

Samuel Ginn College of Engineering

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ENGINEERS ARE FACED with worldwide problems and expectations awesome in responsibility, yet exciting as professional challenges. These range from the extremes of interplanetary exploration through earth orbiting systems to the problems arising from our population explosion: energy, better productivity, housing, transportation and environmental issues.

As a renewed appreciation develops for the contributions of science and technology, engineering leaders are calling for engineers, who are better equipped to tackle the specific, technical problems of the future. They also are calling for engineers who by breadth of education and understanding of other disciplines can convince others of the role of engineers not only in technical matters but in policy decisions to ensure the use of technology to benefit mankind.

Engineering education at Auburn also provides in a four-year curriculum both the technical knowledge and the broad general education necessary to equip engineers for their problem-solving challenges. Centered on mathematics and the physical sciences, the curricula also stress the importance of social sciences, humanities and communication skills. Auburn's engineering programs enable individuals to develop their natural talents and provide knowledge, skills and understanding that will help them to find their places in society as well as in their vocations.

Admission

Freshmen eligibility is determined by the Admissions Office. However, since the requirements for engineering education necessitate high school preparatory work of high intellectual quality and of considerable breadth, the following program is recommended as minimum preparation: English, four units; mathematics (including algebra, geometry, trigonometry, and analytical geometry), four units; chemistry, one unit; history, literature, social science, two or three units. Physics and foreign languages are recommended but not required.

Transfers from other institutions must apply through the Admissions Office. The exact placement of these students can be determined only upon review of their transcripts by the College of Engineering. See "Admission of Transfer Students" in the General Information section for complete requirements.

The College allows credit for courses completed with satisfactory grades provided the courses correspond in time and content to courses offered at Auburn. Courses that are taught at the 3000-level or higher at Auburn are generally not transferable from junior colleges.

Many courses required by the College of Engineering are highly specialized in their content and potential transfer students need to select courses with care. Therefore, to ensure maximum transferability of credits, students are encouraged to contact the College as soon as possible about acceptable credits.

Transfers from On-Campus must be approved by the College of Engineering and the admissions committee of the chosen curriculum, and meet the same academic requirements as off-campus transfer students. The criteria include a minimum overall Auburn GPA of 2.2 and the completion of the first mathematics course listed in the chosen curriculum with a grade of C or better.

Programs

Pre-Engineering. The Pre-Engineering Program consists of a freshman program of studies to prepare students for curricula in the College of Engineering. It also provides academic and career counseling to assist students in determining the curriculum that best fulfills their personal and educational objectives.

Professional Programs. Curricula accredited by the national accrediting agency, the Engineering Accreditation Commission of the

Accreditation Board for Engineering and Technology (ABET), lead to the degrees of Bachelor of Aerospace Engineering, Chemical Engineering, Civil Engineering, Electrical and Computer Engineering, Industrial and Systems Engineering, Materials Engineering, Mechanical Engineering, Textile Engineering and Biosystems Engineering. The curriculum leading to the Bachelor of Computer Science is accredited by the Computer Science Association Commission of the Computing Sciences Accreditation Board. The Department of Textile Engineering also administers curricula leading to the degrees of Bachelor of Textile Management and Technology and Bachelor of Textile Chemistry which are accredited by the Textile Institute, an international organization headquartered in Great Britain, which reviews textile academic programs worldwide.

These curricula are designed to meet the educational requirements of the engineering professions. The program in the fundamental sciences of mathematics, chemistry and physics is followed by a study of basic engineering sciences. Specialized or departmental courses are taken in the third and fourth years. Flexibility is provided in all degree programs through electives so that the individual may emphasize areas of personal interest.

The curriculum in Forest Engineering is offered jointly by the Biosystems Engineering Department and the School of Forestry. The curriculum in Environmental Science is offered jointly with the College of Agriculture and the College of Sciences and Mathematics.

Dual-Degree. The College of Engineering has agreements with several predominantly liberal arts institutions to offer an academic program where a student can earn two baccalaureate degrees. Under the terms of this program the first three years of study are devoted to earning a major in any one of the disciplines offered by the institution first entered, while completing the basic sciences and mathematics courses required for pre-engineering at Auburn.

Upon completion of three years of study in the liberal arts the student transfers to the College of Engineering. After a minimum of two years of study in an engineering curriculum, the student earns degrees from both institutions. The broad background provided by this program may enable a student to cope more effectively with many of the problems of modern-day society.

Dual degree agreements have also been made with Auburn University's Colleges of Agriculture, Liberal Arts and Sciences and Mathematics, to provide for dual-degree programs with the College of Engineering.

Graduate. The College of Engineering offers the M.S. and Ph.D. degrees in aerospace, chemical, civil, computer science and software engineering, electrical and computer, industrial and systems, materials and mechanical engineering and integrated textile and apparel science. The following professional degrees are offered as well: Master of Aerospace Engineering, Master of Chemical Engineering, Master of Civil Engineering, Master of Electrical and Computer Engineering, Master of Industrial and Systems Engineering, Master of Materials Engineering, Master of Mechanical Engineering and Master of Software Engineering.

Cooperative Education. The Cooperative Education Program is offered in all curricula of the College of Engineering. Refer to the program and write to the Director, Cooperative Education, Auburn University, AL 36849 for a booklet which gives additional information.

Extension. The Engineering Extension Service extends the resources of the College of Engineering to the people, businesses and industries of the state. Programs in this service are technical assistance, short courses, conferences, workshops and seminars. For more information, contact: Director, Engineering Extension Service, 217 Ramsay Hall, Auburn University, AL 36849.

Videotape-Based Off-Campus Courses. The College offers graduate-level courses for credit and non-credit to off-campus students

through its Graduate Outreach Program. Graduate-level courses are videotaped in the classroom on the Auburn campus and mailed to off-campus students on the same day. Students enrolled in the program are required to do the same homework assignments and take the same exams as the on-campus students enrolled in the course. For information on admission to the program, fees, course offerings and other particulars, write to the Graduate Outreach Program, 202 Ramsay Hall, Auburn University, AL 36849 or call (334) 844-5300.

Scholastic Requirements. Pre-Engineering students are transferred to the curriculum of their choice in the College of Engineering upon meeting the following requirements:

1. Complete all appropriate freshman courses;
2. Earn an overall GPA on all required and approved elective course work as follows: 2.2 for all curricula, except for a 2.0 for Textile Management.
3. Recommendation by the Curriculum Admissions Committee.

A student who has not met the above criteria after four resident semesters is dropped from the College. Junior standing will not be granted to any student in the Pre-Engineering Program.

Degree Requirements. To earn the bachelor's degree in the College of Engineering, students must complete the subjects in the curriculum, have a minimum GPA of 2.0 in all work attempted at Auburn University and have a cumulative GPA of 2.0 on courses passed in the major at Auburn. The major is defined as all course work shown in bold print on the relevant curriculum model. It is the student's responsibility to keep informed of course requirements and scheduling. Failure to do so may jeopardize graduation.

Military Science. All curricula in the College of Engineering permit the use of six hours of basic or advanced ROTC courses passed at Auburn University. For the options, see the specific curriculum. For programs that do not have sufficient electives, credit will be determined on an individual basis. ROTC courses cannot be substituted for any university core or ABET-required courses.

Minors

BUSINESS-ENGINEERING-TECHNOLOGY

Students who minor in Business-Engineering-Technology learn, practice, and integrate entrepreneurship, engineering, and business management skills demanded by the technology-driven global economy, solve real-world case study and design problems, and work in cross-functional teams. The minor is a joint offering by the Colleges of Business and Engineering. Admission to the minor is competitive. Engineering and business majors apply for admission to the Business-Engineering-Technology Program as second semester sophomores.

16 semester hours in the minor

Courses required:	Cr. Hr.
BUSI 3510 Introduction to Engineering and Business	3
BUSI 3520 Applying Bus. and Engr. Theories in Practice	3
BUSI 3530 Entrepreneurship and E-commerce	3
BUSI 4540 Strategic Mgmt. of Tech. and Innovation	3
BUSI 4970 Capstone Project I: Design Proposal	1
BUSI 4980 Capstone Project II: Design Project	3

COMPUTER SCIENCE MINOR

19 semester hours in Minor

Courses required:	Cr. Hr.
COMP 1200 Introduction to Comp for Engr & Sci	2
COMP 2200 Fund of Computer Science I	4
COMP 2210 Fund of Computer Science II	4
COMP 3240 Discrete Structures	3
COMP 3270 Introduction to Algorithms	3
COMP 3700 Computer Design & Modeling	3

INFORMATION TECHNOLOGY MINOR

15 semester hours in Minor (minimum 9 hours at 3000-level or above, selected from the following courses: COMP 3000, COMP 4000, COMP 6000, COMP 6010, COMP 6020, COMP 6030).

Courses required: NONE

Elective Courses: see adviser for approved course listing.

LOGISTICS MINOR

15 semester hours in Minor (minimum 9 hours at 3000 level or above)

Courses required: NONE

Elective Courses - See adviser for approved course listing.

Department of Aerospace Engineering

Aerospace engineers are concerned with the application of scientific principles and engineering concepts and practices to design, build, test and operate aerospace systems. The curriculum is intended to provide students with a broad understanding of fundamental scientific and technological principles, and to develop the ability to use these principles in developing solutions to engineering problems.

The objectives of the aerospace engineering program are: (1) to help students develop written and oral communication skills and to acquire a knowledge of history, literature and society; (2) to provide students a solid foundation in and a sound working knowledge of basic engineering principles; (3) to help students obtain an understanding of the engineering principles and skills specifically needed in the aeronautical and astronautical disciplines; and (4) to assist and encourage each student to develop an enhanced ability to learn and think creatively.

Required courses cover aeronautical and astronautical subjects. Students may also choose to emphasize either aeronautical or astronautical systems. Technical electives allow concentration in such areas as aerodynamics, astronautics, flight dynamics and control, propulsion, structures and structural dynamics. The design of aerospace components and systems is considered to be an integral part of the education of aerospace engineers. Hence, design is included throughout the curriculum, beginning with a sophomore course in aerospace fundamentals and culminating in the senior design course sequence. Students are required to apply their theoretical knowledge of aerodynamics, dynamics, structures and propulsion to solve open-ended problems and to produce portions of preliminary designs.

Curriculum in Aerospace Engineering

FR	F	S	F	S
CHEM	1030		Chemistry	4 **
ENGL	1100	1120	English Composition I & II	3 3
PHYS		1600	Engineering Physics	** 4
MATH	1610	1620	Calculus I & II	4 4
			Core History	3 3
ENGR	1100		Engineering Orientation	0 **
ENGR		1110	Introduction to Engineering	** 2
COMP	1200		Introduction to Computing	2 **
				16 16
SO				
PHYS	1610		Engineering Physics II	4 **
ENGL	2200	2210	Great Books I & II	3 3
MATH	2630		Calculus III	4 **
MATH		2650	Linear Diff Equations	** 3
			Core Philosophy	3 **
			Core Social Science Group 1	** 3
ENGR		2010	Thermodynamics	** 3
ENGR	2050		Statics	3 **
ENGR		2070	Strength of Materials	** 3
AERO	2200		Aero Fundamentals	** 2
				17 17
JR				
			Core Fine Arts	3 **
ENGR	2350		Dynamics	3 **
MATH	2660		Topics in Linear Algebra	3 **
ELEC	3810		Fundamentals of EE	3 **
AERO	3110	3120	Aerodynamics I & II	3 3
AERO		3130	Aerodynamics Lab	** 2
AERO		3220	Aerospace Systems	** 3
AERO		3230	Flight Dynamics	** 4
AERO		3310	Orbital Mechanics	** 3
AERO	3610		Aerospace Structures I	2 **
				17 15
SR				
			Core Social Science Group 2	** 3
AERO	4140		Aerodynamics III	3 **
AERO	4510		Aerospace Propulsion	4 **
AERO	4620	4640	Aerospace Structures II & III	3 2
AERO		4630	Aero Structural Dynamics	** 3
			Design Option I & II	3 3
			Aero/Astro Elective	3 3
				16 14

TOTAL HOURS - 128

Design Option - see adviser for approved course listing.
Aero/Astro - see adviser for approved course listing.

Department of Biosystems Engineering

The mission of the Biosystems Engineering Department is to develop and disseminate engineering knowledge to solve problems in agriculture, food, forestry, natural resources and the environment. It meets the resident instruction portion of that mission through the offering of a degree program which leads to a Bachelor of Biosystems Engineering in either a curriculum in Biosystems Engineering or a curriculum in Forest Engineering.

Biosystems Engineering

The Biosystems Engineering Department offers the only accredited degree in Biosystems Engineering in Alabama. It is committed to preparing students for productive professional careers in the biosystems industries and related natural resource and environmental systems sectors. Specific educational objectives of the program are to produce graduates with: the skills necessary to solve engineering problems associated with the production, processing, storage, and manufacture of food, fiber and agricultural products; the ability to combine engineering skills with training in biological sciences to solve problems and to work in multidisciplinary teams; the ability to analyze problems critically and conduct scientific experimentation and engineering analysis; the ability to continue developing professionally throughout their career.

The curriculum is coordinated by the colleges of Engineering and Agriculture. Students should apply for admission to the College of Engineering and complete the Pre-Biosystems Engineering program.

Curriculum in Biosystems Engineering

FR	F	S	F	S
CHEM 1030		Chemistry I	3	**
CHEM 1031		Chemistry I Lab	1	**
ENGL 1100	1120	English Composition I & II	3	3
PHYS 1600		Engineering Physics I	**	4
MATH 1610	1620	Calculus I & II	4	4
		Core History	3	3
ENGR 1100		Engineering Orientation	0	**
ENGR 1110		Introduction to Engineering	**	2
COMP 1200		Introduction to Comp for Engrs & Sci	2	**
			16	16
SO				
BIOL 1020		Principles of Biology	4	**
BIOL 1030	1030	Organismal Biology	**	4
CHEM 1030		Chemistry II	3	**
CHEM 1031		Chemistry II Lab	1	**
ECON 2020		Microeconomics	**	3
ENGR 2070		Mechanics of Materials	**	3
ENGR 2010		Thermodynamics	**	3
MECH 2110		Statics & Dynamics	4	**
MATH 2630		Calculus III	4	**
MATH 2650		Differential Equations	**	3
			16	16
JR				
ENGL 2200	2210	Great Books I & II	3	3
STAT 3010		Statistics for Engr & Sci	3	**
CIVL 3110		Hydraulics	4	**
BIOL 3200		Microbiology	**	4
ELEC 3810		Fundamentals of Electrical Engr.	3	**
BSEN 3200		Mechanical Power for Biosystems	3	**
BSEN 3230		Natural Resource Conversation Eng	**	3
BSEN 3240		Thermal Process Ops in Bio Engr	**	3
		Biosystems Electives	**	3
			16	16
SR				
		Core Fine Arts	**	3
		Core Social Science Group I	**	3
		Core Philosophy	**	3
AGRN 2040		Introduction to Soils	4	**
BSEN 3260		Engr for precision Ag & Fy	3	**
BSEN 4210		Irrigation Systems Design	3	**
BSEN 4230		Waste Mgt & Utilization Eng for Bio	**	3
BSEN 4240		Mech & Elec Process Op in Bio	3	**
BSEN 4310		Eng Design for Biosystems	**	4
		Biosystems Elective	**	3
			16	16

TOTAL HOURS - 128

Biosystems Electives: see adviser for approved course listing.

Forest Engineering

The Biosystems Engineering Department in conjunction with the College of Engineering and School of Forestry offers the only accredited degree with a curriculum in Forest Engineering in the Southern U.S. It is committed to preparing students for productive professional careers in the forest products industry and related natural resource and environmental systems sector. Specific educational objectives of the program are to produce graduates with: the skills necessary to solve engineering problems associated with the management of forest and natural resources and the production of wood fiber, and the manufacture and utilization of wood-based products, the ability to combine engineering skills with training in forest sciences to solve problems and to work in multidisciplinary teams; the ability to analyze problems critically and conduct scientific experimentation and engineering analysis; the ability to continue developing professionally throughout their career.

The curriculum is coordinated by the College of Engineering and the School of Forestry. Beginning student should apply to the College of Engineering and complete the Pre-forest Engineering program. Forest Engineering majors must meet School of Forestry requirements for admission to the Summer Field Practicum.

Curriculum in Forest Engineering

FR	F	S	F	S
CHEM 1030		Chemistry I	3	**
CHEM 1031		Chemistry I Lab	1	**
ENGL 1100	1120	English Composition I & II	3	3
PHYS 1600		Engineering Physics I	**	4
MATH 1610	1620	Calculus I & II	4	4
		Core History	3	3
ENGR 1100		Engineering Orientation	0	**
ENGR 1110		Introduction to Engineering	**	2
COMP 1200		Introduction to Comp for Engrs & Sci	2	**
			16	16
SO				
BIOL 1020		Principles of Biology	**	4
ENGL 2200	2210	Great Books I & II	3	3
ENGR 1031	2010	Thermodynamics	**	3
ENGR 2070		Mechanics of Materials	**	3
MECH 2110		Statics & Dynamics	4	**
MATH 2630		Calculus III	4	**
MATH 2650		Differential Equations	**	3
STAT 3010		Statistics for Engr & Sci	3	**
			14	16
SUMMER PRACTICUM				
FORY 3020		Forest Biology	2	**
FORY 3050		Field Mensuration	3	**
FORY 3060		Intro to Forest Management	1	**
FOEN 3000		Intro to Forest Operations	1	**
FOEN 3040		Forest Surveying	3	**
			10	**
JR				
ECON 2020		Microeconomics	**	3
FORY 3100		Dendrology (F) OR	**	**
CIVL 3110		Hydraulics	4	**
FORY 3180		Measurements I	3	**
FOPR 3390		Wood Science (P)	3	**
ELEC 3810		Fund of Elect Engr (P)	3	**
CIVL 4300		Soils Mechanics (F) OR	**	**
BSEN 3210		Mech Power for Biosystems	3	**
BSEN 3230		Natural Resource Cons Engr	**	3
BSEN 3240		Therm Pro & Ops in Bio (P)	**	3
BSEN 4250		Hydraulic Control Sys Des	**	3
BSEN 6220		Intro to Spatial Tech For Bio (F) OR	**	**
			16	12
SR				
		Core Fine Arts	**	3
		Core Philosophy	3	**
		Core Social Science Group I	**	3
FOPR 4200		Forest Products Utilization (P)	3	**
FOPR 6210		Primary Wood Process (P) OR	**	**
FORY 6230		Silviculture (F) OR	**	**
FOEN 4220		Low Vol Road Design (F) OR	**	**
BSEN 4240		Mech & Elect Proc Ops Bio (P)	3	**
BSEN 4310		Engr Design for Biosystems	**	4
FOEN 6230		Engr Wood Structures Design	3	**
FOEN 6710		Timber Harvest Analy Methods	3	**
		Forest Engineering Elective	**	3
			15	13

TOTAL HOURS - 128

Forest Engineering Elective: see adviser for approved course listing.

(F) denotes courses for Forest Emphasis: see adviser for approved course listing.

(P) denotes courses for Products Emphasis: see adviser for approved course listing.

Department of Chemical Engineering

Chemical engineering at Auburn provides program specializations in Biochemical Engineering, Computer-aided Control in Chemical Engineering, Environmental Chemical Engineering, Pre-Medicine/Biomedical in Chemical Engineering, Technical Services and Pulp and Paper Chemical Engineering. Through the general program and these specializations, graduates have attractive opportunities in process engineering (chemical, paper, plastics, pharmaceuticals and biochemicals), professional and consulting services (environmental, process design/control, technical service, marketing, research and development). Students are also prepared for graduate study in chemical engineering, medicine, business and law.

Chemical engineering builds on a thorough grounding in chemistry obtained from general, organic and physical chemistry and other advanced chemistry topics appropriate to the program specialization. Fundamental and specific math, science and engineering topics are selected to provide a strong core chemical engineering background and the needs of each program specialization. Each graduate has a strong working knowledge of the core chemical engineering topics including material and energy balances applied to chemical processes, thermodynamics of physical and chemical equilibria, heat, mass and momentum transfer, chemical reaction engineering, continuous and stagewise separation operations, process dynamics, statistics and control. The design experience is interwoven throughout the curriculum from elementary design principles in material and energy balances using modern computing methods to the capstone senior process design and process control sequence employing advanced computer process and control simulators and experimental control systems.

The specific curriculum goals are designed to enable each graduate to model or simulate chemical and physical processes, design and conduct experiments, analyze and interpret chemical engineering data, design and determine capital costs for chemical and physical processes, perform mass and energy balances, understand professional and ethical responsibility, communicate (written and orally) technical information, effectively apply modern computing and experimental chemical engineering tools, be economically, socially, environmentally and safety conscious and demonstrate the skills learned in the classroom and laboratory.

Curriculum in Chemical Engineering

FR	F	S	F	S
ENGL 1100	1120	English Composition I & I	3	3
CHEM 1110	1120	General Chemistry I & II	3	3
CHEM 1111	1121	General Chemistry Lab I & II	1	1
MATH 1610	1620	Calculus I & II	4	4
		Core History I & II	3	3
ENGR	1100	Engineering Orientation	**	0
ENGR 1110		Introduction to Engineering	2	**
COMP	1200	Computer Science	**	2
			16	16
SO				
CHEM 2100		Principles of Chemical Engineering	3	**
CHEM 2101		Principles of Chemical Engineering Lab 1	**	**
CHEM	2610	Transport I	**	3
PHYS 1600		Engineering Physics I	3	**
PHYS 1601		Engineering Physics I Lab	1	**
ENGL	2200	Great Books I	**	3
ENGR	2010	Thermodynamics	**	3
CHEM 2070	2080	Organic Chemistry I & II	3	3
CHEM 2071		Organic Chemistry Lab I	1	**
MATH 2630		Multivariate Calculus	4	**
MATH	2650	Differential Equations	**	3
			16	15
JR				
ENGL 2210		Great Books II	3	**
ELEC	3810	Electrical Engineering	**	3
CHEM	6070	Physical Chemistry I	**	3
CHEM	6071	Physical Chemistry Lab	**	1
CHEM 3370		Phase & Reaction Equil	3	**
CHEM 3620		Transport II	3	**
CHEM 3650		Applied ChE Analysis	3	**
CHEM	3660	ChE Separations	**	3
CHEM 3700		Chemical Reaction Engineering	3	**
CHEM	3820	ChE Lab I	**	2
CHEM		Technical Elective I	**	2
			15	14

SUMMER				
PSYC	1000	Psychology and Culture	3	
ECON	2020	Microeconomics	3	
CHEM	4860	ChE Lab II	2	
		Core Fine Arts	3	
			11	
SR				
CHEM	4160	Process Dynamics	**	4
CHEM	4450	Process Economics	2	**
CHEM	6170	Digital Process Control	3	**
CHEM	6460	Process Sim, Syn & Design	3	**
CHEM	6470	Process Design Practice	**	2
CHEM	6650	Hazardous Materials Mngt	2	**
CHEM	6651	Process Engr Safety Lab	**	1
CHEM		Technical Elective 2	**	2
CHEM		Technical Elective3	**	2
CHEM		Technical Elective 4	**	3
		Physical Science Elective	4	**
PHIL	1040	Business Ethics	**	3
			14	17
TOTAL HOURS - 134				

Electives, Technical Electives, Physical Science Electives: See adviser for approved course listing.

Biochemical Engineering Specialization

Chemical engineers trained in biochemical engineering and biotechnology are the key to successful commercialization of new biologically based processes ranging from high value pharmaceuticals to new food processes. This program specialization provides a strong biology and chemistry fundamental background for graduate work in biochemical engineering and a plan of study to meet these objectives.

Students in this specialization will also be responsible for BIOL 3200, BCHE 6180, CHEN 6800, CHEM 2081 and Biochemical Engineering Technical Elective (3 hours). These courses replace Technical Elective 1, 2, 3 and 4 and Physical Science Elective. A list of approved electives is available in the department office.

Any deviation from the above requires approval of the department head.

Computer Control Chemical Engineering Specialization

Chemical engineers with expertise in the application of computer-aided process control, computer-aided process systems and advanced technology are highly sought after by all process industries. The program specialization provides appropriate courses for an individual with interests in computer control.

Students in this specialization will also be responsible for CHEN 4970, CHEM 6130, 6131 and Computer Control in CHEN Technical Elective (7 hours). These courses replace Technical Elective 1, 2, 3 and 4, Physical Science Elective. A list of approved electives is available in the department office.

Any deviation from the above requires approval of the department head.

Environmental Chemical Engineering Specialization

The environmental specialization in chemical engineering prepares students for careers in the expanding environmental arena. Students specializing in this area learn about the chemical processes and reactions which affect the environment, pollution prevention, the latest standards for air, water and land quality, as well as, hazardous materials management. This specialization prepares students for environmental positions in a broad range of manufacturing and service industries all of which must comply with increasingly complex environmental standards, and in various state and federal agencies.

Students in this specialization will also be responsible for CIVL 4210, Environmental CHEN Technical Elective, CHEM 6130, CHEM 6131 and CHEN 6670. These courses replace Technical Elective 1, 2, 3 and 4, and Physical Science Elective. A list of approved electives is available in the department office.

Any deviation from the above requires approval of the department head.

Pre-Med/Biomed Chemical Engineering Specialization

This specialization provides the necessary preparation for students wanting to do graduate work in biomedical engineering and, when completed, provides a regular chemical engineering degree while simultaneously meeting pre-medicine requirements.

Students in this specialization will also be responsible for CHEM 2081, BIOL 1020, BIOL 1030, Pre-Med/Biomed Engineering Physical Science

Elective and Pre-Med/Biomed Engineering Technical Elective. These courses replace Technical Elective 1, 2, 3 and 4, Physical Science Elective and CHEM 6071. A list of approved electives is available in the department office.

Students in this program specialization who are interested in pre-medicine must be advised by the Pre-Health Professions Adviser in the College of Science and Mathematics. Any deviation from the above requires approval of the department head.

Pulp and Paper Chemical Engineering Specialization

This specialization prepares students for challenging and rewarding technical careers in the pulp and paper and numerous allied industries, which service the paper industry. The industry is capable of sustainable development with a renewable raw material base, recyclable products and processing technology able to achieve energy self-sufficiency and environmental compatibility. Entry-level positions for students successfully completing this specialization include process engineering, project engineering, environmental engineering, product development, technical service, sales and marketing.

Students in this specialization will also be responsible for CHEN 3090, CHEN 4100, CHEN 6110, CHEN 4560, CHEN 4570, FOPR 4780. These courses replace Technical Elective 1, 2, 3 and 4 and , Physical Science Elective, CHEN 6470, CHEM 6071. A list of approved electives is available in the department office.

Any deviation from the above requires approval of the department head.

Technical Service Specialization

This specialization prepares students for careers in technical service to the paper, chemical, petroleum, plastics and allied industries. This program specialization provides appropriate courses for individuals interested in technical service, product engineering, engineering consulting and technical sales.

Students in this specialization will also be responsible for CHEN 3090, CHEN 6420, CHEN 6120, and Technical Service Technical Elective (6 hours). These courses replace Technical Elective 1, 2, 3 and 4 and , Physical Science Elective, CHEM 6071. A list of approved electives is available in the department office.

Any deviation from the above requires approval of the department head.

SO					
CHEM	1030	1040	Fund of Chemistry I & II	3	3
CHEM	1031		Fund of Chemistry I Lab	1	**
ENGL	2200		Great Books I	3	**
ENGR	2050		Statics	3	**
ENGR		2070	Mechanics of Materials	**	3
ENGR		2200	Thermo/Fluids/Heat	**	3
ENGR		2350	Dynamics	**	3
MATH	2630		Calculus III	4	**
MATH		2650	Linear Diff Equations	**	3
CIVL	2010		Surveying	2	**
				16	15
SUMMER					
	ENGL	2210	Great Books II	3	**
			Core Social Science	3	**
	STAT	3010	Stat Meth Sci & Engineering	3	**
				9	**
JR					
CIVL	3010		Civil Engineering Analysis	4	**
CIVL	3110		Hydraulics	4	**
CIVL		3210	Environmental Engineering I	**	3
CIVL		3310	Geotechnical Engineering I	**	4
CIVL		3410	Construction Engineering	**	3
CIVL		3510	Transportation Engineering	**	4
CIVL		3610	Structural Analysis	4	**
CIVL	3810		Civil Engineering Materials	4	**
CIVL		4600	Reinforced Concrete Design	**	2
				16	16
SR					
PHIL	1020		Introduction to Ethics	3	**
			Core Fine Arts	**	3
			Core Social Science	3	**
ELEC		3810	Fund of Electrical Engr	**	3
CIVL	4210		Environmental Engineering II	4	**
CIVL	4650		Steel Design	2	**
CIVL			Technical Elective	3	3
CIVL			Design Elective	**	3
CIVL			Senior Design Project	**	3
				15	15
			TOTAL HOURS - 134		

Technical Elective, Design Elective: see adviser for approved course listing.

Department of Civil Engineering

The fundamental instructional mission of the department is to prepare students for ethical practice of civil engineering. The broad-based and professionally-oriented curriculum emphasizes the application of science and mathematics to the solution of engineering problems, encourages the development of communication skills, fosters an appreciation for culture and the natural world, affirms the necessity of maintaining the highest ethical standards, stresses the responsibility for protection of the public interest and public health and safety and provides a sound basis for maintaining and enhancing professional competence through life-long learning.

The first two years focus on basic principles, which are applied in the last two years in required and elective courses in major specialty areas including construction methods and materials, soil mechanics, highway transportation, hydraulics, structures and environmental engineering. Engineering science and design are integrated throughout, with the design emphasis shifting from introduction of fundamental concepts, principles and tools in the early courses to increasingly realistic situations. The experience culminates in the capstone senior design project.

Graduates are prepared for a variety of entry-level civil engineering positions. By giving careful attention to the selection of technical and design electives and the senior design project, students may choose to emphasize a technical speciality area.

Curriculum in Civil Engineering

FR	F	S	F	S
ENGL	1100	1120	English Composition I & II	3 3
PHYS	1600	1610	Engineering Physics I & II	4 4
MATH	1610	1620	Calculus I & II	4 4
			Core History	3 3
ENGR	1100		Engineering Orientation	0 **
ENGR		1110	Introduction to Engineering	** 2
COMP	1200		Introduction to Computing	2 **
				16 16

Curriculum in Environmental Science

FR	F	S	F	S
BIOL		1020	Principles of Biology	** 4
CHEM	1030	1040	Fundamentals of Chemistry I & II	3 3
CHEM	1031	1041	Fundamentals of Chemistry I & II Lab	1 1
ENGL	1100	1120	English Composition I & II	3 3
MATH		1610	Calculus I	4 **
			Core Histgory	3 3
AGEC	2100		Microcomputer Application	2 **
ENVI	1010		Intro to Environmental Science	0 **
ENVI		1020	Fund of Environmental Science	** 2
				16 16

SO					
BIOL	1030		Organismal Biology	4	**
PHYS	1500	1510	General Physics I & II	4	4
ENGL	2200	2210	Great Books I & II	3	3
GEOL	1100		Physical Geology	4	**
CHEM		2030	Survey of Organic Chemistry	**	3
STAT		2510	Introduction to Statistics	**	3
ENVI	2010		Environ Science Seminar	1	**
GEOL	2100		Environmental Geology	**	3
				16	16
JR					
CHEM		3050	Analytical Chemistry	**	3
CHEM		3051	Analytical Chemistry Lab	**	1
FORN	4470		GIS Applications	2	**
AGRN	3040		Basic Soils	4	**
BIOL	3060		Ecology	**	4
BIOL	3200		General Microbiology	4	**
CIVL	3220		Water & Waste Treatment	**	4
			Professional Track	6	**
			Professional Track	**	4
				16	16
SR					
			Core Fine Arts	**	3
			Core Philosophy	3	**
			Core Social Science Group 1 & 2	3	3
FORN	3440		Environmental Law	3	**
			Professional Track	7	7
			Elective	**	3
				16	16
			TOTAL HOURS - 128		

Professional Track - see adviser for approved course listing.

Department of Computer Science and Software Engineering

Computer Science

The Computer Science curriculum, leading to the Bachelor of Science in Computer Science degree, combines a general foundation in science, mathematics, social sciences and humanities and the fundamentals of computer science with advanced work in the theoretical basis for computation, and design and analysis of algorithms and software development methodologies. It prepares the student for careers in software design, analysis and development as well as graduate study. Course work includes hands-on exposure to a variety of computer systems, tools and techniques. Through a sequence of advanced elective courses, the plan of study allows the student to specialize in areas of the computer science core. In addition, the student selects a concentration of 9 semester credit hours outside computer science (e.g., business, mathematics, physics, etc.). This provides the opportunity to have a second field of study to which computer science can be applied. The computer science degree program is accredited by the computer Sciences Accreditation Board, Inc (CSAB).

Curriculum in Computer Science

FR	F	S		F	S
ENGL	1100	1120	English Composition I & II	3	3
HIST			Core History	3	3
MATH	1610	1620	Calculus I & II	4	4
ENGR		1110	Introduction to Engineering	**	2
			Science Sequence I & II	4	4
COMP	1200		Introduction to Computing	2	**
				16	16
SO					
ENGL	2200	2210	Great Books I & II	3	3
			Core Social Science Group 1 & 2	3	3
COMM	1010		Professional Communication	3	**
ELEC		2200	Digital Systems for Computer Sci	**	3
MATH	2660		Linear Algebra	**	3
			Concentration	3	**
COMP	2200	2210	Fund of Computer Sci I & II	4	4
				16	16

JR					
PHIL		1040	Business Ethics	**	3
STAT	3600		Probability and Statistics	3	**
			Concentration	**	3
COMP	3220		Principles of Programming Languages	3	**
COMP	3240		Discrete Structures	3	**
COMP	3270		Introduction to Algorithms	**	3
COMP	3350		Comp Org & Assemb Lng Prog	3	**
COMP	3500		Introduction to Operating Systems	**	3
COMP	3700		Software Modeling and Design	**	3
			Elective	3	**
				15	15
SR					
			Core Fine Arts	3	**
			Concentration	3	**
			Science	**	4
COMP	4200		Language Translation	3	**
COMP	4320		Introduction to Computer Networks	3	**
COMP	4640		Intelligent & Interactive Systems	3	**
COMP	4730		Computer Ethics	**	1
			COMP Elective	**	6
			Math Elective	**	3
				15	14
			TOTAL HOURS - 123		

Software Engineering

The focus of this curriculum, which leads to a Bachelor of Software Engineering degree, is on the analysis, design, verification, validation, construction, application and maintenance of complex software systems. These software systems include operating systems and networks, compilers, real-time and embedded systems, distributed and parallel systems, and engineering, scientific, and business application software systems. The degree program prepares students for professional careers and graduate study with a balance of computer science theory and practical application of software engineering methodology using modern software engineering environments and tools. The curriculum is based on a strong core of topics including software modeling and design, construction, process and quality assurance, intelligent and interactive systems, networks, operating systems, and computer architecture. The curriculum also enriches each student's general education with a range of courses from science, mathematics, the humanities and the social sciences. Through a sequence of advanced elective courses, the plan of study allows the student to specialize in areas of the computer science and software engineering core. Engineering design theory and methodology, as they apply to software systems, form an integral component of the curriculum, beginning with the first course in computing for engineers and scientists and culminating with a comprehensive senior design project.

Curriculum in Software Engineering

FR	F	S		F	S
ENGL	1100	1120	English Composition I & II	3	3
HIST			Core History	3	3
PHYS	1600	1610	Physics I & II	4	4
MATH	1610	1620	Calculus I & II	4	4
ENGR	1100		Engineering Orientation	0	**
ENGR		1110	Introduction to Engineering	**	2
COMP	1200		Introduction to Computing	2	**
				16	16
SO					
ENGL	2200	2210	Great Books I & II	3	3
			Core Social Science Group 1 & 2	3	3
ELEC		2200	Digital Systems for Computer Sci	**	3
MATH	2630		Calculus III	4	**
MATH		2660	Linear Algebra	**	3
COMP	2200	2210	Fund of Computer Sci I & II	4	4
				14	16

JR									
PHIL	1040		Business Ethics	3	**				
ENGR		2100	Fund of Engr Mechanics	**	3				
MATH	2650		Linear Differential Equations	3	**				
STAT		3600	Probability and Statistics	**	3				
COMP	3220		Principles of Programming Languages	3	**				
COMP	3240		Discrete Structures	3	**				
COMP	3270		Introduction to Algorithms	**	3				
COMP	3350		Comp Org & Assemb Lng Prog	3	**				
COMP	3500		Introduction to Operating Systems	**	3				
COMP	3700		Software Modeling and Design	**	3				
COMP	4730		Computer Ethics	**	1				
				15	16				
SR									
			Core Fine Arts	**	3				
COMP	4300		Computer Architecture	3	**				
COMP	4320		Introduction to Computer Networks	3	**				
COMP	4640		Intelligent & Interactive Systems	3	**				
COMP	4710		Senior Design Project	**	3				
COMP	4730		Computer Ethics	1	**				
COMP	6700		Software Process	3	**				
COMP	6710		Software Quality Assurance	**	3				
			COMP Elective	3	3				
			Elective	**	3				
				16	15				
			TOTAL HOURS - 123						

JR									
ENGL	2200	2210	Great Books I & II	3	3				
ELEC	3030	3040	EE Lab III & IV	1	1				
ELEC	3310		Fundamentals of Electromagnetics	3	**				
ELEC	3320		Electromagnetics for Wireless App	**	3				
ELEC	3400		Communication Systems	**	3				
ELEC	3500		Control Systems	**	3				
ELEC	3600		Electric Power Engineering	3	**				
ELEC	3700		Analog Electronics	3	**				
ELEC	3800		Random Signals and Systems	3	**				
			Fine Arts Elective	**	3				
				16	16				
SR									
PHIL		1040	Business Ethics	**	3				
			Core Social Science Group 2	3	**				
ENGR	2100		Fundamentals of Engr Mechanics	3	**				
ENGR		2200	Introduction Thermo Fluids & Heat	**	3				
INSY	3600		Engineering Economics	3	**				
ELEC	4000		Senior Design Project	**	3				
			ELEC Elective	3	3				
			Math/Science Elective	3	**				
			Elective	**	3				
				15	15				
			TOTAL HOURS - 128						

ELEC Elective, Math/Science Elective: see adviser for approved course listing.

Department of Electrical and Computer Engineering

The Electrical and Computer Engineering curricula produce well-educated graduates prepared to practice engineering at a professional level in an era of rapid and challenging technological development. The goal of the professional portion of each curriculum is to emphasize basic areas of study while providing the flexibility to accommodate a diversity of interests and talents. To this end, each curriculum emphasizes engineering design, hands-on laboratory experience, knowledgeable use of digital computer systems, oral and written communication skills, the importance of business, economic, social and global forces on engineering, appreciation of the need to maintain the highest ethical standards, and the maintenance of professional competence through continued self-improvement after graduation.

Each curriculum builds upon a solid foundation in mathematics and science. In the Electrical Engineering curriculum, topics in the seven fundamental areas of electrical engineering are introduced early and are carefully coordinated to provide the principles necessary for the practice of electrical engineering. In the Computer Engineering Option, fundamental topics in both electrical engineering and computer science are introduced early and are carefully coordinated to provide the principles necessary for the design and application of computer components and systems. In each case, design experience is interwoven throughout the curriculum by introducing basic design concepts early, emphasizing design experiences in the laboratories, and culminating with a capstone design project in the senior year. The senior year elective structure provides students with the flexibility to pursue a range of career options.

Curriculum in Electrical Engineering

FR	F	S		F	S
ENGL	1100	1120	English Composition I & II	3	3
PHYS	1600	1610	Engineering Physics I & II	4	4
MATH	1610	1620	Calculus I & II	4	4
			Core History	3	3
ENGR	1100		Engineering Orientation	0	**
ENGR		1110	Introduction to Engineering	**	2
COMP	1200		Intro to Comp Prog for Engr & Sci	2	**
				16	16
SO					
CHEM		1030	Fundamentals of Chemistry I	**	3
CHEM		1031	Fundamentals of Chemistry I Lab	**	1
			Core Social Science Group 1	3	**
MATH	2630		Calculus III	4	**
MATH	2650		Linear Diff Equations	3	**
MATH		2660	Topics in Linear Algebra	**	3
ELEC	2010	2020	EE Lab I & II	1	1
ELEC	2110		Electric Circuit Analysis	3	**
ELEC		2120	Linear Signal & Systems Analysis	**	3
ELEC		2210	Digital Electronics	**	3
ELEC	2200		Digital Logic Circuits	3	**
ELEC		2220	Computer Systems	**	3
				17	17

Curriculum in Electrical Engineering

(Computer Engineering Option)

FR	F	S		F	S
ENGL	1100	1120	English Composition I & II	3	3
PHYS	1600	1610	Engineering Physics I & II	4	4
MATH	1610	1620	Calculus I & II	4	4
			Core History	3	3
ENGR	1100		Engineering Orientation	0	**
ENGR		1110	Introduction to Engineering	**	2
COMP	1200		Intro to Comp Prog for Engr & Sci	2	**
				16	16
SO					
MATH	2630		Calculus III	4	**
MATH	2650		Linear Diff Equations	3	**
MATH		2660	Topics in Linear Algebra	**	3
ELEC	2010	2020	EE Lab I & II	1	1
ELEC	2110		Electric Circuit Analysis	3	**
ELEC		2120	Linear Signal & Systems Analysis	**	3
COMP	2200	2210	Fundamentals of Computer Sci I & II	4	4
ELEC		2210	Digital Electronics	**	3
ELEC	2200		Digital Logic Circuits	3	**
ELEC		2220	Computer Systems	**	3
				18	17
JR					
CHEM		1030	Fundamentals of Chemistry I	**	3
CHEM		1031	Fundamentals of Chemistry I Lab	**	1
ENGL	2200	2210	Great Books I & II	3	3
			Core Fine Arts	**	3
			Core Social Science Group 1	**	3
ELEC	3050		Computer Systems Design Lab	1	**
COMP	3240		Discrete Structures	3	**
COMP		3270	Introduction to Algorithms	**	3
COMP	3500		Introduction to Operating Systems	3	**
ELEC	3700		Analog Electronics	3	**
ELEC	3800		Random Signals & Systems	3	**
				16	16
SR					
PHIL		1040	Business Ethics	**	3
ECON	2020		Microeconomics	3	**
ENGR	2100		Fundamentals of Engr Mechanics	3	**
ENGR		2200	Introduction Thermo Fluids & Heat	**	3
ELEC	4000		Senior Design Projects	**	3
ELEC	6200		Computer Arch & Design	3	**
ELEC	6220		Information Communication	3	**
			ECE Elective	**	5
			Elective	3	**
				15	14
			TOTAL HOURS - 128		

ECE elective - see adviser for approved course listing.

Joint Program in Wireless Engineering

(Tentative Effective Date: August 16, 2002)

The Wireless Engineering curriculum is a joint offering of the Department of Electrical and Computer Engineering and the Department of Computer Science and Software Engineering, leading to the Bachelor of Wireless Engineering (BWE) degree. The curriculum is designed to produce well-educated graduates prepared to practice engineering at a professional level to improve life and business in these times of a mobile society. Graduates of this program will be able to analyze, develop, design, test, administer and support wireless network systems, communication devices, and other components used in wireless computer and telecommunication networks.

The BWE curriculum has two formal options – Wireless Electrical Engineering (EE), emphasizing the design of hardware and networks, and Wireless Software Engineering (SWE), emphasizing the design of software and networks. Through a choice of several courses within the senior year, a student can select one of two areas of specialization within each degree option. Students interested in designing wireless hardware, such as integrated circuit chips, wireless communication devices, and wireless network switching equipment, should choose the Hardware Specialization within the Wireless EE Option. Students interested in application software development, including server-side, client-side, and embedded applications, should choose the Software Specialization within the Wireless SWE Option. Students interested in pursuing a career with wireless service providers and other companies that develop and maintain wireless networks and sell service should choose the Network Specialization within either the Wireless EE Option or the Wireless SWE Option.

Each curriculum builds upon a solid foundation in mathematics, science, and electrical or software engineering fundamentals to introduce wireless communications theories, devices, circuits, systems, networks, standards, management, and applications. Design experience is interwoven throughout the curriculum by introducing basic design concepts early, emphasizing hands-on design experiences in the laboratories, including effective use of computers and other modern engineering tools, and culminating with a capstone design project in the senior year. In addition to its technical aspects, the curriculum emphasizes oral and written communication skills, the importance of business, economic, social and global forces on engineering, appreciation of the need to maintain the highest ethical standards, and the maintenance of professional competence through continued self-improvement after graduation.

Wireless Electrical Engineering Option

FR	F	S	F	S
ENGL	1100	1120	English Composition I & II	3 3
MATH	1610	1620	Calculus I & II	4 4
			Core History	3 3
COMP	1200		Introduction to Computing	2 **
ENGR	1100		Engineering Orientation	0 **
PHYS	1600	1610	Engineering Physics I & II	4 4
				16 14
SO				
			Core Social Science	3 **
CHEM		1030	Fund. of Chemistry I	** 3
CHEM		1031	Fund. of Chemistry I Lab	** 1
MATH	2630		Calculus III	4 **
MATH	2650		Linear Differential Equations	3 **
MATH		2660	Linear Algebra	** 3
ELEC	2010	2020	EE Lab I & II	1 1
ELEC	2110		Electric Circuit Analysis	3 **
ELEC		2120	Linear Signal & Systems Analysis	** 3
ELEC	2200		Digital Logic Circuits	3 **
ELEC		2210	Digital Electronics	** 3
ELEC		2220	Computer Systems	** 3
				17 17
JR				
ENGL	2200	2210	Great Books I & II	3 3
			Fine Arts Elective	** 3
COMM	3000		Object-Oriented Programming	3 **
INSY		3600	Engineering Economics	** 3
ELEC	3030		Electrical Engineering Lab III	1 **
ELEC	3310		Fund of Electromagnetics	3 **
ELEC		3320	Electromagnetics for Wireless Apps.	** 3
ELEC		3400	Communication Systems	** 3
ELEC	3700		Analog Electronics	3 **
ELEC	3800		Random Signals & Systems	3 **
				16 15

SR				
			Core Social Science	3 **
PHIL	1040		Business Ethics	** 3
ELEC	3060		Wireless Comm Lab	1 **
ELEC		4000	Senior Design Projects	** 3
ELEC	6100		Wireless Comm Systems	3 **
ELEC		6110	Wireless Network	** 3
ELEC	6130		RF Devices & Circuits * OR	3 **
ELEC	6220		Information Networks & Tech **	**
ELEC	6120		Telecomm Networks ** OR	3 **
ELEC	6410		Digital Signal Processing *	**
COMP		6330	Network Optimization & Alg** OR	** 3
			Math/Science Elective*	**
			Wireless Elective/ROTC	** 3
			Free Elective/ROTC	3 **
				16 15

TOTAL HOURS - 128

* Hardware Specialization requires ELEC 6130, ELEC 6410, and a Math/Science Elective

** Network Specialization requires ELEC 6120, ELEC 6220, and COMP 6330

Wireless Software Engineering Option

FR	F	S	F	S
ENGL	1100	1120	English Composition I & II	3 3
MATH	1610	1620	Calculus I & II	4 4
			Core History	3 3
COMP	1200		Introduction to Computing	2 **
ENGR	1100		Engineering Orientation	0 **
ENGR		1110	Introduction to Engineering	** 2
PHYS	1600	1610	Engineering Physics I & II	4 4
				16 16

SO				
			Core Social Science	** 3
MATH	2630		Calculus III	4 **
MATH	2650		Linear Differential Equations	3 **
MATH		2660	Linear Algebra	** 3
COMP	2200	2210	Fundamentals of Computer Sci I & II	4 4
COMP		3240	Discrete Structures	** 3
ELEC		2010	EE Lab I	** 1
ELEC	2110		Electric Circuit Analysis	3 **
ELEC		2120	Linear Signal & Systems Analysis	** 3
ELEC	2200		Digital Logic Circuits	3 **
				17 17

JR				
			Core Social Science	3 **
ENGL	2200	2210	Great Books I & II	3 3
COMP	3270		Algorithms	3 **
COMP	3350		Computer Org. & Assembly Lang.	3 **
COMP		3510	Embedded Systems Software	** 3
COMP		3710	Wireless Software Engineering	** 3
COMP		6330	Network Optimization & Alg** OR	** 3
			Math/Science Elective*	**
ELEC		3400	Communication Systems	** 3
ELEC	3800		Random Signals & Systems	3 **
				15 15

SR				
PHIL	1040		Business Ethics	3 **
			Fine Arts Elective	** 3
INSY	3600		Engineering Economics	3 **
COMP	4320		Introduction to Computer Networks	3 **
COMP		4710	Senior Design Project	** 3
COMP		4730	Computer Ethics	** 1
COMP	6700		Software Process * OR	3 **
ELEC	6120		Telecommunication Networks **	**
COMP		6710	Software Quality Assurance * OR	** 3
COMP		6340	Network Quality Assurance **	**
COMP		6360	Wireless & Mobile Networks	** 3
ELEC	3060		Wireless Communication Lab	1 **
			Wireless Elective/ROTC	** 3
			Free Elective/ROTC	3 **
				16 16

TOTAL HOURS - 128

* Software Specialization requires COMP 6700, COMP 6710, and a Math/Science Elective

** Network Specialization requires COMP 6330, COMP 6340, ELEC 6120

Department of Industrial and Systems Engineering

The Industrial and Systems Engineering (INSY) curriculum draws on specialized skills in the mathematical, physical and social sciences to develop a student's ability to deal with economic, technical and human performance considerations in design, analysis and control of industrial and service systems. The curriculum provides a solid core of courses in systems analysis and design, along with courses in ergonomics and economic analysis. Design experience is integrated throughout the curriculum starting in the freshman year and culminates in a one semester senior design project in which students apply their knowledge to the solution of real-world problems. Technical and departmental engineering elective courses provide flexibility in the program. Technical electives allow students to select from courses in engineering, computer science and business. The degree provides graduates with broad, flexible career opportunities with industrial, consulting, service or governmental organizations. The degree can also provide the foundation and background for further studies in engineering and business.

Curriculum in Industrial and Systems Engineering

FR	F	S	F	S
ENGL	1100	1120	English Composition I & II 3	3
			History I & II 3	3
MATH	1610	1620	Calculus I & II 4	4
PHYS		1600	Physics I & Lab **	4
CHEM	1030		Fundamentals of Chemistry 3	**
CHEM	1031		Fundamentals of Chemistry Lab 1	**
COMP		1200	Intro. Comp. Prog. **	2
ENGR	1100		Eng. Orientation 0	**
ENGR	1110		Introduction to Engineering 2	**
			16	16
SO				
ENGL	2200		Great Books I & II 3	**
PHYS		1610	Physics II & Lab **	4
MATH	2630		Calculus III 4	**
MATH	2650		Linear Diff Equations 3	**
MATH		2660	Topics in Linear Algebra **	3
ENGR	2100		Fundamentals of Engr Mechanics 3	**
INSY		3020	Occup. Safety & Ergon. **	3
INSY		3021	Methods Engr. & Meas. **	2
STAT	3600	3610	Prob. & Statistics I & II 3	3
STAT		3611	Applied Statistics Lab **	1
			16	16
JR				
ENGL		2210	Great Books II **	3
			Core Social Science Group 1 & 2 3	3
			Ethics **	3
COMP	3000		Obj. Or. Programming 3	**
INSY	3400		Stochastic Operations Research 3	**
INSY	3410		Det. Ops. Res. 3	**
INSY		3420	Simulation **	3
INSY	3600		Engineering Economy 3	**
INSY		3700	Operations Planning **	3
			15	15
SR				
			Fine Arts **	3
ELEC	3810		Fundamentals of Electrical Engineering 3	**
INSY	3800		Manufacturing Processes 3	**
INSY	4330		Quality Control 3	**
INSY	4500		Professional Practice 1	**
INSY	4700		Manufacturing Systems 3	**
INSY		4800	Senior Design Projects **	3
			INSY Electives 3	3
			ENGR Elective **	3
			Technical Elective **	3
			16	15
			TOTAL HOURS — 125	

Department of Mechanical Engineering

Mechanical engineering focuses on the design and operation of machinery and the prediction of machine behavior in industries such as: vehicles (land, sea, air, and space), processing (of materials, food, and chemicals), production and fabrication, power generation, heating and refrigeration, and many others. Mechanical engineers design both mechanical components, as well as mechanical systems comprised of different categories of components. Mechanical engineers study the engineering sciences of rigid mechanics (force and motion), deformable mechanics (stress and strain), thermo-fluid sciences (energy and hydraulics), and mechanisms (dynamics and control), often applying these sciences far afield from the traditional mechanical industries.

The mission of the Mechanical Engineering Program is to educate students to become professionals who are prepared to enter practice, and to engage in advanced and lifelong learning, in the profession of mechanical engineering. The Program emphasizes a background in the fundamental disciplines of Mechanical Engineering, as well as the supporting mathematics, basic science, and core subjects, leading to a comprehensive design experience in the senior year. Laboratory experience (physical and computer) and communication (written and oral) are emphasized throughout the curriculum. Specialized concentrations are offered in Automotive Engineering (in cooperation with the Society of Automotive Engineers Collegiate Design Series) and in Pulp and Paper (in cooperation with the Pulp and Paper Institute).

Curriculum in Mechanical Engineering

FR	F	S	F	S
MATH	1610	1620	Calculus I & II 4	4
PHYS		1600	Engineering Physics I **	4
ENGL	1100	1120	English Composition I & II 3	3
			Core History 3	3
CHEM	1030		Fund. of Chemistry I 3	**
CHEM	1031		Fund. of Chemistry I Lab 1	**
COMP	1200		Introduction to Computing 2	**
ENGR	1100		Engineering Orientation 0	**
ENGR		1110	Introduction to Engineering **	2
			16	16
SO				
PHYS	1610		Engineering Physics II 4	**
MATH	2630		Calculus III 4	**
MATH	2650		Linear Differential Equations 3	**
MATH		2660	Linear Algebra **	3
ENGR		2010	Thermodynamics I **	3
MATL		2100	Introduction to Materials Science **	3
MECH	2000		Mech. Eng. Progress Assessment I 0	**
MECH	2110		Statics and Dynamics 4	**
MECH	2120		Kinematics & Dynamics of Machines ... **	4
MECH	2210		Concepts in Design & Manufacturing ... **	3
			15	16
JR				
INSY		3600	Engineering Economics **	3
ELEC	3810		Fund. Electrical Engineering 3	**
MECH	3000		Mech. Eng. Progress Assessment II 0	**
MECH	3020		Thermodynamics II 3	**
MECH	3030		Fluid Mechanics 3	**
MECH	3040		Heat Transfer **	3
MECH	3050		Measurement and Instrumentation **	3
MECH	3130		Mechanics of Materials 4	**
MECH	3140		System Dynamics and Controls **	3
MECH	3220		Computer-Aided Engineering 3	**
MECH	3230		Machine Design **	3
			16	15
SR				
ENGL	2200	2210	Great Books I & II 3	3
			Core Social Science Group 1 & 2 3	3
			Core Fine Arts **	3
			Business Ethics 3	**
PHIL	1040		Comprehensive Design I & II* 2	2
MECH	4240	4250	Technical Elective 3	6
			Elective 3	**
			17	17
			TOTAL HOURS — 128	

* May substitute MECH 4440/4450 for MECH 4240/4250 with departmental approval.

Materials Engineering

The curriculum in Materials Engineering (MATL), administered by the Department of Mechanical Engineering, is structured to address problems associated with the design of materials and materials processes to meet specific needs. The objective of the undergraduate MATL program is to produce professionally qualified materials engineering graduates for a range of industries. Emphasis is on the basic sciences and principles of engineering with applications of these principles to materials behavior. The student must obtain a broad foundation in chemistry, physics and mathematics, which is applied in engineering courses. Within materials engineering courses, students obtain a foundation in the major areas of materials science and to the major classes of engineering materials, which is applied in courses in materials properties and selection, computational methods and in a capstone design course. Students gain exposure to another engineering discipline through technical electives. Students may design alternative, cross-disciplinary sequences, but they must be coordinated and approved by the Materials Engineering Curriculum Committee. Graduates will be prepared to meet the needs of industry and/or continue their studies towards an advanced degree.

Curriculum in Materials Engineering

FR	F	S		F	S
CHEM	1030	1040	Fund. of Chemistry I & II	3	3
CHEM	1031	1041	Fund. of Chemistry I & II Lab	1	1
MATH	1610	1620	Calculus I & II	4	4
ENGL	1100	1120	English Composition I & II	3	3
			Core History	3	3
COMP	1200		Introduction to Computing	2	**
ENGR	1100		Engineering Orientation	0	**
ENGR		1110	Introduction to Engineering	**	2
				16	16
SO					
PHYS	1600	1610	Engineering Physics I & II	4	4
PHIL	1020		Introduction to Ethics	3	**
ECON		2020	Principles of Microeconomics	**	3
MATH	2630		Calculus III	4	**
MATH		2650	Linear Differential Equations	**	3
MATH		2660	Linear Algebra	**	3
ENGR	2050		Engr. Mechanics: Statics	3	**
ENGR		2070	Mechanics of Materials	**	3
ENGR	2200		Thermodynamics, Fluids & Heat Trans.	3	**
				17	16
JR					
ENGL	2200	2210	Great Books I & II	3	3
			Core Social Science	3	**
			Core Fine Arts	**	3
ELEC	3810		Fund. Electrical Engineering	3	**
MATL	3100		Engr. Materials: Metals	3	**
MATL	3101		Metallography Lab	1	**
MATL		3200	Engr. Materials: Polymers	**	3
MATL		3201	Polymer & Comp. Materials Lab	**	1
MATL	3300		Engr. Materials: Ceramics	3	**
			Technical Elective	**	3
			Elective	**	3
				16	16
SR					
MATL	4500		Materials Properties & Selection	4	**
MATL		4900	Senior Design Project	**	3
MATL	6100		Thermodynamics of Materials Syst.	3	**
MATL	6200		Crystallography	2	**
MATL	6201		X-Ray Diffraction Lab	1	**
MATL		6300	Ph. Transformations in Mtl. Process.	**	3
MATL		6400	Physics of Solids	**	3
MATL		6500	Num. Sim. of Materials Processing	**	3
			Technical Electives	3	3
			Elective	3	**
				16	15

TOTAL HOURS — 128

Technical electives: see adviser for approved list of courses.

Department of Textile Engineering

The diverse fiber and related industries provide careers in process engineering, quality engineering, research and product development, chemicals and dyestuffs, environmental protection, management, marketing, technical sales, lab and technical services. Graduates work in companies which make products for aerospace, aircraft, apparel, architecture and construction, automotive, carpet, computers, electronics, fiber optics, filtration, home furnishings, medical, military and defense, the paper industry, recreation, safety and protection. Students may prepare for graduate study in a variety of areas, including polymer science, materials engineering, bioengineering, industrial engineering, medical fields, business, computers, and law. Internships and the Cooperative Education Program at Auburn offer opportunities for related job experience. Programs in textile engineering provide students with a high quality, comprehensive education as well as career-related, specialized coursework.

Textile Engineering. The textile engineering curriculum is based upon a solid, general engineering core that includes calculus, differential equations, linear algebra, chemistry, physics, and fundamental engineering courses. The design aspect of textile engineering is incorporated into all major courses in the curriculum. Major courses in fiber analysis and processes incorporate laboratory exercises that allow students to apply their knowledge of mathematics, science, and engineering to real-world examples. All seniors are required to complete a two-semester, independent design project that includes experimental design and data collection and analysis, and present their results in the form of a written report and an oral presentation. Students may choose a specialization in engineering or science or a minor in business or Business-Engineering-Technology.

Textile Chemistry. Students obtain a thorough grounding in general, organic, and physical chemistry and advanced chemistry topics related to fibers and processes, polymers, and environmental topics. Bench labs and opportunities for research at the undergraduate level enhance students' educational experience.

Textile Management and Technology. This curriculum integrates a technical and management background. Graduates are prepared to work and communicate effectively with both the engineering and business cultures of a company and with cross-functional teams. Students may choose a specialization or minor in science, foreign language, or business.

Curriculum in Textile Engineering

FR	F	S		F	S
MATH	1610	1620	Calculus I & II	4	4
CHEM	1010	1020	Chemistry I & II	3	3
CHEM	1011	1021	Chemistry I & II Lab	1	1
ENGL	1100	1120	English Composition I & II	3	3
HIST	1210	1220	Technology & Civilization I & II	3	3
COMP	1200		Introduction to Computers	2	**
ENGR	1100		Engineering Orientation	0	**
ENGR		1110	Introduction to Engineering	**	2
				16	16
SO					
PHYS	1600	1610	Engineering Physics I & II	4	4
PHIL	1040		Business Ethics	3	**
MATH	2630		Calculus III	4	**
MATH		2650	Linear Diff Equations	**	3
ENGR	2050		Statics	3	**
ENGR		2350	Dynamics I	**	3
TXEN	2100		Fiber to Yarn Engineering	3	**
TXEN		2250	Fabric Design & Engineering	**	4
			Elective or ROTC	**	3
				17	17
JR					
			Core Social Science Group 1	3	**
ENGL		2200	Great Books I	**	3
MATH	2660		Topics in Linear Algebra	3	**
ENGR		2200	Introduction Thermo Heat & Fluid	**	3
STAT	3010		Stats for Engineers & Scientists	3	**
INSY		3600	Engr. Ec. Analysis	**	3
TXEN	3300		Textile Test Instr.	3	**
TXTN	3310		Str & Prop Fibers	4	**
TXEN		3400	Introduction to Dye & Finish	**	4
TXEN		3600	Mech Flexible Structure	**	3
				16	16
SR					

ENGL	2210	Great Books II	3	**
		Core Fine Arts	3	**
ELEC	3810	Fund of Electrical Engineering	3	**
POLI	1020	Political Economy	**	3
TXEN	4250	Engr Text Structure	3	**
TXEN	4500	Text Reinf. Material	**	3
TXEN	4600	Mech Text Man Process	**	3
TXEN	4910	Text Engr Design I & II	3	3
		Technical Elective or ROTC	**	3
			15	15

TOTAL HOURS — 128

Technical Elective - see adviser for approved course listing.

Curriculum in Textile Management and Technology

FR	F	S	F	S
ENGL	1100	1120	English Composition I & II	3
CHEM	1010	1020	Chemistry I & II	3
CHEM	1011	1021	Chemistry I & II Lab	1
MATH	1130		Pre-Calculus with Trigonometry	3
MATH		1610	Calculus I	**
			Core History	3
TXTN	2000		Introduction to Textile Technology	2
			Elective	**
				15

SO				
ENGL	2200	2210	Great Books I & II	3
PHIL	1040		Business Ethics	3
PHYS		1000	Introduction to Physics	**
			Core Fine Arts	3
TXTN	2110		Yarn Form I	2
TXMT	2120		Yarn Form II	**
TXTN	2210		Fabric Form System	**
			Elective	3
				14

JR				
ECON	2020		Microeconomics	3
			Core Social Science Group 1	**
			Technical Elective	3
ACCT	2910		Fundamental Cost Accounting	3
STAT	3010		Stats for Engineers & Scientists	3
COMM		1000	Public Speaking or ROTC	**
TXMT	2410		Dye & Finish	**
TXMT	3220		Non-conventional Fabrics	**
TXTN	3310		St. Prop Fibers	4
				16

SR				
MNGT	3100		Principles of Management	3
TXMT	3200		Fabric Design Analysis	**
TXTN	3450		Technical Text	3
TXTN	3500		Text Testing	**
TXMT	3520		Text Quality Control	2
TXMT	4800		Plant Operation/Cost Control	**
TXMT	4900	4910	Senior Research I & II	1
			Free Elective	**
			Technical Elective	3
				3
				15

TOTAL HOURS — 120

Technical Elective: see adviser for approved course listing.

Curriculum in Textile Chemistry

FR	F	S	F	S
ENGL	1100	1120	English Composition I & II	3
MATH	1610	1620	Calculus I & II	4
HIST	1210	1220	Technology & Civilization I & II	3
TXTN	2000		Introduction to Textile Technology	2
PHYS		1600	Engineering Physics I	**
CHEM	1110	1120	General Chemistry	3
CHEM	1111	1121	General Chemistry Lab I & II	1
				16

SO				
PHYS	1610		Engr Physics II	4
ENGL	2200	2210	Great Books I & II	3
MATH	2630		Calculus III	4
MATH		2650	Linear Differential Equation	**
TXTN	2110		Yarn Formation	2
TXTN		2210	Fabric Formation	**
CHEM	2070	2080	Organic Chemistry I & II	3
CHEM	2071	2081	Organic Chemistry Lab I & II	1
			Elective or ROTC	**
				17

JR				
PHIL	1040		Business Ethics	3
			Core Fine Arts	**
STAT	3010		Stats for Engineers & Scientists	3
POLI		1020	Political Economy	**
CHEM	3050		Analytical Chemistry	3
CHEM	3051		Analytical Chemistry Lab	1
CHEM	6070		Physical Chemistry I	**
TXTN	3310	3220	Non-Conventional Fabric	**
TXTN	3310		Structure Prop Fiber	4
TXEN	3400		Intro Dye & Finish	**
				14

SR				
TXTN	3500		Core Social Science I	**
INSY		3600	Text Testing	3
TXTN	3450		Engineering Economic Analysis	**
CHEM	6080		Technical Text	3
TXCH	4350		Physical Chemistry II	3
TXCH	4410		Env Asp D & F	1
TXCH	4900	4910	Adv Dyeing	4
TXCH	4900	4910	Senior Project 1 & 2	1
TXCH	6510		Polymer Chemistry	**
TXCH	6610		Text Finishes	**
			Technical Elective or ROTC	**
				15

TOTAL HOURS — 127

Technical Elective: see adviser for approved course listing.