

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 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 Office of Enrollment Services. 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 Office of Enrollment Services. The exact placement of these students can be determined only upon review of their transcripts by the Samuel Ginn 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 Samuel Ginn 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 Samuel Ginn College of Engineering and the admissions committee of the chosen curriculum, and meet the same academic requirements as off-campus transfer students. The requirements for a student to advance from the pre-engineering program into an engineering curriculum are subsequently described in the "Scholastic Requirements" section.

Programs

Pre-Engineering. The Pre-Engineering Program consists of a freshman program of studies to prepare students for curricula in the Samuel Ginn 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. The following undergraduate engineering programs are accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>: Aerospace Engineering, Biosystems Engineering, Chemical Engineering, Civil Engineering, Electrical Engineering, Industrial and Systems Engineering, Materials Engineering,

Mechanical Engineering, Polymer and Fiber Engineering, Software Engineering, and Wireless Engineering.

The undergraduate Computer Science program is accredited by the Computing Accreditation Commission of ABET, <http://www.abet.org>.

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.

An ecological engineering option and a forest engineering option are available under the biosystems engineering program. The forest engineering option is offered jointly by the Department of Biosystems Engineering and the School of Forestry and Wildlife Sciences. The environmental science curriculum is offered jointly by the College of Agriculture, the College of Engineering, and the College Sciences and Mathematics.

Graduate. The Samuel Ginn College of Engineering offers the MS and PhD degrees in aerospace, chemical, civil, computer science and software engineering, electrical and computer, industrial and systems, materials and mechanical engineering and polymer and fiber engineering. 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, master of polymer and fiber engineering, and master of software engineering. The college also offers a dual-degree master of industrial and systems engineering and master of business administration.

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

Continuing Education. Business and Engineering Continuing Education extends the resources of the Samuel Ginn 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, Business and Engineering Continuing Education, 217 Ramsay Hall, Auburn, AL 36849.

Video-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 recorded in the classroom on the Auburn campus and mailed to off-campus students on the same day. Alternatively, courses can be delivered via streaming video. 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, AL 36849 or call (334) 844-5300.

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

Complete all appropriate freshman courses;

Earn an overall grade-point average of 2.2 on all required and approved elective course work.

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 Samuel Ginn College of Engineering, students must complete the subjects in the curriculum, have a minimum grade-point average of 2.0 in all work attempted at Auburn University and have a cumulative grade-point average

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 Samuel Ginn 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

Automotive Engineering and Manufacturing Minor

Students in any engineering major may choose to minor in automotive engineering and manufacturing. Three curriculum tracks are available: industrial and systems engineering, mechanical engineering, and car team tracks. The courses required for the minor may require prerequisites that will not count toward the student's major or toward the minor.

The minor requires successful completion of 15-16 semester credit hours as shown below:

Industrial and Systems Engineering Track (15 hours): MECH 4430; INSY 5800, 5840, 5860, and 5330 or 5830.

Mechanical Engineering Track (15 hours): MECH 4410, 4420, 4430; INSY 5800, 5860.

SAE Team Track (16 hours): MECH 4430, 4440, 4450, INSY 5800, 5840, 5860. (Approval of department and car team advisor required).

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. To remain in the program, the cumulative GPA must be equal to or greater than 3.0.

16 semester hours in the minor

Courses required		Cr. Hr.
BUSI 3510	Introduction to Engineering and Business	3
BUSI 3520	Integrat Bus. and Engr. Theories in Practice	3
BUSI 3550	Cross-Functional Teamwork	1
BUSI 3560	Leadership	1
BUSI 4540	Entrep & Strat. Mngt. Of Tech. & Innov.....	4
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 1210	Fundamentals of Computing I	3
COMP 2210	Fundamentals of Computing II	4
COMP 2710	Software Construction	3
COMP 3240	Discrete Structures	3
COMP 3270	Introduction to Algorithms	3
COMP 3700	Software Modeling & Design	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 4730, COMP 5000, COMP 5010, COMP 5020, COMP 5030).

Courses required: None

Elective Courses: see advisor for approved course listing.

Nuclear Power Generation Systems Minor

This 17-hour minor prepares Auburn engineering students for careers specializing in the support and service of America's nuclear power generation industry. Students who complete this minor will have demonstrated an understanding of the industry's basic construction techniques, power plant models, integration into the national electrical grid and common reactor plant operations. Coursework for the minor will take place in the classroom as well as on-site at nuclear power generating facilities, and will be led by faculty and nuclear industry leaders. Areas of emphasis include: regulation, safety, reliability and dependability, radiological health and work control practices, and training requirements for operators and maintenance technicians.

Courses required		Cr. Hr.
ENGR 2700	Introduction to Nuclear Power Operations	1
ENGR 3710	Basic Nuclear Theory and Operations I	4
ENGR 3720	Basic Nuclear Theory and Operations II	4
ENGR 4710	Advanced Reactor Plant Operations I	4
ENGR 4720	Advanced Reactor Plant Operations II	4

Tribology Minor

This 15-hour multidisciplinary minor prepares students from various science and engineering majors for careers that require a background in friction, wear and lubrication (tribology). Students will be prepared for not only the lubricant and bearing manufacturing industry, but for design and maintenance in the power generation, vehicle, and manufacturing industries. Students who complete this minor will acquire the skills necessary to identify critical parameters in a tribological system, design a tribological system for the needs of a specific application, including geometry, lubricant, and surface properties. Students will also understand the chemical formulation and operating mechanisms of lubricants and additives.

Courses required		Cr. Hr.
MECH 5230	Friction, Wear and Lubrication	3
PFEN 5300	Rheology.....	3
CHEM 2080	Org. Chemistry II or CHEM 2030 Survey of Org. Chemistry	3

Representative Courses required		Cr. Hr.
BUSI 3510	Introduction to Business and Engineering	3
MATL 5600	Corrosion	3
MECH 5240	Boundary and Full Film Lubrication	3
MECH 5270	Metalworking and Manufacturing Tribology	3
CHEN 5660	Macroscale Assembly and Applications of Nanomaterials.....	3
MECH 5970	Multiscale Contact Mechanics	3

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				3	**
CHEM 1031				1	**
ENGL 1100	1120			3	3
PHYS 1600				**	4
MATH 1610	1620			4	4
				3	**
				**	3
ENGR 1100				0	**
ENGR 1110		1110		**	2
COMP 1200				**	2
				16	16
So					
PHYS 1610				4	**
				3	**
				**	3
				3	**
MATH 2630				4	**
MATH 2650		2650		**	3
ENGR 2010				**	3

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ENGR 2050	Statics.....	3	**	ENGR 2010	Thermodynamics.....	3	**
ENGR 2070	Mechanics of Materials.....	**	3	MATH 2630	Calculus III.....	4	**
AERO 2200	Aero Fundamentals.....	**	2	MATH 2650	Differential Equations.....	**	3
		17	14	BSEN 2210	Engineering Methods for Biosystems.....	2	**
SUMMER				BSEN 2240	Biol and Bioenviron Heat & Mass Transfer.....	**	3
ELEC 3810	Fundamentals of EE.....	3				16	16
	Core Fine Arts.....	3		SUMMER			
	Core Social Science.....	3		ECON 2020	Principles of Microeconomics.....	3	
		9		CHEM 1040	Chemistry II.....	3	
JR				STAT 3010	Statistics for Engineers & Scientists.....	3	
ENGR 2350	Dynamics.....	3	**		PHIL 1020 or 1040 Ethics.....	3	
MATH 5630	Numerical Analysis I.....	3	**			12	
MATH 2660	Topics in Linear Algebra.....	3	**	JR			
AERO 3110 3120	Aerodynamics I & II.....	3	3	ENGL 2200	World Literature I.....	**	3
AERO 3130	Aerodynamics Lab.....	2	**		Fine Arts Core.....	**	3
AERO 3220	Aerospace Systems.....	**	3	AGRN 2040	Basic Soil Science.....	4	**
AERO 3230	Flight Dynamics.....	**	4	BIOL 3200	General Microbiology.....	4	**
AERO 3310	Orbital Mechanics.....	**	3	BSEN 3210	Mech Power for Biosystems.....	3	**
AERO 3610	Aerospace Structures I.....	**	2	BSEN 3230	Natural Resource Conserv Eng.....	**	3
		14	15	BSEN 3240	Process Engineering in Biosystems.....	**	3
SR				BSEN 3310	Hydraulic Transport in Biosystems.....	4	**
AERO 4140	Aerodynamics III.....	3	**	BSEN 3610	Instrumentation & Controls for Biosystems.....	**	3
AERO 4510	Aerospace Propulsion.....	4	**			15	15
AERO 4620	Aerospace Structures II.....	4	**	SR			
AERO 4630	Aero Structural Dynamics.....	**	4	ENGL 2210	World Literature II.....	3	**
AERO 4AA0	Program Assessment.....	**	0		Social Science Core.....	**	3
AERO 4710	Aerospace Design I.....	3	**	BSEN 4210	Irrigation Systems Design.....	3	**
AERO 4720	Aerospace Design II.....	**	3	BSEN 4230	Waste Mgt & Utilization Eng for Biosys.....	**	3
	Aero/Astro Elective.....	3	3	BSEN 4300	Professional Practice in Biosystems Engng.....	2	**
	Core Social Science.....	**	3	BSEN 4310	Engr Design for Biosystems.....	**	3
UNIV 4AA0	EN1 Undergraduate Graduation.....	**	0	BSEN 5220	Geospatial Tech in Biosystems.....	3	**
		17	13		Biosystems Engr Elective.....	3	3

TOTAL HOURS - 131

* Student must complete either a Literature sequence or a History sequence
 ** Student must select a core course that addresses SLO 3.
 Aero/Astro Electives - see adviser for approved course listing.

				ENGR 2010	Thermodynamics.....	3	**
				MATH 2630	Calculus III.....	4	**
				MATH 2650	Differential Equations.....	**	3
				BSEN 2210	Engineering Methods for Biosystems.....	2	**
				BSEN 2240	Biol and Bioenviron Heat & Mass Transfer.....	**	3
						16	16
				SUMMER			
				ECON 2020	Principles of Microeconomics.....	3	
				CHEM 1040	Chemistry II.....	3	
				STAT 3010	Statistics for Engineers & Scientists.....	3	
					PHIL 1020 or 1040 Ethics.....	3	
						12	
				JR			
				ENGL 2200	World Literature I.....	**	3
					Fine Arts Core.....	**	3
				AGRN 2040	Basic Soil Science.....	4	**
				BIOL 3200	General Microbiology.....	4	**
				BSEN 3210	Mech Power for Biosystems.....	3	**
				BSEN 3230	Natural Resource Conserv Eng.....	**	3
				BSEN 3240	Process Engineering in Biosystems.....	**	3
				BSEN 3310	Hydraulic Transport in Biosystems.....	4	**
				BSEN 3610	Instrumentation & Controls for Biosystems.....	**	3
						15	15
				SR			
				ENGL 2210	World Literature II.....	3	**
					Social Science Core.....	**	3
				BSEN 4210	Irrigation Systems Design.....	3	**
				BSEN 4230	Waste Mgt & Utilization Eng for Biosys.....	**	3
				BSEN 4300	Professional Practice in Biosystems Engng.....	2	**
				BSEN 4310	Engr Design for Biosystems.....	**	3
				BSEN 5220	Geospatial Tech in Biosystems.....	3	**
					Biosystems Engr Elective.....	3	3
				UNIV 4AA0	EN1 Undergraduate Graduation.....	**	0
						14	12

TOTAL HOURS - 132

Biosystems Electives: see adviser for approved course listing.

Department of Biosystems Engineering

The mission of the Department of Biosystems Engineering is to develop and disseminate engineering knowledge to solve problems in biological systems, 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. Options in ecological engineering and forest engineering are also available under the biosystems engineering degree program.

Biosystems Engineering

The 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 program educational objectives of the Biosystems Engineering program are: 1) graduates solve engineering problems such as those associated with the environment and natural resources, and the production, processing, storage, manufacture, utilization, and recycling of biological products; 2) graduates develop solutions to problems that combine engineering and biological sciences; 3) graduates develop environmentally and economically feasible and practical design solutions; and 4) graduates expand the role of engineering in society, communicate effectively, practice in a professional and ethical manner, and provide leadership in the profession. The curriculum is coordinated by the Samuel Ginn College of Engineering. Students should apply for admission to the Samuel Ginn College of Engineering and complete the pre-biosystems engineering program.

Curriculum in Biosystems Engineering

FR	F	S		F	S
CHEM 1030			Fundamentals of Chemistry I.....	3	**
CHEM 1031			Fundamentals of 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
HIST 1210	1220		Tech and Civ 1 & 2.....	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			Organismal Biology.....	**	4
ENGR 2050			Statics.....	3	**
ENGR 2350			Dynamics.....	**	3
ENGR 2070			Mechanics of Materials.....	**	3

Ecological Engineering Option

The Department of Biosystems Engineering offers an option in ecological engineering as part of the bachelor of biosystems engineering degree. This option prepares students to solve environmental problems by applying engineering knowledge to natural ecological and biological systems. Ecological engineering combines basic and applied science from engineering, ecology, economics, and natural sciences to design, construct, and manage sustainable ecosystems that have value to both humans and the natural environment. The ecological engineering option is coordinated by the Samuel Ginn College of Engineering. Students should apply for admission to the Samuel Ginn College of Engineering and complete the ecological engineering option portion of the pre-biosystems engineering program.

Curriculum in Ecological Engineering Option

FR	F	S		F	S
CHEM 1030			Fundamentals of Chemistry I.....	3	**
CHEM 1031			Fundamentals of 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
HIST 1210	1220		Tech and Civ 1 & 2.....	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					
			Fine Arts Core.....	**	3
BIOL 1020			Principles of Biology & Lab (1021).....	4	**
BIOL 1030			Organismal Biology & Lab (1031).....	**	4
ENGR 2050			Statics.....	3	**
ENGR 2070			Mechanics of Materials.....	**	3
ENGR 2010			Thermodynamics.....	3	**
MATH 2630			Calculus III.....	4	**
MATH 2650			Differential Equations.....	**	3
BSEN 2210			Engineering Methods for Biosystems.....	2	**
BSEN 2240			Biol and Bioenviron Heat & Mass Transfer.....	**	3
				16	16
SUMMER					
ECON 2020			Principles of Microeconomics.....	3	
CHEM 1040			Chemistry II.....	3	
STAT 3010			Statistics for Engineers & Scientists.....	3	
			PHIL 1020 or 1040 Ethics.....	3	
				12	
JR					
ENGL 2200			World Literature I.....	**	3
			Social Science Core*.....	**	3
AGRN 2040			Basic Soil Science.....	4	**
BIOL 3200			General Microbiology.....	4	**

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		Ecology Elective.....	**	3	FOPR 4200	Forest Products Utilization (P)	3	**
CIVL	3230	Intro to Environmental Engineering	4	**	BSEN 5220	Geospatial Tech in Biosystems	3	**
BSEN	3230	Natural Resource Conserv Eng	**	3	BSEN 4300	Professional Practice in Biosystems Engng	2	**
BSEN	3310	Hydraulic Transport in Biosystems	4	**	BSEN 4310	Engr Design for Biosystems	**	3
BSEN	3610	Instrumentation & Controls for Biosystems.....	**	3	FOEN 5710	Timber Harvest Analy Methods.....	3	**
			16	15		Forest Engineering Elective.....	**	3
SR					UNIV	EN1 Undergraduate Graduation.....	**	0
ENGL	2210	World Literature II.....	**	3	4AA0		15/14	12
BSEN	4510	Fundamentals of Ecological Engng	3	**				
BSEN	4520	Watershed Modeling	**	3				
BSEN	4230	Waste Mgt & Utilization Eng for Biosys	**	3				
BSEN	4560	Site Design.....	3	**				
BSEN	5220	Geospatial Tech in Biosystems	3	**				
BSEN	4300	Professional Practice in Biosystems Engng	2	**				
BSEN	4310	Engr Design for Biosystems	**	3				
		Ecological Engineering Elective.....	3	**				
UNIV	4AA0	EN1 Undergraduate Graduation.....	**	0				
			14	12				

TOTAL HOURS - 131/132

Forest Engineering Elective: see adviser for approved course listing.
(F) denotes courses for Forest Emphasis.
(P) denotes courses for Products Emphasis.

TOTAL HOURS - 133

Biosystems Electives: see adviser for approved course listing.

Forest Engineering Option

The Department of Biosystems Engineering in conjunction with the Samuel Ginn College of Engineering and School of Forestry and Wildlife Sciences offers an option in forest engineering as a part of the bachelor of biosystems engineering degree. It is committed to preparing students for productive professional careers in the forest products industry and related natural resource and environmental systems sector.

The forest engineering option is coordinated by the Samuel Ginn College of Engineering and the School of Forestry and Wildlife Sciences. Beginning students should apply to the Samuel Ginn College of Engineering and complete the forest engineering option portion of the pre-biosystems engineering program. Students pursuing the forest engineering option must meet School of Forestry and Wildlife Sciences requirements for admission to the Forestry Summer Field Practicum.

Curriculum in Forest Engineering

FR	F	S		F	S
CHEM	1030		Fundamentals of Chemistry I	3	**
CHEM	1031		Fundamentals of 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
HIST	1210	1220	Tech and Civ 1 & 2	3	**
ENGR	1100		Engineering Orientation.....	0	0
ENGR		1110	Introduction to Engineering	**	2
COMP	1200		Introduction to Comp for Engrs & Sci.....	2	**
				16	16
SO					
			Fine Arts Core	**	3
BIOL	1020		Principles of Biology & Lab (1021)	4	**
ENGR	2010		Thermodynamics.....	3	**
ENGR	2050		Statics.....	3	**
ENGR		2350	Dynamics.....	**	3
ENGR		2070	Mechanics of Materials.....	**	3
MATH	2630		Calculus III.....	4	**
MATH		2650	Differential Equations	**	3
STAT		3010	Statistics for Engr & Sci.....	**	3
BSEN	2210		Engineering Methods for Biosystems.....	2	**
				16	15
SUMMER PRACTICUM					
FOEN	3000		Intro to Forest Operations	2	**
FOEN	3040		Forest Surveying	3	**
FORV	3020		Forest Biology	2	**
FORV	3050		Field Mensuration.....	3	**
FORV	3060		Intro to Forest Management.....	2	**
				12	
JR					
ECON		2020	Principles of Microeconomics.....	**	3
ENGL	2200	2210	World Literature I & II	3	3
FORV	3100		Dendrology (F) OR	3	**
FOPR	3390		Wood Science (P)	3	**
FORV	3180		Measurements I.....	3	**
CIVL		3310	Geotechnical Engr (F) OR.....	**	4
BSEN	3610		Instrumentation & Controls for Biosys (P) and	**	3
BSEN	2240		Biol and Bioenviro Heat & Mass Transfer (P)	**	3
BSEN	3210		Mech Power for Biosystems	3	**
BSEN	3230		Natural Resource Conserv Engr	**	3
BSEN	3310		Hydraulic Transport in Biosystems	4	**
				16	13/15
SR					
			PHIL 1020 or 1040 Ethics	**	3
			Social Science Core.....	**	3
FORV	5230		Silviculture (F) OR.....	4	**
FOEN	5230		Engr Wood Structures Design (P)	3	**
BSEN	4560		Site Design (F) OR.....	3	**

Department of Chemical Engineering

Chemical engineers contribute to society through the useful application of knowledge and understanding of chemistry, physics, biology, and mathematics. Chemical engineers traditionally have participated in many decisions crucial to the preservation and improvement of society, including energy, fuel, commodity chemical and food production, resource management, and the design of necessary pollution control measures. Emerging new areas such as biotechnology, space technology, nanofabrication technology, semiconductor devices and modern construction materials also utilize the unique capabilities of the chemical engineer. Many technologies to improve public health depend significantly on chemical engineering such as biomaterials, biomedical devices, medical diagnostics, the chemical design and synthesis of drugs, the genetic engineering of therapeutic materials, drug delivery systems and medical imaging technology. Finally, chemical engineering plays an essential role in important environmental technologies such as atmospheric chemistry, product life cycle analysis, bioremediation, environmental risk and impact analysis, environmental friendly manufacturing technology and products, separation and conversion technologies for waste reduction and the cleanup of contaminated sites.

The instructional mission of the department is to provide its chemical engineering graduates with the tools, skills and competencies necessary to understand and apply today's technologies and, through life-long learning, successfully develop and employ tomorrow's technologies.

Specific program educational objectives of the Chemical Engineering program are: (1) Our graduates apply their technical proficiency for the professional practice of chemical engineering or any other career path they choose. (a) They successfully utilize practical engineering skills and have productive, gainful, and ethical careers in chemical and related industries and organizations. (b) They successfully pursue advanced technical and professional degrees. (c) They successfully transition into other professional areas, such as medicine, law, business or management. (2) Our graduates contribute to the professional practice of their chosen field through effective communication, leadership, teamwork, and service, while maintaining high ethical and professional standards. (3) Our graduates apply high standards in the performance of their professional work including global and societal issues such as health, safety, and the protection of the environment. (4) Our graduates demonstrate continued life-long learning through professional activities and training, the pursuit of higher educational degrees, and individual professional improvement.

Because of their broad training and education, chemical engineers contribute to society in many functions, such as pure research, development, environmental protection, process design, plant operation and manufacturing, marketing, sales, and corporate or government administration.

The program is specially designed to assure all students have demonstrated capabilities in the core chemical engineering topics including material and energy balances, thermodynamics, 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 to the capstone senior process design and process control sequence employing advanced computer process and control simulators and experimental control systems.

The curriculum is specifically designed to enable graduates to model and design chemical and physical processes, design and conduct experiments, analyze and interpret chemical engineering data, and to determine capital and operating costs for chemical and physical processes. The curriculum prepares graduates to understand the need for professional integrity and ethical decision making in the practice of chemical engineering as well as providing an understanding of contemporary issues including business

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practices, environmental, health, and safety and other public interests. Students are also prepared for graduate study in chemical engineering, medicine, business and law.

Because of the breadth of chemical engineering opportunities, the department offers a number of specially designed program specializations that provide unique training and course selection to those students who wish to concentrate in a particular area or technology. The current program specializations are biochemical engineering, biomedical engineering, computer-aided chemical engineering, environmental chemical engineering, pre-medicine specialization and pulp, paper and bio-resource engineering.

Curriculum in Chemical Engineering

FR	F	S	F	S
CHEM	1110	1120	General Chemistry I & II.....	3 3
CHEM	1111	1121	General Chemistry Lab I & II.....	1 1
COMP		1200	Computer Science.....	** 2
ENGL	1100	1120	English Composition I & II.....	3 3
ENGR		1100	Engineering Orientation.....	** 0
ENGR	1110		Introduction to Engineering.....	** 2
MATH	1610	1620	Calculus I & II.....	4 4
PHYS		1600	Engineering Physics I.....	** 4
			Core History.....	3 **
				16 17
SO				
BIOL	1020		Principles of Biology.....	3 **
BIOL	1021		Principles of Biology Lab.....	1 **
CHEM		2070	Organic Chemistry I.....	** 3
CHEM		2071	Organic Chemistry Lab I.....	** 1
CHEM		2AA0	Progress Assessment I.....	** 0
CHEN	2100		Principles of Chemical Engineering.....	** 4
CHEN		2610	Transport I.....	** 3
			Core History or Core Literature*.....	** 3
ENGR		2010	Thermodynamics.....	** 3
MATH	2630		Multivariate Calculus.....	** 4
MATH		2650	Differential Equations.....	** 3
PHYS	1610		Engineering Physics II.....	** 4
				16 16
JR				
CHEM	2080		Organic Chemistry II.....	3 **
CHEN		3AA0	Progress Assessment II.....	** 0
CHEN	3370		Phase & Reaction Equilibria.....	** 3
CHEN	3600		Computer - Aided Chemical Engineering.....	** 3
CHEN	3620		Transport II.....	** 3
CHEN		3650	Applied ChE Analysis.....	** 3
CHEN		3660	ChE Separations.....	** 3
CHEN		3700	Chemical Reaction Engineering.....	** 3
CHEN		3820	ChE Lab I.....	** 2
			Core Literature.....	3 **
			Core Social Science.....	** 3
				15 14
SUMMER				
CHEN		4860	ChE Lab II.....	** 2
PHIL		1040	Business Ethics.....	3 **
			CHEN Technical Elective 1.....	3 **
			Core Social Science.....	3 **
				11 11
SR				
CHEN	4170		Digital Process Control.....	3 **
CHEN	4450		Process Economics & Safety.....	3 **
CHEN	4460		Process Simulation & Optimization.....	2 **
CHEN		4470	Process Design Practice.....	** 3
			CHEN Technical Elective 2.....	** 3
			CHEN Technical Elective 3 or ROTC.....	** 3
			CHEN Technical Elective 4 or ROTC.....	** 3
			Advanced Chemistry Elective.....	3 **
			Core Fine Arts.....	** 3
			Core Social Science or Core Humanities**.....	** 3
UNIV		4AA0	EN1 Undergraduate Graduation.....	** 0
				14 15
TOTAL HOURS - 134				

* Students must complete a sequence in either Literature or History
 ** Must be Social Science if the Literature sequence was completed, Humanities if the History sequence was completed.

Electives, Technical Electives, Advanced Chemistry Elective: 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 take BCHE 5180, CHEN 5800, and Biochemical Engineering Technical Elective (9 hours). These courses replace Technical Elective I-IV and the Advanced Chemistry Elective.

Biomedical Engineering Specialization

This specialization provides the necessary preparation for students wanting to do graduate work in biomedical engineering or work in a career with an emphasis of medical applications of chemical engineering.

Students in this specialization take PHIL 1030, CHEM 2081, BCHE 5180, CHEN 5810, and a Biomedical Engineering Technical Elective (8 hour). These courses replace Technical Elective I-IV, the Advanced Chemistry Elective and PHIL 1040.

Computer-Aided Chemical Engineering Specialization

Chemical engineers with expertise in the application of advanced computer-aided tools in areas like process systems engineering, process control, and advanced process technology are highly sought after by all process industries. The program specialization provides appropriate courses for an individual with interests in advanced use of computers for solving chemical and biological engineering problems.

Students in this specialization take BCHE 5180 and a Computer-Aided Chemical Engineering Technical Elective (12 hours). These courses replace Technical Elective I-IV and the Advanced Chemistry Elective.

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 that 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 take BCHE 5180 and Environmental Chemical Engineering Technical Electives (12 hours). These courses replace Technical Elective I-IV and the Advanced Chemistry Elective.

Pre-Medicine Specialization

This specialization provides the necessary preparation for students wanting to go to medical school. A Pre-Med series of courses, when completed, provides a chemical engineering degree while simultaneously meeting medical school requirements.

Students in this specialization take PHIL 1030, CHEM 2081, BCHE 5180, CHEN 5810, BIOL 1030/1031 and a Pre-Medicine Technical Elective (4 hour). These courses replace Technical Elective I-IV, PHIL 1040 and the Advanced Chemistry Elective. Students in this program specialization who are interested in medical school must also work with the director for Pre-Health Professions in the College of Science and Mathematics.

Pulp, Paper and Bio-Resource Engineering Specialization

This specialization prepares students for challenging and rewarding careers in the pulp, paper and bio-resource industries. These industries are unique in being capable of sustainable development with a renewable raw material base, recyclable products, and processing technology able to achieve energy self-sufficiency and environmental compatibility. This specialization prepares students for a broad range of career paths in process engineering, product development, bio-technology and sustainable engineering.

Students in this specialization take CHEM 2081, BCHE 5180, CHEN 3090, CHEN 4100, and CHEN 5110. These courses replace Technical Elective I-IV and the Advanced Chemistry Elective.

Department of Civil Engineering

Civil engineers conceive, plan, design, construct, operate, and maintain the facilities and systems that serve the basic needs of society. Auburn University's Department of Civil Engineering strives to prepare students, through high quality programs, to practice civil engineering professionally in a competitive global environment. The department's objectives include preparing graduates to play an active role in the civil engineering profession by functioning as effective team members while developing leadership skills in the profession and in the community, communicating ideas and information effectively, and expanding their body of knowledge and experience as they make progress towards licensure as professional engineers. Graduates should be able to successfully engage in one or more of the following activities: planning and design of new civil infrastructure

systems, or rehabilitation of existing systems; monitoring and analysis of the performance of existing infrastructure systems to assess their safety, efficiency, or remaining usefulness; management of natural resources and processes; management of construction or rehabilitation processes; and graduate or professional studies.

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, geotechnical, transportation, hydraulics, structural, pavements, 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.

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
HIST	1020		World History II	3	**
POLI		1090	American Government	**	3
ENGR	1100		Engineering Orientation	0	0
ENGR		1110	Introduction to Engineering	**	2
COMP	1200		Introduction to Computing	2	**
				16	16
SO					
CHEM	1030	1040	Fund of Chemistry I & II	3	**
CHEM	1031		Fund of Chemistry I Lab	1	3
ENGL			Core Literature 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	3	**
				17	15
SUMMER					
	ENGL		Core Literature 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		3230	Introduction to Environmental Engineering	**	4
CIVL	3310		Geotechnical Engineering I	4	**
CIVL	3410		Construction Engineering	3	**
CIVL		3510	Transportation Engineering	**	4
CIVL	3610		Structural Analysis	4	**
CIVL		3820	Civil Engineering Materials	**	3
				15	15
SR					
	PHIL		Core Ethics (PHIL 1020 or PHIL 1040)	3	**
			Core Fine Arts	**	3
			Core Social Science	**	3
			Science Elective	**	4
CIVL			Specialty Elective	6	3
CIVL			Technical Elective	3	3
CIVL			Senior Design Project	**	3
UNIV	4AA0		EN1 Undergraduate Graduation	**	0
				16	15

TOTAL HOURS - 134

* Student must complete literature sequence.
Science Elective, Specialty Elective, Technical Elective: see adviser for approved course listing.

In addition, students select a concentration of 9 semester credit hours outside computer science (e.g., business, mathematics, physics, etc.). This concentration enriches students' educational experience and adds breadth of knowledge by providing an opportunity to explore a second field of study to which computer science can be applied. The curriculum also emphasizes oral and written communication skills, the importance of ethical behavior, and the need for continual, lifelong learning.

Specific educational objectives of the Computer Science program are to: (1) Develop within graduates the level of technical proficiency needed for the professional practice of computer science; (2) Develop within graduates the ability to effectively communicate their ideas to other practicing professionals and the general public; (3) Instill within graduates an appreciation for and the ability to engage in life-long learning; (4) Instill within graduates an appreciation for and an understanding of the need to maintain high ethical standards both as professionals as well as individuals; (5) Prepare graduates to compete for positions in the job market and in graduate schools.

The Computer Science degree program is accredited by Computing Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012 C telephone: 410-347-7700.

Curriculum in Computer Science

FR	F	S		F	S
ENGL	1100	1120	English Composition I & II	3	3
HIST			Core History	3	**
			Core History or other Social Science*	**	3
MATH	1610	1620	Calculus I & II	4	4
ENGR		1110	Introduction to Engineering	2	**
			Core Science Sequence I & II	4	4
COMP		1210	Fundamentals of Computing I	**	3
				16	17
SO					
			Core Literature	3	**
			Core Literature or other Humanities*	**	3
			Core Social Science	3	**
COMP		3240	Discrete Structures	**	3
COMM	1000		Public Speaking	3	**
ELEC		2200	Digital Logic Circuits	**	3
MATH		2660	Linear Algebra	**	3
			Science Elective	4	**
COMP		2710	Software Construction	**	3
COMP	2210		Fundamentals of Computing II	4	*
				17	15
JR					
	PHIL		PHIL 1020 OR PHIL 1040	**	3
	STAT	3600	Probability and Statistics	3	**
			Concentration	**	3
COMP	3220		Principles of Programming Languages	3	**
			Core Social Science	**	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
			Core Fine Arts	3	**
				15	15
SR					
			Free Elective or ROTC	3	**
			Concentration	3	**
			Concentration	**	3
COMP	4200		Formal Languages	3	**
COMP	4320		Introduction to Computer Networks	3	**
COMP		4730	Computer Ethics	**	1
			COMP Elective	3	6
			Math Elective	**	3
UNIV	4AA0		EN1 Undergraduate Graduation	**	0
				15	13

TOTAL HOURS - 123

* Student must complete a sequence in either history or literature.
COMP Elective, Math/Science Elective: See adviser for approved course listing.

Department of Computer Science and Software Engineering

Computer Science

The computer science curriculum, which leads to the bachelor of science in computer science degree, provides an excellent preparation for students seeking careers as software professionals and in computing-related fields, as well for those planning to pursue graduate study. The curriculum builds on a strong foundation in science, mathematics, social sciences, humanities and computer science with advanced course work in theoretical computer science, human-computer interaction, and net-centric computing. Course work ensures that students receive hands-on exposure to a variety of computer systems, tools and techniques. Elective courses allow students to specialize in core areas of computer science such as networking, database systems, and artificial intelligence.

Software Engineering

The focus of the software engineering curriculum, which leads to the bachelor of software engineering, is on the analysis, design, verification, validation, construction, application, and maintenance of 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 advanced elective courses, the curriculum allows students to specialize in core areas of computer science and software engineering. Engineering design theory and methodology, as they apply to software systems, form an integral part of the curriculum, beginning with the first course in computing and culminating with a comprehensive senior design project, which gives students the opportunity to work in one or more significant application domains. The curriculum also emphasizes oral and written communication skills, the importance of ethical behavior, and the need for continual, life-long learning.

Specific educational objectives of the Software Engineering program are to: (1) Develop within graduates the level of technical proficiency needed for the professional practice of software engineering; (2) Develop within graduates the ability to effectively communicate their ideas to other practicing professionals and to the general public; (3) Instill within graduates an appreciation for and the ability to engage in lifelong learning; (4) Instill within graduates an appreciation for and an understanding of the need to maintain high ethical standards both as professionals as well as individuals; (5) Prepare graduates to compete for positions in the job market and in graduate schools.

The software engineering program is accredited by the Engineering Accreditation Commission of ABET, 11 Market Place, Suite 1050, Baltimore, MD 21202-4012 (telephone: 410-347-7700).

Curriculum in Software Engineering

FR	F	S		F	S
ENGL	1100	1120	English Composition I & II	3	3
HIST			Core History	3	**
			Core History or other Social Science*	**	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		1210	Fund of Computing I	**	3
				16	17
SO					
ENGL	2200		Core Literature	3	**
			Core Literature or other Humanities*.....	**	3
			Core Social Science	**	**
COMP		3240	Discrete Structures	**	3
			Core Fine Arts	**	**
ELEC		2200	Digital Logic Circuits.....	3	3
MATH	2630		Calculus III.....	4	**
MATH		2660	Linear Algebra	3	3
COMP		2710	Software Construction.....	**	3
COMP	2210		Fund of Computing II	4	**
				17	15
JR					
PHIL			PHIL 1020 OR PHIL 1040	**	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
			Core Social Science	**	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
				15	15
SR					
COMP	4300		Computer Architecture	**	3
COMP	4320		Introduction to Computer Networks.....	**	3
COMP	4710		Senior Design Project.....	**	3
COMP	4730		Computer Ethics.....	**	1
COMP	5700		Software Process	**	3
COMP	5710		Software Quality Assurance.....	**	3
			COMP Elective	6	3
			Free Elective or ROTC	**	3
UNIV		4AA0	EN1 Undergraduate Graduation.....	**	0
				15	13

TOTAL HOURS - 123

* Student must complete a sequence in either history or literature.
COMP Electives: 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 educational objectives of the Electrical Engineering curriculum include developing within our graduates a basic foundation in seven fundamental areas of electrical engineering (circuits and systems, electromagnetics,

electronics, digital systems, communications and signal processing, control systems, and power engineering) to provide the technical proficiency needed for the professional practice of electrical engineering. The educational objectives of the Computer Engineering Option include developing within our graduates a basic foundation in both electrical engineering (circuits and systems, electronics, and digital systems) and computer science to provide the technical proficiency needed for the professional practice of computer engineering, including the design and application of computer components and systems. In addition, both curricula have as educational objectives to develop within our graduates the ability to communicate their ideas effectively to technical and non-technical audiences and work effectively in multidisciplinary terms, to prepare them to take their places in society as responsible citizens, and to provide them with the basis for, and instill within them an appreciation of and enthusiasm for, lifelong scientific inquiry, learning and creativity.

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	**
			Core History or Core Social Science*	**	3
ENGR	1100		Engineering Orientation.....	0	**
ENGR		1110	Introduction to Engineering	**	2
COMP	1200		Intro to Comp 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	**	**
			Calculus III.....	**	**
MATH	2630		Linear Diff Equations	**	**
MATH	2650		Topics in Linear Algebra	**	3
ELEC	2110		Electric Circuit Analysis	4	**
ELEC	2120		Linear Signals & Systems Analysis.....	**	3
ELEC	2210		Digital Electronics	**	4
ELEC	2200		Digital Logic Circuits	3	**
ELEC	2220		Computer Systems.....	**	3
				17	17
JR					
			Core Literature	3	**
			Core Literature or Humanities	**	3
			Core Fine Arts	**	3
ELEC	3030		RF Systems Lab	1	**
ELEC	3040		Electrical System Design Lab	**	1
ELEC	3310		Fundamentals of Applied Electromagnetics	3	**
ELEC	3320		Electromagnetics for Wireless Communications.....	**	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	**
				16	16
SR					
PHIL		1040	Business Ethics	**	3
			Core Social Science	**	**
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	**
		Math/Science Elective.....3	**
		Elective.....**	3
UNIV	4AA0	EN1 Undergraduate Graduation.....**	0
			15

TOTAL HOURS - 128

ELEC Elective, Math/Science Elective: see adviser for approved course listing.
 * Student must complete a sequence in either literature or history.

**Curriculum in Electrical Engineering
 (Computer Engineering Option)**

FR	F	S		F	S
ENGL	1100	1120	English Composition I & II.....3	3	3
PHYS	1600	1610	Engineering Physics I & II.....4	4	4
MATH	1610	1620	Calculus I & II.....4	4	4
			Core History.....3	**	**
			Core History or Core Social Science*.....**	3	3
			Fund of Computing I.....**	3	3
ENGR	1110		Introduction to Engineering.....2	**	**
ENGR	1100		Engineering Orientation.....0	**	**
				16	17
SO			Calculus III.....4	**	**
MATH	2630		Linear Diff Equations.....3	**	**
MATH	2650		Topics in Linear Algebra.....**	3	3
COMP		2710	Software Construction.....**	3	3
ELEC	2110		Electric Circuit Analysis.....4	**	**
ELEC		2120	Linear Signals & Systems Analysis.....**	3	3
COMP	2210		Fundamentals of Computer Sci II.....4	**	**
ELEC		2210	Digital Electronics.....**	4	4
ELEC	2200		Digital Logic Circuits.....3	**	**
ELEC		2220	Computer Systems.....**	3	3
				18	16
JR			Fundamentals of Chemistry I.....**	3	3
CHEM		1030	Fundamentals of Chemistry I Lab.....**	1	**
CHEM		1031	Core Literature.....3	**	**
			Core Literature or Core Humanities*.....**	3	3
			Core Fine Arts.....**	3	3
ELEC	3050		Embedded System Design Lab.....1	**	**
COMP	3240		Discrete Structures.....3	**	**
COMP		3270	Introduction to Algorithms.....**	3	3
COMP	3500		Introduction to Operating Systems.....3	**	**
ELEC	3700		Analog Electronics.....3	**	**
ELEC		4200	Digital System Design.....**	3	3
ELEC	3800		Random Signals & Systems.....3	**	**
				16	16
SR			Core Social Science.....3	3	3
PHIL		1040	Business Ethics.....**	3	**
INSY	3600		Engineering Economics.....3	**	**
ELEC		4000	Senior Design Projects.....**	3	3
ELEC	5200		Computer Architecture & Design.....3	**	**
ELEC	5220		Information Networks & Technology.....3	**	**
			ECE Elective.....**	5	**
			Elective.....3	**	**
UNIV	4AA0		EN1 Undergraduate Graduation.....**	0	0
				15	14

TOTAL HOURS - 128

ECE elective - see adviser for approved course listing.
 * Student must complete a sequence in either literature or history

Joint Program in Wireless Engineering

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). To meet the need for engineers that can improve life and business in these times of a mobile society, the educational objectives of this curriculum are (1) to develop within our graduates a basic foundation in wireless engineering and either electrical engineering, software engineering, or communication networks that will provide the technical proficiency needed for the professional practice of engineering in the wireless industry, (2) to develop within our graduates the ability to communicate their ideas effectively within the technical community and to the general public, (3) to provide our graduates with the basis for, and instill within them an appreciation of and enthusiasm for, lifelong scientific inquiry, learning and creativity, and (4) to prepare our graduates to take their places in society as responsible citizens, with an appreciation of and understanding for the need to maintain the highest ethical standards in their personal and professional lives. 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 engineering-hardware (WIRE), emphasizing a hardware design-oriented approach to wireless engineering, and wireless engineering-software (WIRS), emphasizing a software-oriented approach. There is a network specialization within each option. Students interested in designing wireless hardware, such as integrated circuit chips, wireless communication devices, and wireless network switching equipment, should choose the WIRE hardware specialization option. Students interested in application software development, including server-side, client-side, and embedded applications, should choose the WIRS software specialization option. Students interested in pursuing a career with wireless service providers and other companies that develop and maintain wireless networks and sell service, can choose the Network Specialization within either the WIRE option or the WIRS 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 Engineering-Hardware Option

FR	F	S		F	S
			Core History.....3	**	**
			Core History or Core Social Science*.....**	3	3
ENGL	1100	1120	English Composition I & II.....3	3	3
MATH	1610	1620	Calculus I & II.....4	4	4
COMP	1200		Intro to Comp for Engr & Sci.....2	**	**
ENGR	1100		Engineering Orientation.....0	**	**
ENGR		1110	Introduction to Engineering.....**	2	2
PHYS	1600	1610	Engineering Physics I & II.....4	4	4
				16	16
SO			Core Social Science.....3	**	**
CHEM		1030	Fund. of Chemistry I.....*	3	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	3
ELEC	2110		Electric Circuit Analysis.....4	**	**
ELEC		2120	Linear Signals & Systems Analysis.....**	3	3
ELEC	2200		Digital Logic Circuits.....3	**	**
ELEC		2210	Digital Electronics.....**	4	4
ELEC		2220	Computer Systems.....**	3	3
				17	17
JR			Core Literature.....3	**	**
			Core Literature or Humanities*.....**	3	3
			Core Fine Arts.....**	3	3
COMP	3000		Object-Oriented Programming.....3	**	**
INSY		3600	Engineering Economics.....**	3	3
ELEC	3030		RF Systems Lab.....1	**	**
ELEC	3310		Fundamentals of Applied Electromagnetics.....3	**	**
ELEC		3320	Electromagnetics for Wireless Communications.....**	3	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		1020 or PHIL 1040**	3	3
ELEC	3060		Wireless Design Lab.....1	**	**
ELEC		4000	Senior Design Projects.....**	3	3
ELEC	5100		Wireless Communication Systems.....3	**	**
ELEC		5110	Wireless Networks.....**	3	3
ELEC	5130		RF Devices & Circuits ** OR.....3	**	**
ELEC	5220		Information Networks & Tech ***.....3	**	**
ELEC	5120		Telecommunication Networks *** OR.....3	**	**
ELEC	5410		Digital Signal Processing **.....3	**	**
INSY	3410		Deterministic Operations Research *** OR.....3	**	**
			Math/Science Elective**.....**	3	3
			Wireless Elective/ROTC.....**	3	3
			Free Elective/ROTC.....**	3	3
UNIV	4AA0		EN1 Undergraduate Graduation.....**	0	0
				16	15

TOTAL HOURS - 128

Technical Elective - see adviser for approved course listing.

- * Student must complete a sequence in either literature or history.
- ** Hardware Specialization requires ELEC 5130, ELEC 5410, and a Math/Science Elective
- *** Network Specialization requires ELEC 5120, ELEC 5220, and INSY 3410

Wireless Engineering-Software Option

FR	F	S		F	S
HIST			Core History	3	**
			Core History or Social Science*	**	3
ENGL	1100	1120	English Composition I & II	3	3
MATH	1610	1620	Calculus I & II	4	4
COMP		1210	Fundamentals of Computing I.....	**	3
ENGR	1100		Engineering Orientation.....	0	**
ENGR	1110		Introduction to Engineering	2	**
PHYS	1600	1610	Engineering Physics I & II	4	4
				16	17
SO			Core Social Science	**	3
			Core Literature	**	3
MATH	2630		Calculus III.....	4	**
MATH	2650		Linear Differential Equations	3	**
MATH		2660	Linear Algebra	**	3
COMP	2210		Fundamentals of Computing II.....	4	**
COMP		2710	Software Construction.....	**	3
ELEC	2110		Electric Circuit Analysis.....	4	**
ELEC		2120	Linear Signals & Systems Analysis.....	**	3
ELEC	2200		Digital Logic Circuits	3	**
				18	15
JR			Core Social Science	3	**
			Core Literature or Core Humanities*	3	**
COMP	3240		Discrete Structures	3	**
COMP		3270	Introduction to Algorithms	**	3
COMP	3350		Computer Organization & Assembly Language.....	3	**
COMP		3510	Embedded Systems Software.....	**	3
COMP	3710		Wireless Software Engineering.....	**	3
INSY		3600	Engineering Economics.....	**	3
ELEC	3400		Communication Systems	**	3
ELEC	3800		Random Signals & Systems.....	**	3
				15	15
SR			PHIL 1020 OR PHIL 1040.....	3	**
PHIL			Deterministic Operations Research *** OR	3	**
INSY	3410		Math/Science Elective*		
COMP	4730		Computer Ethics.....	**	1
COMP	4320		Introduction to Computer Networks.....	3	**
COMP	4710		Senior Design Project.....	**	3
ELEC	3060		Wireless Design Lab.....	1	**
COMP	5700		Software Process ** OR.....	3	**
ELEC	5120		Telecommunication Networks ***	**	3
COMP	5710		Software Quality Assurance ** OR	**	3
COMP	5340		Network Quality Assurance ***	**	3
COMP	5360		Wireless & Mobile Networks	**	3
			Wireless Elective/ROTC.....	**	3
			Free Elective/ROTC.....	3	**
			Core Fine Arts	**	3
UNIV	4AA0		EN1 Undergraduate Graduation.....	**	0
				16	16

TOTAL HOURS - 128

- * Student must complete a sequence in either literature or history
 - ** Software Specialization requires COMP 5700, COMP 5710, and a Math/Science Elective
 - *** Network Specialization requires INSY 3410, COMP 5340, ELEC 5120
- Wireless Elective, Math/Science Elective: See adviser for approved course listing.

Department of Industrial and Systems Engineering

Industrial and Systems Engineers plan, design, implement, and analyze systems. This engineering discipline is where technology, people, business and information intersect. The degree provides graduates with broad, flexible career opportunities with manufacturing, consulting, service or governmental organizations. The degree can also provide the foundation and background for further studies in engineering and business as well as professions such as law or medicine. The curriculum builds on a solid engineering mathematics and science core and adds courses in production and manufacturing, ergonomics and safety, engineering management, operations research, statistics, quality control, and information technologies. The curriculum graduates students who have:

- An ability to apply knowledge of mathematics, science, and engineering.
- An ability to design and conduct experiments, as well as to analyze and interpret data.
- An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

- An ability to function on multidisciplinary teams.
- An ability to identify, formulate, and solve engineering problems.
- An understanding of professional and ethical responsibility.
- An ability to communicate effectively.
- The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
- A recognition of the need for, and an ability to engage in, life-long learning.
- A knowledge of contemporary issues.
- An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- An ability to design, develop, implement, and improve integrated systems that include people, materials, information, equipment, and energy.
- An ability to integrate systems using appropriate analytical, computational, and experimental practices.

Curriculum in Industrial and Systems Engineering

FR	F	S		F	S
ENGL	1100	1120	English Composition I & II	3	3
			Core Fine Arts	3	**
			Core History	**	3
MATH	1610	1620	Calculus I & II	4	4
PHYS		1600	Engineering Physics I	**	4
CHEM	1030		Fundamentals of Chemistry I	3	**
CHEM	1031		Fundamentals of Chemistry I Lab	1	**
COMP		1200	Intro. Comp. Prog.	**	2
ENGR	1100		Eng Orientation	0	**
ENGR	1110		Introduction to Engineering	2	**
				16	16
SO			Core Literature	3	**
			Engineering Physics II	4	**
PHYS	1610		Calculus III.....	4	**
MATH	2630		Linear Diff Equations	3	**
MATH	2650		Topics in Linear Algebra	**	3
		2660	ENGR Elective	**	3
INSY	3020		Occup. Safety & Ergon.....	**	3
INSY	3021		Methods Engr. & Meas.....	**	3
STAT	3600	3610	Prob. & Statistics I & II.....	3	3
STAT	3611		Applied Statistics Lab.....	**	1
				17	16
JR			Core History or Social Science*	3	**
			Core Social Science.....	**	3
			Technical Elective.....	**	3
COMP	3010		Spreadsheet-Based Apps w/ VBA.....	3	**
INSY	3400		Stochastic Operations Research.....	3	**
INSY	3410		Deterministic Operation Research	3	**
INSY	3800		Manufacturing Systems I.....	**	3
INSY	3420		Simulation	**	3
INSY	3600		Engineering Economy	3	**
INSY	3700		Operations Planning	**	3
				15	15
SR			Core Humanities (PHIL 1020, 1030, or 1040)	3	**
			Core Literature or Humanities*	**	3
			Core Social Science.....	**	3
			Fundamentals of Electrical Engineering.....	3	**
ELEC	3810		Quality Control	3	**
INSY	4330		Professional Practice.....	1	**
INSY	4500		Manufacturing Systems I.....	3	**
INSY	4700		Manufacturing Systems II.....	3	**
INSY	4800		Senior Design	**	3
			INSY Electives	**	3
			Technical Elective.....	**	3
UNIV	4AA0		EN1 Undergraduate Graduation.....	**	0
				16	15

TOTAL HOURS — 126

- Technical Elective - see adviser for approved course listing.
- * Student must complete sequence in either literature or history

Department of Mechanical Engineering

The curriculum in Mechanical Engineering focuses on the analysis, design, manufacturing, and maintenance of mechanical components and systems. Emphasis is placed on the fundamental concepts of engineering science and design needed in a variety of industries, including automotive, aerospace, biotechnology, material and chemical processing, microsystems and sensors, nanotechnology, machinery and robotics, pharmaceutical, energy production and distribution, heating and refrigeration, food production and processing, entertainment, pulp and paper, weapons systems, and many others. Mechanical engineering students take courses in several areas of engineering including: mechanics of rigid and deformable solids, thermo-fluid sciences, energy systems,

dynamic systems and controls, design and manufacturing, materials, and electronics.

The educational objectives of the Mechanical Engineering program are to produce graduates who will be:

- Engaged in careers where they apply knowledge of the fundamental subject areas of mechanical engineering science to the analysis, design, and manufacture of mechanical devices and systems.
- Proficient in a broad array of professional skills, including engineering software tools, oral and written communication, leadership, and teamwork.
- Aware of the importance of, and engage in the process of lifelong learning through self-study, continuing education courses, and graduate-level education.
- Knowledgeable in a broad range of contemporary issues, particularly as they impact the mechanical engineering profession.

Students are able to concentrate on areas of special interest through technical elective courses taken in the senior year. In addition, specialized concentrations are offered in Automotive Engineering, Business Engineering and Technology, and in Pulp and Paper Engineering.

Curriculum in Mechanical Engineering

FR	F	S		F	S
MATH	1610	1620	Calculus I & II	4	4
PHYS	1600	1600	Engineering Physics I.....	**	4
ENGL	1100	1120	English Composition I & II	3	3
			Core History	3	**
			Core History or Core Social Science*	**	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		2AA0	Mech. Eng. Progress Assessment I.....	**	0
MECH	2110		Statics and Dynamics	**	4
MECH		2120	Kinematics & Dynamics of Machines.....	**	4
MECH		2220	Computer-Aided Engineering	**	3
				15	16
JR					
INSY		3600	Engineering Economics.....	**	3
ELEC	3810		Fund. Electrical Engineering	3	**
MECH		3AA0	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	3200		Concepts in Design and Manufacturing.....	2	**
MECH	3210		Design and Manufacturing Laboratory	1	**
MECH		3230	Machine Design	**	3
				16	15
SR					
ENGL	2200		World Literature I.....	3	**
			World Literature II or Core Humanities*	**	3
			Core Social Science.....	3	3
			Core Fine Arts	**	3
			Core Ethics (PHIL 1020 or PHIL 1040)	3	**
MECH	4240	4250	Comprehensive Design I & II**	2	2
			Technical Elective	6	3
			Free Elective	**	3
UNIV		4AA0	EN1 Undergraduate Graduation.....	**	0
				17	17
TOTAL HOURS — 128					

* Student must complete sequence in either literature or history
 ** May substitute MECH 4440/4450 for MECH 4240/4250 with departmental approval.
 Technical Elective - see adviser for approved course listing.

Materials Engineering

The curriculum in Materials Engineering (MATL) is structured to address problems associated with the design of materials and materials processes to meet specific needs for a variety 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 in-depth experience in another engineering discipline through coordinated technical elective sequences. Students may design alternative cross-disciplinary sequences, but they must be coordinated and approved by the Materials Engineering Curriculum Committee. The objective of the MATL program is to produce graduates who are engaged in careers through which they apply materials engineering proficiency, effective communication and lifelong learning to provide technical, economic, or other benefits to society.

Curriculum in Materials Engineering

FR	F	S		F	S
CHEM	1030		Fund. of Chemistry I	3	**
CHEM	1031		Fund. of Chemistry I Lab	1	**
MATH	1610	1620	Calculus I & II	4	4
ENGL	1100	1120	English Composition I & II	3	3
PHYS		1600	Engineering Physics I	**	4
			Core History	3	3
COMP	1200		Introduction to Computing	2	**
ENGR	1100		Engineering Orientation.....	0	**
ENGR		1110	Introduction to Engineering	**	2
				16	16
SO					
CHEM	1040		Fund. of Chemistry I & II.....	3	**
CHEM	1041		Fund. of Chemistry I & II & Lab	1	**
ECON	2020		Principles of Microeconomics.....	3	**
PHYS		1610	Engineering Physics II	**	4
PHIL	1020		Introduction to Ethics.....	3	**
STAT		3010	Statistics for Engineers & Scientists.....	**	3
MATH	2630		Calculus III.....	4	**
MATH		2650	Linear Differential Equations	**	3
ENGR	2050		Engr. Mechanics: Statics.....	3	**
ENGR		2070	Mechanics of Materials.....	**	3
MATL		2100	Intro. To Materials Science	**	3
				17	16
JR					
MATH	2660		Linear Algebra	3	**
			Core Social Science.....	3	**
			Core Fine Arts	**	3
ELEC	3810		Fund. Electrical Engineering	3	**
ENGR		2200	Thermodynamics, Fluids & Heat Trans.	**	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
MATL		5200	Crystallography	2	**
MATL		5201	X-Ray Diffraction Lab.....	1	**
			Technical Elective.....	**	3
				16	16
SR					
			Core Literature	3	3
MATL	4500		Materials Properties & Selection	4	**
MATL		4980	Senior Design Project.....	**	3
MATL	5100		Thermodynamics of Materials Syst.....	3	**
MATL		5300	Ph. Transformations in Mtl. Process.....	**	3
MATL	5400		Physics of Solids.....	3	**
MATL		5500	Num. Sim. of Materials Processing	**	3
			Technical Electives.....	3	3
UNIV		4AA0	EN1 Undergraduate Graduation.....	**	0
				16	15
TOTAL HOURS — 128					

Technical electives: see adviser for approved list of courses.

Department of Polymer and Fiber Engineering

Bachelor of Polymer and Fiber Engineering

Polymers and fibers are high performance materials utilized in such diverse fields as plastics, elastomers (rubber), adhesives, surface coatings (paints), films, paper, packaging, insulation, filtration, aerospace, automotive, biomedical, composite, construction, environmental, industrial, marine, nonwoven, recreational, and safety materials.

Polymer and fiber engineering prepares graduates to work in research and development, product development, process engineering, composite engineering, quality engineering, industrial engineering, or technical sales; or to proceed to advanced studies in engineering, science, medicine, law, computer, business, or related fields.

Research and instruction in polymer and fiber engineering includes:

- Polymer synthesis and processing.
- Characterization and evaluation of structure and properties of polymeric materials using advanced techniques and state-of-the-art instrumentation.
- Modeling of structure-property-performance relationships emphasizing correlation of properties with the structure across nano-, micro-, and macro-length scales.
- Design, analysis, engineering, and assembly of polymeric fibrous materials into advanced engineered materials with novel compositions and tailored microstructures.
- Product, mold, and die design.

A solid foundation in mathematics, chemistry, and physics is applied in engineering and major courses during junior and senior years. Engineering design is integrated throughout the curriculum in major courses, laboratories, and a capstone design project which is completed during the senior year.

To accommodate the broad range of polymer and fiber opportunities, the undergraduate program offers two options leading to the bachelor of polymer and fiber engineering. The polymer option emphasizes polymer characterization, processing, and chemistry. The fiber option emphasizes the mechanics of composite materials and other fibrous structures.

Graduates will be actively engaged in one or more of the following:

The practice of engineering:

- Evidence of increasing responsibilities in the form of promotions, management or leadership duties, or other professional activities while employed in industrial, governmental, educational or consulting positions
- Evidence of recognitions and awards.
- Evidence of contributing to their chosen field of practice through the development and dissemination of technical knowledge, presentations, publications, patents, or other means.
- Evidence of meeting professional responsibilities in the form of mentoring, professional society activities, peer review, editorial work, or similar activities.
- The acquisition of new knowledge and skills:
- Evidence of pursuit of an advanced degree.
- Evidence of participation in ongoing professional development activities.
- Activities which meet their ethical responsibilities for public service:
 - Evidence of involvement in community service.
 - Evidence of involvement in K-12 education.
 - Evidence of providing input to policy makers.

Curriculum in Polymer and Fiber Engineering (Fiber Option)

FR	F	S		F	S
MATH	1610	1620	Calculus I & II	4	4
CHEM	1030	1040	Fund of Chemistry I & II.....	3	3
CHEM	1031	1041	Fund of Chemistry I & II lab	1	1
ENGL	1100	1120	English Composition I & II	3	3
HIST			Core History	3	**
			Core History or Core Social Science*	**	3
COMP		1200	Introduction to Comp for Engr & Sci	**	2
ENGR		1100	Engineering Orientation.....	**	0
ENGR	1110		Introduction to Engineering	2	**
				16	16
SO					
			PHIL 1020 or 1030 or 1040	**	3
CHEM		2030	Organic Chemistry Survey	**	3
PFEN	2270		Fiber to Fabric Engineering.....	4	**
MATH	2630		Calculus III.....	4	**
MATH		2650	Linear Diff Equations	**	3
PHYS	1600	1610	Engineering Physics I & II	4	4
STAT	3010		Stats for Engineers & Scientists	3	**
ENGR		2050	Statics.....	**	3
				15	16

JR					
			Core Literature	3	**
			Core Literature or Core Humanities*	**	3
MATH	2660		Topics in Linear Algebra	3	**
ENGR	2070		Mechanics of Materials.....	3	**
ENGR	2200		Introduction Thermo Heat & Fluid	3	*
INSY		3600	Engr. Ec. Analysis.....	**	3
			Free Elective or ROTC.....	**	3
PFEN	3100		Fundamentals of Polymers	3	**
PFEN	3570		Engineered Protective Materials.....	3	**
PFEN	3400		Fund of Coloration and Finishing.....	**	4
PFEN	3500		Str and Prop of Polymers and Fibers	**	3
				18	16

SR					
			Core Fine Arts	3	**
			Core Social Science.....	**	3
			Core Social Science.....	**	3
			Fund of Electrical Engineering	3	**
ELEC	3810		Engr Fibrous Structure.....	4	**
PFEN	4300		Mech Flexible Structure.....	3	**
PFEN	4400		Fiber Reinf. Material.....	**	3
PFEN	4500		Poly & Fiber Engr Design I & II.....	3	3
PFEN	4810	4820	Technical Elective or ROTC	**	3
UNIV		4AA0	EN1 Undergraduate Graduation.....	**	0
				16	15

TOTAL HOURS - 128

Technical Elective - see adviser for approved course listing.

* Student must complete a sequence in either literature or history.

Curriculum in Polymer and Fiber Engineering (Polymer Option)

FR	F	S		F	S
MATH	1610	1620	Calculus I & II	4	4
CHEM	1030	1040	Fund of Chemistry I & II.....	3	3
CHEM	1031	1041	Fund of Chemistry I & II lab	1	1
ENGL	1100	1120	English Composition I & II	3	3
HIST			Core History	3	**
			Core History or Social Science*	**	3
COMP		1200	Introduction to Comp for Engr & Sci	**	2
ENGR		1100	Engineering Orientation.....	**	0
ENGR	1110		Introduction to Engineering	2	**
				16	16

SO					
			PHIL 1020 or 1030 or 1040	**	3
CHEM	2070	2080	Organic Chemistry I & II.....	3	3
CHEM	2071		Organic Chemistry I lab	1	**
MATH	2630		Calculus III.....	4	**
MATH		2650	Linear Diff Equations	**	3
PHYS	1600	1610	Engineering Physics I & II	4	4
PFEN	2270		Intro to Engineered Fibrous Materials.....	4	**
ENGR		2050	Statics.....	**	3
				16	16

JR					
			Core Literature	3	**
			Core Literature or Humanities*	**	3
			Core Social Science.....	**	3
			Topics in Linear Algebra	3	**
MATH	2660		Mechanics of Materials.....	3	**
ENGR	2070		Introduction Thermo Heat & Fluid	3	**
ENGR	2200		Engr. Ec. Analysis.....	**	3
INSY		3600	Statistics for Scientists & Engineers.....	3	**
STAT	3010		Fundamentals of Polymers	3	**
PFEN	3100		Structure and Prop of Polymers and Fibers	**	3
PFEN	3500		Free Elective or ROTC.....	**	3
				18	15

SR					
			Core Fine Arts	3	**
			Core Social Science.....	**	3
			Fund of Electrical Engineering	3	**
ELEC	3810		Polymer Characterization.....	**	4
PFEN	4100		Poly from Renewable Resources.....	2	**
PFEN	4200		Fiber Reinf. Material	**	3
PFEN	4500		Poly & Fiber Engr Design I & II.....	3	3
PFEN	4810	4820	Polymer Processing.....	**	4
PFEN	5200		Technical Elective or ROTC	**	3
UNIV		4AA0	EN1 Undergraduate Graduation.....	**	0
				14	17

TOTAL HOURS - 128

* Student must complete a sequence in either literature or history.

Technical Elective - see adviser for approved course listing.