

SIU **e**

School of Engineering

Hasan Sevim, Dean

www.sie.edu/engineer

School of Engineering

The School of Engineering offers the bachelor of science degree with majors in civil engineering, computer science, computer engineering, construction management, electrical engineering, industrial engineering, manufacturing engineering, and mechanical engineering, and a bachelor of arts degree in computer science. The civil engineering, computer science, electrical engineering, industrial engineering, and mechanical engineering programs are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology. The construction management program is accredited by the American Council for Construction Education.

School of Engineering Mission Statement

The mission of the School of Engineering is to provide excellent, innovative engineering, computer science and construction education to citizens of Illinois, the greater St. Louis metropolitan area and representatives of the global community. The school focuses on strong undergraduate education and graduate programs that serve the needs of full-time students and employed professionals. Faculty conduct basic and applied research and outreach activities in partnership with others who contribute to technological advancement in the fields of study offered.

School of Engineering Vision Statement

The vision of the School of Engineering is to be a partnership of faculty, students, staff, alumni and other professionals who work together to provide the highest quality education and maintain innovative resources that support the technical growth and economic development of this region.

School of Engineering Core Values

The school's faculty strive to exhibit and to instill in each graduate the following characteristics:

- technical excellence in their disciplines
- desire for excellence in all they do
- respect for the rich diversity of humankind
- effective communication capabilities
- ability to provide leadership in innovative multi-disciplinary teams

- social, civic, and political responsibility built on an understanding of contemporary issues
- commitment to ethical professional conduct and practice
- environmental stewardship
- independent and innovative thought
- pursuit of lifelong learning

Classes began in the Engineering Building in fall 2000. The three-level structure, with a single-story testing laboratory wing, has 129,000 square feet of usable space. Faculty offices, classrooms, and laboratories are furnished with state-of-the-art equipment and teaching aids. All offices, classrooms, and laboratories are designed for the latest in computer and communication links.

Students interested in any of the majors offered by the School of Engineering should seek advisement from the School of Engineering when they initially enroll in the University. Enrollment in 300- or 400-level courses in a particular engineering program (except computer science) is limited to students who have been admitted to the upper division in that program as described below. Other students wishing to enroll in 300- or 400-level engineering courses may do so only with the permission of the department chair.

Students enrolled in most School of Engineering programs must have a scientific graphing calculator and must buy some technical textbooks; a personal computer is highly recommended.

Admission to School Programs

Students admitted to programs offered by the School of Engineering shall have met University admission requirements and the following additional School of Engineering requirements:

- 1 completion of all academic development courses required by the University
- 2 completion of any required courses to address high school deficiencies
- 3 completion of MATH 120 – College Algebra (or high school equivalent) with a grade of C or better, and
- 4 maintenance of a cumulative grade point average of at least 2.0 (on a 4.0 scale).

Students who are considering a major in any School of Engineering program should contact the associate dean of engineering, Engineering Building, room 3062, telephone (618) 650-2534, as early as possible. Early declaration and advisement by the School of Engineering will enable students to enroll in courses that are major-restricted, and to complete their programs with minimum conflicts within the shortest possible time.

Enrollment in Upper-Division Engineering Courses

Eligibility for upper-division courses in civil engineering, computer engineering, electrical engineering, industrial engineering, manufacturing engineering, and mechanical engineering requires satisfactory completion of lower-division core courses and special requirements for the specific major.

Specific requirements for enrollment in upper-division engineering courses for each major are given in the departmental sections that follow. Entry points for electrical and computer engineering are fall, spring, and summer terms. Entry points for civil engineering are fall and spring terms. Industrial engineering, manufacturing engineering, and mechanical engineering students normally enter the upper-division programs in fall terms. Application forms for admission to upper-division engineering courses are available in departmental offices as well as the associate dean's office, Engineering Building, room 3062. An application should be filed in the appropriate departmental office no later than March 15 for summer or fall semester admission, and no later than October 15 for spring semester admission. Late applications will be considered on a space-available basis.

The admissions committee of the appropriate department considers applications. Students whose applications are rejected may not register for upper-division engineering courses. If the rejection is based on enrollment limitations, students may reapply for a different engineering program or for later entry in the same program. If the rejection is based on failure to complete lower-division courses, students may apply for entry when the requirements are completed.

Enrollment Limits

The number of students accepted into each engineering program upper-division entry point is restricted due to class-size limitations. Priority will

be assigned as follows using grade point ranking for the lower-division courses required for each program's upper-division admission:

- 1 current SIUE students who have 12 or fewer lower-division transfer hours, Illinois transfer students, and students from regional community colleges with approved School of Engineering articulation programs, ranked by program lower-division grade point average (2.0 and above) and
- 2 other transfer students ranked by program lower-division grade point average (2.25 and above).

Transfer Students

Transfer students wishing to enter one of the programs offered by the School of Engineering should contact the associate dean of engineering for a transfer credit evaluation at least 30 days before the beginning of the term for which entry is desired. Students must supply copies of the pertinent transcripts and any other materials, such as course descriptions or syllabi that may be needed for the evaluation. Only chemistry, computer science, mathematics, physics, and engineering science courses completed with a grade of C or better will be considered for transfer credit toward completing a major or minor in the School of Engineering. In addition, only courses that are part of an ABET-accredited engineering program and have been completed within the last 10 years will be considered toward any 300- or 400-level engineering course requirement.

Transfer students who satisfy part or all of the University general education requirements by transfer courses or a previous degree also must satisfy the School of Engineering humanities and social sciences requirements for the bachelor of science degree. Any remaining humanities and/or social sciences requirements will be specified by the associate dean as part of the transfer credit evaluation.

Minority and Women Engineering Services

The School of Engineering provides support services for minority and women students including orientation for new students, advisement, counseling and assistance in networking, internship placement, and career planning. For more information, contact the assistant to the dean, Engineering Building, room 3060, (618) 650-2541.

Civil Engineering

Professors: Cross, W.B.; Lin, C.; Panahshahi, N.; Rossow, M.P. (Chair)

Associate Professors: Morgan, S.M.

Assistant Professors: Luttrell, G.L.; Zhou, J.

Instructor: Pierce, R.G. Jr.

Civil engineering is concerned with creating and maintaining the infrastructure of modern industrialized society. Civil engineers conceive, design, and construct physical works such as bridges, buildings, stadiums, warehouses, power plants, factories, canals, pipelines, highways, airports, rapid transit lines, railroads, harbor facilities, dams and water supply, waste-water treatment, storm water run-off, and solid-waste management systems including hazardous wastes.

The Department of Civil Engineering offers a curriculum that provides students with a rigorous background in mathematics, physical science, and civil engineering. Elective courses are available in the environmental, structural, geotechnical, transportation, and materials areas. Baccalaureate graduates are prepared to hold an entry-level position in industry or government, or to pursue graduate study. During the senior year, students are encouraged to complete the Fundamentals of Engineering Examination, the first step in achieving registration as a professional engineer. Students interested in civil engineering will find facilities available for conducting basic soil mechanics procedures such as soil classification, permeability, compaction, direct shear, consolidation, and triaxial tests. In addition, equipment for demonstrating hydraulic phenomena, conducting tensile and torsional testing, analyzing water and wastewater, and testing concrete and asphalt mix designs is provided.

The civil engineering program is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, telephone: (410) 347-7700.

The civil engineering program mission is consistent with the mission of the University and the School of Engineering. The department assigns first priority to excellence in undergraduate education. The program educational objectives are dynamic and under continual review by the program constituencies. The

objectives are given on the department Web site: www.ce.siue.edu/CIVIL/undergrad/.

Career Opportunities

Civil engineers are employed in technical and managerial positions by structural design, transportation, environmental design, construction, consulting, and manufacturing companies. Civil engineers also work as members of teams of engineers and scientists in the aerospace, petroleum, biomedical, automotive, telecommunication, and other industries. In addition, many civil engineers are employed by city, state and federal government agencies.

Enrollment in Upper-Division Civil Engineering Courses

The following requirements must be met to enroll in upper-division civil engineering courses:

- satisfactory completion of all University and School of Engineering admission requirements;
- an approved application for enrollment in upper-division engineering courses;
- satisfactory completion of the lower-division courses CHEM 121a, 125a; CE 204, 206, 207L, 240, 242; ENG 101, 102; IME/PHIL 106, MATH 150, 152, 250, 305; ME 262; PHYS 211a, 211b, 212a, 212b; and SPC 103, with a grade point average of at least 2.0 for the above courses required for non-transfer students, transfer students from articulated programs, and Illinois resident transfer students; a grade point average of at least 2.25 for the above courses is required for other transfer students; and
- a grade of C or above in CE 240, CE 242, and ME 262.

Academic Status

Students must maintain the following standards. Students who fail to do so will be placed on probation in the major.

- maintain a cumulative grade point average of at least 2.0.
- maintain a term grade point average above 1.0 in any term.
- maintain a cumulative grade point average of at least 2.0 in all mathematics and science courses.

- maintain a cumulative grade point average of at least 2.0 in courses taught in the School of Engineering.
- maintain a cumulative grade point average of at least 2.0 in major courses numbered above 299.
- receive no more than two failure grades, incomplete, and/or withdrawals in any combination for a single course required in the major.

Students placed on probation should seek immediate advisement and will be given the conditions required for removal from probation. If the conditions are not met, students are dropped from the major and may not enroll in upper-division School of Engineering courses without written departmental permission. After one year, students are eligible to re-apply for admission to the major. Students dropped from the major may direct a written appeal to the departmental academic standards committee.

Degree Requirements Bachelor of Science Civil Engineering

Natural Science and Mathematics Courses	32
CHEM 121a (131), 125A (135)	5
MATH 150, 152, 250, 305	17
PHYS 211a, 211b, 212a, 212b	10
Engineering Courses	68
CE 204, 206, 207L, 240, 242, 315, 330, 330L, 342, 343, 354, 354L, 376, 380, 415L, 416 or 455, 460, 493	44
3 CE Electives and 1 CE-Related Elective*	12
ECE 210	3
IME 345	3
ME 262, 310	6
Fine Arts and Humanities Courses	9
Introductory Fine Arts/Humanities Courses	6
PHIL 323	3
Social Science Courses	6
ECON 111	3
Dist. Social Science	3
Skills Courses	15
ENG 101, 102	6
IME/PHIL 106	3
SPC 103, 104, or 105	3
STAT 380	3
Interdisciplinary Course	3
Total	133

* Civil engineering and CE-related electives must be selected with the approval of a faculty adviser. A curriculum guide with a list of civil engineering electives is available in the department office.

For a suggested program of study, visit the department Web site: www.ce.siu.edu/CIVIL/undergrad/

Exit Requirements

A cumulative grade point average of 2.0 or higher is required for courses taught in the School of Engineering; a cumulative grade point average of 2.0 or higher is required for civil engineering courses numbered above 299; and students must complete a senior assignment included as part of CE 493 Engineering Design. In addition to fulfilling department requirements, students must complete all University requirements for graduation.

Computer Science

Professors: Waxman, B.M. (Acting Dean); Wu, T.

Associate Professors: Ehlmann, B.K.; Weinberg, J.B. (Chair); White, W.W.; Yu, X.W.

Assistant Professors: Blythe, S.A.; Dooly, D.R.; Fujinoki, H.

Computer science is the study of processes and machines that describe and transform information. The fundamental quest underlying all of computing is a determination of all that can be automated. The roots of the discipline extend deeply into mathematics and engineering. Mathematics contributes methods of analysis to the field; engineering contributes methods of design. The discipline was born in the early 1940s with the joining of algorithm theory, mathematical logic, and the invention of the stored program electronic computer.

At present, nine areas cover the field of computing: algorithms and data structures, programming languages, computer architecture, numerical and symbolic computation, operating systems, software methodology and engineering, database and information retrieval systems, artificial intelligence and robotics, and human-computer communications. Each area is very broad. For example, human-computer communications includes computer graphics, user interface design and voice recognition. Computer architecture includes the design of personal computers, supercomputers, and extensively parallel computers. Some aspects of computing, such as parallel and distributed computation, pervade all areas.

Each area has a theoretical component, significant abstractions, and substantial design and implementation issues. The theory is the underlying

mathematics. Abstraction deals with models of possible implementations. The models suppress details while retaining essential features, and provide means for predicting the future systems. Design deals with the process of specifying a problem, transforming the problem statement into a design specification, and repeatedly inventing and investigating alternative solutions until a reliable, maintainable, documented, and tested design that meets cost criteria is achieved. The design process must recognize social, legal, and ethical constraints.

Although change is constant in computing, the change in underlying concepts is gradual; therefore, students preparing for a career in computing need to develop a firm understanding of basic principles. The ability to grow and change requires more than just technical expertise. Communication skills and a sound general education are critical if one is to have the capacity and perspective to live with and manage change. Students must develop a good understanding of the social and economic setting in which they will live and work.

The major professional organizations for computing are the Association for Computing Machinery and the Computer Society of the Institute for Electrical and Electronic Engineering. Members of these organizations work together to define the goals and content of undergraduate programs in computing. Faculty members of the Department of Computer Science are members of both professional organizations, participate in the organizations, and are committed to maintaining a program that meets professional standards. The goals and content of the department's curricula reflect the recommendations of both professional organizations.

Career Opportunities

The outlook for a person with a bachelor's degree in computer science remains good. Areas of application continue to expand, maintaining the demand. Departmental advisers can provide information about career possibilities in computer science and can suggest elective courses that would be appropriate for various career goals and interests, including graduate study.

Admission

Students who are considering computer science as a major should call or visit the Department of Computer Science (Engineering Building, room 2054, telephone 618-650-2386) as early as possible. They will be referred to a faculty adviser who will

provide more information about the curricula and the department and help them plan an academic program. Early advisement will enable students to complete their programs with minimal conflicts and within the shortest possible time.

To be admitted to the bachelor of science or bachelor of arts program, students must:

- 1 complete all Academic Development courses required by the University
- 2 complete any courses required to address high school deficiencies
- 3 complete MATH 120 - College Algebra (or high school equivalents) with a grade of C or better, and
- 4 attain a cumulative grade point average of at least 2.0 (on a 4.0 scale).

Academic Status

Student must meet the following standards. Students who fail to do so will be placed on probation in the major.

- 1 maintain a cumulative grade point average of 2.0.
- 2 maintain a term grade point average above 1.0 in any term.
- 3 maintain a cumulative grade point average of at least 2.0 in all mathematics and science courses.
- 4 maintain a cumulative grade point average of at least a 2.0 in courses taught in the School of Engineering.
- 5 maintain a cumulative grade point average of at least 2.0 in major courses numbered above 299.
- 6 receive no more than two failure grades, incomplete, and/or withdrawals in any combination for a single course required in the major.

Students placed on probation should seek immediate advisement and will be informed of the conditions required for removal from probation. If the conditions are not met, students are dropped from the major and may not enroll in upper-division School of Engineering courses without written departmental permission. After one year, students are eligible to re-apply for admission to the major. Students dropped from the major may direct a written appeal to the department's academic standards committee.

Program of Study

The Department of Computer Science offers a bachelor of science curriculum and a bachelor of arts curriculum. The bachelor of arts curriculum has fewer computing, mathematics, and science requirements than the bachelor of science curriculum; it allows students to design a program of study that will include a minor in another discipline or, with an appropriate selection of courses, a second major.

Both curricula require students to complete a senior project during their last year of study. Department advisers can provide detailed information about the senior project requirement.

Most computer science courses have other courses as prerequisites. Before enrolling in a course in computer science, students must complete the prerequisite(s) with a grade of C or better. A grade of D in a prerequisite course implies inadequate preparation to continue to the next course.

To graduate, students must complete the specific program requirements and meet the following conditions:

- 1 complete at least 12 hours of computer science credits at SIUE in courses numbered above 299 and with a cumulative GPA of 2.0 or above,
- 2 have a GPA of 2.0 or above in all computer science courses numbered above 299, and
- 3 complete at least 6 hours of credit in major courses numbered above 299 at SIUE within two years preceding graduation.

Degree Requirements Bachelor of Science Computer Science

Natural Science and Mathematics Courses	30-31
MATH 150, 152, 224 and one course in MATH from 250, 305, 321, 423	16
Laboratory Science Sequence: Either PHYS 211a, 211b, 212a, 212b or CHEM 121a, 121b, 125a, 125b, or	10
125a, 125b, (or 131, 135 for 121a and 125a) Natural Sciences Electives — One additional laboratory course selected from BIOL 120; CHEM 121a and 125a; 131 and 135; PHYS 211a and 212a; or PHYS 302 and 308	4-5
Computing Core	38
CS 111, 140, 150, 240, 275, 312, 321, 325, 330, 340, 414, ECE 282	
Computing Electives	15
Five courses selected from: CS 423, 434, 438, 447, 454, 456, 482, 490, 495, ECE 381, 482, 483, MATH 465	

Senior Project	6
CS 425, 499	
General Education: Introductory Courses	9
One Fine Arts/Humanities Course and Two Social Science Courses or vice versa	9
General Education: Distribution Courses	6
Distribution Fine Arts/Humanities	3
Distribution Social Science	3
Skills Courses	15
ENG 101, 102	6
FL 106, IME 106, MATH 106, or PHIL 106	3
SPC 103, 104, or 105	3
STAT 380	3
Interdisciplinary Studies Course	3
Free Electives	1-2
Total	124

To view a sample program for a bachelor of science degree in computer science, see the School of Engineering Web site: www.siu.edu/ENGINEER.

Degree Requirements Bachelor of Arts Computer Science

Natural Science and Mathematics Courses	10-11
MATH 125, 130 or 150, 224	
Computing Core	34
CS 111, 140, 150, 240, 275, 312, 321, 325, 330, 340, 414	
Computing Electives	9
Three courses selected from: CS 423, 434, 438, 447, 454, 456, 482, 490, 495, MATH 465	
Senior Project	6
CS 425, 499	
Introductory GER Courses	9
One Fine Arts/Humanities Course and Two Social Science Courses or vice versa	9
Distribution GER Courses	6
Distribution Fine Arts/Humanities	3
Distribution Social Science	3
Skills Courses	17
ENG 101, 102	6
Foreign Languages	8
STAT 244	3
Interdisciplinary Studies Course	3
Minor	18 22
Free Electives	7-12
Total	124

To view a sample program for a bachelor of arts degree in computer science, visit the School of Engineering Web site at www.siu.edu/ENGINEER.

Minor Requirements

The minor in computer science requires 22 semester hours consisting of CS 111, CS 140, CS 150, CS 240, CS 312, and two additional CS courses which have at least one of the above five required courses as a prerequisite. The required courses must be completed with a GPA of 2.0 or above. At least six semester hours must be earned at SIUE.

Construction

Professors: Snell, L.M.

Associate Professor: Kay, D.H. (Chair)

Assistant Professor: Duvel, C.S.; Lee, D.; Slattery, K.T.

The objective of the Construction Management program is to provide graduates with the knowledge and skills necessary to coordinate the multifaceted aspects of the construction industry. Course work presents basic scientific principles augmented by business and engineering practices and procedures.

Career Opportunities

The construction industry is one of the largest components of the present economy. The construction work force includes skilled and unskilled labor, engineers, accountants, financial analysts, business managers, and construction professionals. The scope of construction ranges from most modest projects costing a few hundred dollars to projects whose total cost may be billions of dollars. The industry's continuing changes in technology produce a need for construction professionals trained in the managerial and scientific techniques of construction.

Academic Status

Student must meet the following standards. Students who fail to do so will be placed on probation in the major.

- 1 Maintain a cumulative grade point average of 2.0.
- 2 Maintain a term grade point average above 1.0 in any term.
- 3 Maintain a cumulative grade point average of at least 2.0 in all mathematics and science courses.
- 4 Maintain a cumulative grade point average of at least a 2.0 in courses taught in the School of Engineering.
- 5 Maintain a cumulative grade point average of at least 2.0 in courses taught in the School of Business.
- 6 Maintain a cumulative grade point average of at least 2.0 in major courses numbered above 299.
- 7 Receive no more than two failure grades, incomplete, and/or withdrawals in any combination for a single course required in the major.

Students placed on probation should seek immediate advisement and will be informed of the conditions required for removal from probation. If the conditions are not met, students are dropped from the major and may not enroll in construction courses without written departmental permission. After one year, students are eligible to re-apply for admission to the major. Students dropped from the major may direct a written appeal to the department's academic standards committee.

Degree Requirements

Bachelor of Science

Construction Management

Natural Science and Mathematics Courses	19
Chemistry 120a, 124a	4
Mathematics 150, 152	10
Physics 211a, 212a	5
Construction Courses	48
CNST 120, 201, 202, 264, 301, 321, 332, 341, 351, 353, 403, 411, 451, 452, 470	48
Technical Electives	9
Business Courses*	15
ACCT 200, 210	6
ECON 331	3
FIN 320	3
GBA 400	3
Engineering Courses	6
CE 240, 242	6
Fine Arts and Humanities Courses	9
Introductory Fine Arts/Humanities Courses	6
Distribution Fine Arts/Humanities Course	3
Social Science Courses	6
*ECON 111, 112	6
Skills Courses	16
ENG 101, 102	6
PHIL 106	3
SPC 103, 104 or 105	3
STAT 244	4
Total	128

* These courses fulfill the requirements for a minor in business.

To view a sample program for construction management, visit the School of Engineering Web site at www.siu.edu/ENGINEER/CONSTRUCT/

Exit Requirements

Construction students must meet all University requirements for graduation and the following construction management program requirements:

- 1 Earn a cumulative grade point average above 2.0 in all construction courses and
- 2 Earn a cumulative grade point average above 2.0 in all business courses to qualify for a minor in business administration general.
- 3 Complete the construction management senior assignment.

Minor Requirements

Twenty-one semester hours are required for a minor in construction management. The courses are to be selected from the construction curriculum with approval by the chair of Construction Department. A cumulative grade point average of 2.0 or higher is required for construction management courses.

Electrical and Computer Engineering

Professors: Alkin, O. (Chair); Chen, J.; Godhwani, A.; Smith, S.R.; Umbaugh, S.E.; Youn, L.T.

Associate Professors: Engel, G.L.; Noble, B.L.

Assistant Professors: LeAnder, R.W.; Lozowski, A.

Electrical engineering and computer engineering disciplines are concerned with the development and application of electrical and computer technology to enhance and enrich all life. Electrical and computer engineers, as part of this mission, are engaged in a wide variety of activities that include among other things:

- space exploration and remote sensing,
- process control and automation,
- automatic control systems for use in robotics, missiles, aircraft, and manufacturing plants,
- electric power generation and distribution, environmentally responsible generation and use of energy,
- audio- video- and data-communication systems, satellite communications,
- digital processing of signals and images using the computer,
- design and manufacturing of faster and more capable microprocessors for the computers of tomorrow,

- applications of technology in the health care field through computerized ultrasound, radiology, tomography and imaging systems, computer-aided diagnosis and treatment, and tele-surgery.

The applications listed above require a solid foundation in mathematics and physics, thus requiring electrical and computer engineering students to go through a substantial set of courses in these areas. In addition, today's engineers also must be aware of a wide variety global, social, ethical, economic and environmental issues that are relevant to the systems they design and build. Our bachelor's degree programs include courses and projects designed to build this awareness. The electrical and computer engineering program mission is consistent with the mission of the University and the School of Engineering. Program educational objectives and outcomes are available on the department Web site: www.siu.edu/ENGINEER.

The department of Electrical and Computer Engineering has several well-equipped modern laboratories for computation, simulation, and measurement. Individual laboratories to support elective courses in the areas of computers, control, digital signal processing, image processing, and power also are available to students.

Career Opportunities

Electrical and computer engineers find employment in a wide variety of manufacturing companies such as aerospace and aircraft, electric manufacturers, computer circuit (a.k.a. "chip") manufacturers, and medical equipment manufacturers. They are employed in the fields of research, design, manufacturing, and sales. Many public utilities, which include power companies and telephone companies, employ both computer engineers and electrical engineers. Other potential employers include oil companies, railroads, food processing plants, chemical and biological laboratories, chemical plants, various branches of federal government, and many consulting engineering companies.

Enrollment in Electrical and Computer Engineering Courses

- 1 Enrollment in any ECE course is limited to students with a declared major in one of the engineering disciplines. Exceptions to this rule require the approval of the department chair.

- 2 Students must meet the prerequisites for ECE courses in which they enroll. Exceptions require the approval of the course instructor and the department chair.
- 3 A prerequisite can be fulfilled only by a grade of C or better. A grade of D is sufficient to pass a course, but is not sufficient to qualify the student to enroll in a more advanced course that lists the former as a prerequisite.

Academic Status

Student must meet the following standards. Students who fail to do so will be placed on probation in the major.

- 1 Maintain a cumulative grade point average of 2.0.
- 2 Maintain a term grade point average above 1.0 in any term.
- 3 Maintain a cumulative grade point average of at least 2.0 in all mathematics and science courses.
- 4 Students must maintain a cumulative grade point average of at least a 2.0 in courses taught in the School of Engineering.
- 5 Students must maintain a cumulative grade point average of at least 2.0 in major courses numbered above 299.
- 6 Students must receive no more than two failure grades, incomplete, and/or withdrawals in any combination for a single course required in the major.

Students placed on probation should seek immediate advisement and will be given the conditions required for removal from probation. If the conditions are not met, students are dropped from the major and may not enroll in upper-division School of Engineering courses without written departmental permission. After one year, students are eligible to re-apply for admission to the major. Students dropped from the major may direct a written appeal to the department's academic standards committee.

Degree Requirements Bachelor of Science Electrical Engineering

Natural Science and Mathematics Courses	37
CHEM 121a, 125a	5
MATH 150, 152, 250, 305,355	22
PHYS 211a, b, 212a,b	10

Engineering Courses	62
ECE 210, 211, 282, 326, 327, 340, 341, 351, 352, 365, 375, 404, 405	43
ECE Electives	12
IME 345	3
CE/ME 244	4
Fine Arts and Humanities Courses	9
Intro Fine Arts / Humanities Courses	6
PHIL 323	3
Social Science Courses	6
ECON 111	3
Distribution Social Science Course	3
Interdisciplinary Course	3
Skills Courses	15
CS 145 or CS 140)	3
ENG 101, 102	6
SPC 103, 104, or 105	3
IME 106	3
Total	132

Degree Requirements Bachelor of Science Computer Engineering

Natural Science and Mathematics Courses	37
CHEM 121a, 125a	5
MATH 150, 152, 224, 250, 305,,355	22
PHYS 211a, b, 212a,b	10
Engineering Courses	50
ECE 210, 211, 282,326, 351, 352, 375, ,381, 404, 405, 483	35
ECE/CS Elective	12
IME 345	3
Computer Science Courses	15
CS 150, 240, 312, 414	9
Fine Arts and Humanities Courses	9
Intro Fine Arts / Humanities Courses	6
PHIL 323	3
Social Science Courses	6
ECON 111	3
Dist. Social Science Course	3
Interdisciplinary Course	3
Skills Courses	16
CS 140	4
ENG 101, 102	6
SPC 103, 104, or 105	3
IME 106	3
Total	133

To view a sample program for electrical engineering, visit the School of Engineering Web site at www.siu.edu/ENGINEER.

To view a sample program for computer engineering, visit the School of Engineering Web site at www.siu.edu/ENGINEER.

Exit Requirements for Electrical Engineering and Computer Engineering Programs

Degree requirements include the following:

- 1 satisfactory completion of all University requirements for graduation
- 2 a cumulative grade point average of 2.0 or higher for courses taught in the School of Engineering
- 3 a grade point average of 2.0 or higher in electrical engineering and computer science courses numbered above 299
- 4 completion of at least 30 hours of the required electrical engineering and computer science courses at SIUE and
- 5 completion of senior assignment contained in ECE 404 and 405.

Minor Requirements

A minor in electrical engineering requires 24 semester hours. The courses required are ECE 210, 211, 282, 326, 340, 351, 365. A cumulative grade point average of 2.0 or higher is required for courses.

A minor in computer engineering requires 23 semester hours. The courses ECE 210, 211, 282, 351, 381, CS 150, CS 240. A cumulative grade point average of 2.0 or higher is required for these courses.

Mechanical and Industrial Engineering

Professors: Eneyo, E.S. (Program Director); Gu, K. (Chair); Karacal, S.C.; Lee, H.F.; Molki, M.; Saniei, N.; Van Roekel, J.H. (Associate Dean); Yan, X.

Associate Professors: Luo, A.

Assistant Professor: Hubbard, K.M.; TeAlakebanga, T.

Industrial and Manufacturing Engineering

Industrial engineering and manufacturing engineering are professional disciplines having extraordinary breadth of application. They are principally concerned with the analysis and design of systems and procedures for organizing the basic resources of production (people, materials, and equipment) to achieve specific objectives. Industrial and manufacturing engineers deal with the design,

improvement, and installation of integrated systems, drawing upon specialized skills in the mathematical, physical, managerial, and behavioral sciences, together with the principles and methods of engineering analysis for specifying, predicting, and evaluating the results to be obtained from such systems. What sets industrial and manufacturing engineering apart from other engineering disciplines is their broader scope. For example, industrial and manufacturing engineers use knowledge in a wider variety of applications, deal with people as well as things, relate to the total picture of productivity improvement, and apply problem-solving techniques in almost every kind of organization imaginable. Consequently, industrial and manufacturing engineers bridge the gap between management and technical operations, dealing with and motivating people as well as determining what tools should be used and how they should be used.

Throughout the program, there is an integrated series or sequence in the major field that includes not only basic and fundamental courses, but also specialized courses in the fields of facilities design, production planning and control, operations research, quality control, computer-integrated manufacturing, process and product design and tool engineering. These specialized courses reflect the impact of recent developments in operations research, information processing, and automation.

The industrial and manufacturing engineering program has a computer-integrated manufacturing laboratory equipped with a wide variety of industrial quality automation equipment including several robots, programmable logic controllers, an automated storage and retrieval system, a loop conveyor, several flexible manufacturing cells, a vision system, a bar code reading system, and a comprehensive computer-integrated manufacturing software package. Students interested in human factors will find facilities for evaluating ergonomic systems and work methods, and for measuring human performance.

The industrial and manufacturing engineering program mission is consistent with the mission of the University and the School of Engineering. The department assigns first priority to excellence in undergraduate education. The program's educational objectives are dynamic and under continuous review by the program constituencies. These objectives are available on the School of Engineering Web site: www.siu.edu/ENGINEER.

Career Opportunities

Industrial and manufacturing engineers are specifically prepared to function as problem solvers, innovators, coordinators, and change agents. Industrial and manufacturing engineers practice in all phases of manufacturing industries, service industries, and government agencies.

For example, in a manufacturing organization, industrial and manufacturing engineers may be concerned with the design of a single work place involving one or more persons and one or more machines. In designing such work places, industrial and manufacturing engineers must consider not only the capabilities of machines, but also the physiological and psychological capabilities and limitations of humans. Industrial and manufacturing engineers also are involved in the design of computer-integrated manufacturing processes with robots, the design of entire plants, and the design of systems to control the production, inventory, and quality of large numbers of complex products. At higher corporate levels, there are concerns with plant and warehouse locations, the development of sales forecasts, and the evaluation of proposals to produce new products and the building of new or improved production facilities.

In service industries and government agencies, the same skills used to design manufacturing systems are found to be useful by industrial engineers in designing better systems to care for patients in hospitals, assisting the judicial system, providing fast and more accurate mail distribution, improving airline reservation methods, and controlling large space projects. The complexity of modern industrial and service organizations and the emphasis on increased effectiveness, efficiency, and productivity have led to a growing need for industrial engineering analysis and design and an increasing demand for industrial and manufacturing engineering graduates. This increased demand recognizes the versatility of modern industrial and manufacturing engineers in being responsive to the challenges of a rapidly changing society. Although manufacturing engineering is a comparatively new professional area, having developed over the last five decades, it already is one of the nation's largest and fastest-growing engineering professions. Demand for new graduates in industrial and manufacturing engineering programs far exceeds the current output of industrial and manufacturing engineering programs.

Enrollment in Upper-Division Industrial and Manufacturing Engineering Courses

The requirements for enrollment in upper-division industrial and manufacturing engineering courses are:

- 1 satisfactory completion of all University and School of Engineering admission requirements;
- 2 an approved application for enrollment in upper-division Engineering courses;
- 3 satisfactory completion of the lower-division (core) courses CE 204, 240, 242; CHEM 131 (or 121a), 135 (or 125a); CS 145 (recommended) (or CS 140); ECE 210; ENG 101, 102; MATH 150, 152, 250, 305 or 321 (for IEs only); ME 262; PHYS 211a, 211b, 212a, 212b; and SPC 103 or 104 or 105; with a grade point average of at least 2.0 for the above courses is required for non-transfer students, transfer students from articulated programs, and Illinois resident transfer students; a grade point average of at least 2.25 for the above courses is required for other transfer students; and
- 4 a grade point average of 2.0 or better in CS 145 or 140, CE 204, 240, 242, ECE 210, and ME 262 (both original and repeat grades are computed in the grade point average)

Academic Status

Students must meet the following standards. Students who fail to do so will be placed on probation in the major.

- 1 Maintain a cumulative grade point average of 2.0 or above.
- 2 Maintain a term grade point average above 1.0 in any term.
- 3 Maintain a cumulative grade point average of at least 2.0 in all mathematics and science courses.
- 4 Maintain a cumulative grade point average of at least a 2.0 in courses taught in the School of Engineering.
- 5 Maintain a cumulative grade point average of at least 2.0 in major courses numbered above 299.
- 6 Receive no more than two failure grades, incomplete, and/or withdrawals in any combination for a single course required in the major.

Students placed on probation should seek immediate advisement and will be given the conditions required for removal from probation. If the conditions are not met, students are dropped from the major and may not enroll in upper-division School of Engineering courses without written departmental permission. After one year, students are eligible to re-apply for admission to the major. Students dropped from the major may direct a written appeal to the department's academic standards committee.

**Degree Requirements
Bachelor of Science
Industrial Engineering**

Natural Science and Mathematics Courses	32
CHEM 125a, 131	5
MATH 150, 152, 250, 305 or 321	17
PHYS 211a, 211b, 212a, 212b	10
Engineering Courses	66
CE 204, 240, 242	9
ECE 210	3
IME 335, 345, 365, 370, 375, 415, 451, 465, 468, 470, 476, 483, 484, 490	42
IME Electives*	9
ME 262	3
Fine Arts and Humanities Courses	9
Introductory Fine Arts/Humanities Courses	6
PHIL 323	3
Social Science Courses	6
ECON 111	3
PSYC 320	3
Skills Courses	15
CS 145 (recommended) or CS 140	3
ENG 101, 102	6
IME 106 or PHIL 106	3
SPC 103, or 104, or 105	3
Interdisciplinary Course	3
Total	131

* Industrial engineering electives must be selected with the approval of a faculty adviser and must contain at least two hours of design content. A curriculum guide with a list of industrial engineering electives and the design hours for each is available in the department office.

**Degree Requirement
Bachelor of Science
Manufacturing Engineering**

Natural Science and Mathematics Courses	32
CHEM 125a, 131	5
MATH 150, 152, 250, 305	17
PHYS 211a, 211b, 212a, 212b	10
Engineering Courses	69
CE 204, 240, 242	9
ECE 210	3
IME 345, 365, 370, 375, 465, 470, 475, 476, 480, 482, 483, 490	36
IME Electives*	9
ME 262, 310, 315, 370	12
Fine Arts and Humanities Courses	9
Introductory Fine Arts/Humanities Courses	6
PHIL 323	3

Social Science Courses	6
ECON 111	3
Distributed Social Science	3
Skills Courses	15
CS 145 (recommended) or CS 140	3
ENG 101, 102	6
IME 106 or PHIL 106	3
SPC 103, or 104, or 105	3
Interdisciplinary Course	3
Total	134

* Manufacturing engineering electives must be selected with the approval of a faculty adviser and must contain at least two hours of design content. A curriculum guide with a list of industrial and manufacturing engineering electives and the design hours for each is available in the department office.

To view sample programs for industrial and manufacturing engineering, visit the School of Engineering Web site at www.siu.edu/ENGINEER.

Exit Requirements

Degree requirements include the following:

- 1 a cumulative grade point average of 2.0 or higher for engineering courses
- 2 a cumulative grade point average of 2.0 or higher for Industrial and Manufacturing Engineering courses numbered above 299
- 3 completion of all departmental and University requirements
- 4 completion of the Senior Assignment with IME 490, Integrated Engineering Design, and
- 5 a grade of C or better for IME 345, 365, 468 and 483 for industrial engineering majors, or
- 6 a grade of C or better for IME 345, 365, 370 and 482 for manufacturing engineering majors.
- 7 taking the FE (fundamental engineering) exam before graduation date.

**Minor Requirements
for Industrial Engineering**

Twenty-one semester hours are required for the industrial engineering minor, including IME 345, 365, 370, 415 and 451. The remaining two courses are electives to be selected from the following four courses: IME 465, 468, 470, and 483. Other substitute electives are subject to approval by the chair/director of the industrial engineering program. A cumulative grade point average of 2.0 or higher is required for industrial engineering courses.

Minor Requirements for Manufacturing Engineering

Twenty-one hours are required, including IME 365, 370, 375, ME 310, 370. The remaining two courses are electives to be selected from the following four courses: IME 465, 475, 480, and 482. Other substitute electives are subject to approval by the chair/director of industrial and manufacturing engineering. A cumulative grade point average of 2.0 or higher is required for manufacturing engineering courses.

Mechanical Engineering

Mechanical engineering is concerned with the generation and use of energy as well as with structures and motion in mechanical systems. The program of study prepares students to contribute to the profession by applying existing technologies to new problems as well as developing new technologies to solve existing problems. Mechanical engineers apply their knowledge and creative abilities to a diverse array of problems such as designing systems for operation at the bottom of the sea and in outer space, as well as for the hostile environments found in many industrial processes. Mechanical engineers examine the basic phenomena of fluid turbulence or superconductors and the characteristics of composite materials, develop earthquake-resistant nuclear power plants and other facilities, and examine alternative energy conversion techniques for mobile and central station use.

The mechanical engineering program mission is consistent with the mission of the University and the School of Engineering. The department assigns first priority to excellence in undergraduate education. The program's educational objectives are dynamic and under continuous review by the program constituencies. These objectives are available on the school's home page, www.siue.edu/ENGINEER.

Career Opportunities

Upon graduation, mechanical engineers are prepared to contribute to society through professional practice in industry or government or to continue their education through graduate study in engineering or the applied sciences. Alternatively, they may choose to pursue a career in a related area such as business, law, or medicine.

Enrollment in Upper-Division Mechanical Engineering Courses

The requirements for enrollment in upper-division mechanical engineering courses are:

- 1 satisfactory completion of all University and School of Engineering admission requirements;
- 2 an approved application for enrollment in upper-division Engineering courses,
- 3 satisfactory completion of the lower-division (core) courses CE 204, 240, 242; CHEM 125a, 131; CS 145 or 140; ECE 210; ENG 101, 102; MATH 150, 152, 250, 305; ME 262; PHYS 211a, 211b, 212a, 212b; and SPC 103; with a grade point average of at least 2.0 for the above courses is required for non-transfer students, transfer students from articulated programs, and Illinois resident transfer students; a grade point average of at least 2.25 for the above courses is required for other transfer students;
- 4 a grade point average of 2.0 or better in ME 262, CE 240, CE 242, and ECE 210 (both original and repeat grades are computed in this grade point average); and
- 5 a grade of C or better in ME 262 and CE 240 or their equivalent.

Note: All grade point averages for the mechanical engineering program are computed using the original and repeat grades.

Exceptional cases will be reviewed by the faculty on a case-by-case basis.

Academic Status

Students must meet the following standards. Students who fail to do so will be placed on probation in the major.

- 1 Maintain a cumulative grade point average of 2.0.
- 2 Maintain a term grade point average above 1.0 in any term.
- 3 Maintain a cumulative grade point average of at least 2.0 in all mathematics and science courses.
- 4 Maintain cumulative grade point average of at least a 2.0 in courses taught in the School of Engineering.
- 5 Maintain a cumulative grade point average of at least 2.0 in major courses numbered above 299.
- 6 Receive no more than two failure grades, incomplete, or withdrawals in any combination for a single course required in the major.

Students placed on probation should seek immediate advisement and will be given the conditions required for removal from probation. If the conditions are not met, the students are dropped from the major and may not enroll in upper-division School of Engineering courses without written departmental permission. After one year, students are eligible to re-apply for admission to the major. Students dropped from the major may direct a written appeal to the department's academic standards committee.

**Degree Requirements
Bachelor of Science
Mechanical Engineering**

Natural Science and Mathematics Courses	35
CHEM 131 (or 121a), 135 (or 125a)	5
MATH 150, 152, 250, 305	17
PHYS 211a, 211b, 212a, 212b	10
STAT 380	3
Engineering Courses	61
ME 262, 310, 312, 315, 350, 356, 356L, 370, 380, 380L, 410, 410L, 480	34
ME Electives*	12
CE 204, 240, 242	9
ECE 210	3
IME 345	3
Fine Arts and Humanities Courses	9
Introductory Fine Arts/Humanities Courses	6
PHIL 323	3
Skills Courses	15
Intro to Computing CS 145 (recommended) or 140	3
ENG 101, 102	6
IME 106 (or PHIL 106)	3
SPC 103, or 104, or 105	3
Social Science Courses	6
ECON 111	3
Dist. Social Science	3
Interdisciplinary Course	3
Total	129

* Mechanical engineering electives must be selected with the approval of a faculty adviser and contain at least 1.5 hours of design content. A curriculum guide with a list of the mechanical engineering electives and the design credit hours for each is available in the departmental office.

To view a sample program for mechanical engineering, visit the School of Engineering Web site at www.siu.edu/ENGINEER.

Exit Requirements

Degree requirements include the following:

- 1 a cumulative grade point average of 2.0 or higher in engineering courses;
- 2 a cumulative grade point average of 2.0 or higher is required for mechanical engineering courses numbered above 299;
- 3 completion of all departmental and University requirements; and
- 4 completion of a senior assignment as part of ME 480, Mechanical Engineering Design.

Minor Requirements

Eighteen semester hours are required for a minor in mechanical engineering, including ME 262 and 310. Remaining courses are electives to be selected from among the mechanical engineering courses subject to approval by the chair of mechanical engineering. A cumulative grade point average of 2.0 or higher is required for mechanical engineering courses.