oxides; sintering of oxide and non-oxide ceramics, methods preparing high purity oxides from organometallics, perovskies for use as high temperature electrodes, synthesizing submicron carbide, nitride and boride powders.

Kulkarni, Manohar, Assistant Professor, Ph.D., University of Missouri-Columbia, 1986; 1993. Energy management, thermal analysis of materials, heat transfer, thermal modeling, transient thermography, refrigeration.

Lalvani, Shashi B., Professor, Ph.D., University of Connecticut, 1982; 1982. Electrosynthesis, corrosion and electrochemical engineering; coal cleaning and conversion; and environmental science.

Muchmore, Charles, B., Professor, Ph.D., Southern Illinois University at Carbondale, 1969; 1966. Biological, physical, and chemical aspects of water quality control, coal conversion and cleaning, mass transfer operations, alcohol production, water pollution control.

O'Brien, William S., Associate Professor, *Emeritus,* Ph.D., West Virginia University, 1972; 1973. Acid-mine-waste treatment, coal conversion processes, coal gasification and combustion, coal cleaning, carbon materials, mass transfer design, air and water pollution control.

Orthwein, William C., Professor, *Emeritus,* Ph.D., University of Michigan, 1958; 1965.

Rajan, Suryanarayaniah, Professor, Ph.D., University of Illinois, 1970; 1977. Internal combustion engines, energy utilization, fluidized bed combustion, pulse combustion, engine fuels, combustion and pollution control.

Swisher, James H., *Emeritus,* Ph.D., University of Tennessee, 1969; 1979.

Templemeyer, Kenneth E., Professor, *Emeritus,* Ph.D., University of Tennessee, 1969; 1979.

Wiltowski, Tomasz, Visiting Instructor, Ph.D., Polish Academy of Sciences, Krakow, Poland, 1983;1993. Application of catalysis in environmental processes, solid state engineering, heterogeneous and homogeneous catalysis, reactor design, process control, surface processes. Fiber reinforced composites, fracture mechanics, carbon-carbon composites, friction materials, brake systems.

Wittmer, Dale, E., Professor, Ph.D., University of Illinois, 1980; 1986. Continuous sintering and advanced materials processing, high temperature resistant materials and testing, ceramics whisker synthesis, ceramic composites, carbon fiber production and composites.

Wright, Maurice, Professor, Ph.D., University of Wales, United Kingdom, 1962; 1984. Fiber rein forced composites, fracture mechanics, carbon-carbon composites, friction materials, brake systems.

Internships and Cooperative Education

Professional work experience through the College of Engineering internship program or cooperative education program is an excellent way to enhance a degree and finance an engineering education. Internships with southern Illinois companies allow students to work at a relevant job for up to 20 hours per week while maintaining their normal academic schedule.

Students ideally enter the co-op program after completion of the sophomore year, alternating a semester of full-time work and a semester of full-time study. In 1997, twenty-five students earned an average salary of $10.83 per hour. At graduation these students already have a year of professional engineering experience. For further information, contact the Cooperative Education Program at the College of Engineering at (618) 453-7155. Please e-mail atwood@siu.edu or visit the web site: http://www.siu.edu/departments/colengr/entech/cooped.htm. Following are the 1997 co-op sites for Mechanical Engineering students.

Mechanical Engineering Co-op Sites for 1997

Olin, Marion, IL
Union Electric, St. Louis, MO
Harrisburg Medical Ctr, Harrisburg, IL
Ligma, Nashville, IL
Rockwell Intl, Thousand Oaks, CA
Toyota, Georgetown, KY
Illinois Dept. of Transportation, Carbondale, IL
Caterpillar, Peoria, IL
DCA Construction, Breese, IL
Maytag, Herrin, IL
Primex, Marion, IL

Career Placement Information

Average salary offers to College of Engineering graduates are at or slightly above the national average for each major. According to the Engineering Workforce Commission, the 1997 national median annual starting salary for engineering baccalaureate degree recipients averaged $38,650. The median annual salary for engineers with 20 years of professional experience averaged $71,617 in 1997. Historically, about 68 percent of our students have at least one job offer upon graduation. Three to six months after graduation, 97 to 98 percent of our students are either placed in professional employment or are continuing their education through graduate study in engineering, business, law, or medicine.

In addition to helping students develop their resume writing and interviewing skills, the University Placement Center offers opportunities for on-campus meetings with corporate recruiters. Some companies that recruit and employ engineering and technology graduates include:

AMC
Aerotek
Airtex
Akorn Roller
Allen-Bradley
Anaconda Minerals
Anderson Consulting
Anheuser Busch Co.
Arch Minerals Corp.
Argonne National Laboratories
Arthur Anderson
Bombardier Motor Corp. of America
Bridgestone/Firestone Inc.
Butler Service Group
CFC International
Caterpillar
Central Illinois Public Service Co.
Champion Laboratories
Chicago & Northwestern Trans. Co.
Citgo Petroleum Corp.
Commonwealth Edison Co.
Danville Metals & Stamping Co.
Electronic Data Systems
Emerson Electric Co.
Eureka Company
Florida Power & Light
Ford Motor Co.
Frito-Lay Co.
GS Metals

GTE
General Dynamics Corp.
General Electric Co.
General Motors
General Tire & Rubber Co.
Goodyear Atomic Corp.
Hewlett Packard
Hobbs Corp.
Hitachi Instruments, Inc.
Hughes Aircraft Co.
Hunen Electric
ITT Aero Space/ Communication
Illinois Power Co.
Illinois Tool Works
Intel
JennMar Corp.
John Deere & Co.
Kansas City Power & Light Co.
Kerr-McGee Coal Corp.
LTV Steele Co.
Lockheed Missiles & Space Co.
Magnetrol
Martin Marietta Energy Sys. Corp.
Martin Marietta Denver Aerospace
Maytag
McDonnell Douglas Corp.
Micro Switch Div. of Honeywell
Midwest Research Institute
Mitsubishi
Miyano Machinery Inc.
Mobil Oil Corp.
Moog Automotive Inc.
Mosler Inc.
Motorola
NASA
NTN Bearing Corp. of America
National Standard
National Steel Corp.
Naval Weapons Center
Norfolk Southern Corp.
Norge
Northrop Corp./Defense Sys. Div.
Olin Corp.
Proctor & Gamble
Pyro Mining Co.
R.A. Nack & Associates
RCA
RCA Astro Electronics
Rockwell International
Rollex Corp.
SEI Systems & Electronics Inc.
Santa Fe Railway Co.
Sargent & Lundy Engineers
Sheller Globe
Snap-On Tools
Sony Engineering & Manufacturing
Southwest Research Institute
Sperry Corp.
Square D Co.
Sun Microsystems
Sunbeam Corp.
Sunstrand Adv. Tech. Group
System Sensor
Teledyne Total Power
Temtron
Texas Instruments
The Quaker Oats Co.
Thermotron Industries
U.S. Environmental Protection Agency
U.S. Gypsum Co.
U.S. Navy Officer Training Program
U.S. Patent & Trademark Office
U.S. Robotics
Union Electric Co.
Wallace Computer Services
White County Coal Company
Zebra Technologies Corp.
Zenith Corp

Laboratories and Research Facilities

Active Research Areas

THERMAL SYSTEMS – planning and design of systems for the production and utilization of heat energy.

MECHANICAL SYSTEMS – planning and design of systems for the production and utilization of mechanical energy.

PROCESS DESIGN AND CONTROL – analysis and creation of safe, efficient, and economical production technologies.

NOISE AND VIBRATION – analysis and design of techniques to minimize the causes and undesirable effects of noise and vibration.

MATERIALS SCIENCE – analysis of the suitability of materials for specific design applications and the creation of new industrial materials.

AIR POLLUTION CONTROL – analysis and design of systems to protect the environmental quality of the atmosphere.

CENTER FOR ADVANCED FRICTION STUDIES (CAFS) – research on brake linings, pads, drums, and rotors for aircraft and automotive industries. CAFS is the only research facility of its kind in the United States.

TRIBOLOGY – analysis and design of lubrication, friction and wear associated with mechanical components.

Teaching and Research Laboratories

Combustion and Engine Systems Laboratory
Compressor Testing Facility
CAFS Optical Microscopy Laboratory
CAFS Dynamometer Laboratory
CAD Laboratory
Rapid Prototyping Facility
Rate Processes Laboratory
Mechanical Simulation Laboratory
Bioremediation Laboratory
Vibration Laboratory
Imaging and Machine Vision Laboratory
X-Ray Diffraction Laboratory
Compressor Research Laboratory
Thermal Analysis, Simulation & Design Lab.
Thermal Systems Laboratory
STM Laboratory
Mechanical Systems Measurement and Control Laboratory
Design and Instrumentation Research
ICP Laboratory
Advanced Materials Processing Laboratory
Electrochemical Processes Laboratory
Materials Engineering Laboratory
Carbon-Carbon Composite Laboratory
Energy Processes Laboratory
Reaction Engineering Laboratory
Equilibrium Processes Laboratory
High Temperature Materials Laboratory
Ceramic Materials Processing Laboratory
Tribology Laboratory

Professional and Student Organizations

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)
Dr. Kambiz Farhang (618) 536-7002
farhang@engr.siu.edu
http://www.siu.edu/~asme/

BLACKS IN ENGINEERING AND ALLIED TECHNOLOGY (BEAT)
Minority Engineering Program Office
Mr. Eugene Cross (618) 536-2463
crosse@siu.edu http://www.nsbe.org/

AMERICAN SOCIETY OF HEATING, REFRIGERATION AND AIR CONDITIONING ENGINEERS (ASHRAE)
Dr. Wayne Helmer (618) 453-7007
helmer@engr.siu.edu http://www.ashrae.org

THE SOCIETY OF HISPANIC ENGINEERS (SHPE)
Minority Engineering Program Office
Mr. Eugene Cross (618) 536-2463
crosse@siu.edu http://www.shpe.org/

THE SOCIETY OF MANUFACTURING ENGINEERS (SME)
Dr. Gary Butson (618) 536-3396
butson@siu.edu http://www.siu.edu/~sme/

THE SOCIETY OF WOMEN ENGINEERS (SWE)
Mr. William Eichfeld (618) 453-7838
eichfeld@ce.siu.edu http://www.swe.org/

TAU BETA PI (NATIONAL HONOR SOCIETY FOR ENGINEERING)
Dr. Bruce DeVantier (618) 453-7819
bdevanti@siu.edu http://sense.engr.utk.edu/

ENGINEERING AND TECHNOLOGY JOINT STUDENT COUNCIL
Ms. Linda Helstern (618) 453-7730
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Visit SIUC's Student Organization Web Site
http://www.siu.edu/departments/rso/

Additional Information

Industrial Advisory Board

James Higginbotham, The Boeing Co. -St. Louis
Beth Hinchee, Caterpillar
Steve Larson, Motorola
Donald Trowbridge, Olin Corporation
Roger Vonjouanne, Boeing Aerospace

For More Information about Mechanical Engineering & Energy Processes

Michael M. Khonsari, Chair
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College of Engineering
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Visit the departmental Web Site: http://howard.engr.siu.edu/mech/
Visit our prospective student Web Site: http://salukinet.siu.edu/prospect/

1998 SIUC Open House Dates

February 21 Student Recreational Sports Center
March 21 Student Center
April 4 Student Center
July 24 Student Recreational Sports Center

Formula SAE '97 Race Car Competition

In May, 1997, a team of SIUC undergraduate Mechanical Engineering students participated in the Formula SAE (Society of Automotive Engineers) race car competition which was held in the Silverdome near Detroit, Michigan. According to Brent Smith, a Ford Motor Company Products Development Engineer, Formula SAE has grown to become the premiere collegiate vehicle design competition in North America. Students gain the most from the Formula SAE competition. The students have to learn how to plan, design, build and test a vehicle from the ground up. The students must learn to work within many constraints including cost, weight and safety regulations. They go through many of the same steps that it takes to build a real passenger car.

The competition develops a pool of students with valuable experience in designing and building cars. Not suprisingly, Ford Motor Company alone has recruited over 100 engineers who have participated in the Formula SAE competition.

The student chapter of the American Society of Mechanical Engineers (ASME) at Southern Illinois University at Carbondale entered the competition for the first time in 1997 and scored more points than the other 12 or 13 rookie teams. The SIUC team outscored over half the other teams who had entered in prior years. The team received 2nd place, among the 99 participating collegiate teams, in fuel economy. The team consisted of six members: Rex Glover (1997 captain), David Freeman, Jamie Nickel, Anthony Rickert, David Van Middendorp and Brice Gustin.

For more information about becoming involved as a student on ASME's Formula race car, please contact: Mr. David Freeman (1998 Team Captain) (618) 549-7002; Dr. Kambiz Farhang, ASME Faculty Advisor, (618) 5536-7002, farhang@engr.siu.edu; Dr. Michael Khonsari, *Chair*, Dept. of Mechanical Engineering and Energy Processes, Southern Illinois University at Carbondale, Carbondale, Illinois 662901-6603, phone: (618) 536-2396, Fax: (618) 453-7658, E-Mail: judi@engr.siu.edu, Home Page: (http//howard.engr.siu.edu/mech/).