

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 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 criteria include a minimum overall Auburn grade-point average 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 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. 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 engineering, industrial and systems engineering, materials engineering, mechanical engineering, polymer and fiber engineering, wireless engineering, and biosystems engineering. The

curriculum leading to the bachelor of science in computer science is accredited by the Computing Accreditation Commission of ABET.

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.

A forest engineering option is also available under the biosystems engineering degree program. It 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 and the College Sciences and Mathematics.

Dual-Degree. The Samuel Ginn 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 Samuel Ginn 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 the university's colleges of Agriculture, Liberal Arts and Sciences and Mathematics to provide for dual-degree programs with the Samuel Ginn College of Engineering.

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

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. To remain in the program, the cumulative Grade-point average 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.

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		Fundamentals of Chemistry I.....	3	**
CHEM	1031		Fundamentals of Chemistry I Lab	1	**
ENGL	1100	1120	English Composition I & II	3	3
PHYS	1600	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 Computing.....	2	**
				16	16
SO					
PHYS	1610		Engineering Physics II.....	4	**
ENGL	2200	2210	World Literature I & II.....	3	3
MATH	2630		Calculus III.....	4	**
MATH		2650	Linear Diff Equations.....	**	3
			Core Philosophy.....	3	**
			Core Social Science Group I.....	**	3
ENGR		2010	Thermodynamics	**	3
ENGR	2050		Statics	3	**
ENGR		2070	Mechanics 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	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 II.....	**	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
AERO	4AA0		Program Assessment	0	**
			Design Option I & II	3	3
			Aero/Astro Elective	3	3
UNIV		4AA0	EN1 Undergraduate Graduation	**	0
				16	14

TOTAL HOURS - 128

Design Option - see advisor for approved course listing.

Aero/Astro - see advisor 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 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. A forest engineering option is 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 educational objectives of the Biosystems Engineering Degree program are to

Samuel Ginn College of Engineering

produce graduates with: (1) the skills necessary to solve engineering problems associated with the environment and natural resources, and the production, processing, storage, manufacture, utilization, and recycling of biological products; (2) a fundamental understanding of engineering and biological sciences and the ability to combine knowledge from both domains to develop solutions to problems; (3) the ability to analyze critically and conduct scientific experimentation and engineering analysis that leads to development of environmentally and economically feasible design solutions that can be practically implemented; and (4) the ability to understand and expand the role of engineering in society; communicate, work, and provide leadership in multidisciplinary environments; and continue developing professionally and ethically throughout their career. The curriculum is coordinated by the Samuel Ginn College of Engineering and the College of Agriculture. 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
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 & Lab (1021)	4 **
BIOL		1030	Organismal Biology & Lab (1031)	** 4
CHEM	1040		Fundamentals of Chemistry II	3 **
CHEM	1041		Fundamentals of Chemistry II Lab	1 **
ENGR	2050		Statics	3 **
ENGR	2350		Dynamics	** 3
ENGR		2070	Mechanics of Materials	** 3
ENGR		2010	Thermodynamics	** 3
MATH	2630		Calculus III	4 **
MATH		2650	Differential Equations	** 3
			Core Fine Arts	3 **
				18 16
JR				
AGRN	2040		Basic Soil Science	4 **
STAT	3010		Statistics for Engrs & Sci	3 **
CIVL	3110		Hydraulics	4 **
BIOL		3200	General Microbiology	** 4
ELEC	3810		Fundamentals of Electrical Engr	3 **
ECON		2020	Microeconomics	** 3
BSEN	3210		Mech Power for Biosystems	3 **
BSEN		3230	Natural Resource Conserv Engr	** 3
BSEN		3240	Thermal Process Ops in Biosys	** 3
			Biosystems Engr Elective	** 3
				17 16
SR				
ENGL	2200	2210	World Literature I & II	3 3
			Core Social Science Group I	** 3
			Core Philosophy	** 3
BSEN	3260		Engr for Precision Ag & Fy	3 **
BSEN	4210		Irrigation Systems Design	3 **
BSEN		4230	Waste Mgt & Utilization Eng for Biosys	** 3
BSEN	4240		Mech & Elec Process Ops in Biosys	3 **
BSEN		4310	Engr Design for Biosystems	** 4
			Biosystems Engr Elective	** 3
UNIV	4AA0		EN1 Undergraduate Graduation	** 0
				15 16

TOTAL HOURS - 130

Biosystems Electives: see advisor 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
			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 & Lab (1021)	4 **
ENGL	2200	2210	World Literature I & II	3 3
ENGR		2010	Thermodynamics	** 3
ENGR		2070	Mechanics of Materials	** 3
ENGR	2050		Statics	3 **
ENGR		2350	Dynamics	** 3
MATH	2630		Calculus III	4 **
MATH		2650	Differential Equations	** 3
STAT	3010		Statistics for Engr & Sci	3 **
				17 15
SUMMER PRACTICUM				
FOEN	3000		Intro to Forest Operations	2 **
FOEN	3040		Forest Surveying	3 **
FORY	3020		Forest Biology	2 **
FORY	3050		Field Mensuration	3 **
FORY	3060		Intro to Forest Management	2 **
				12 **
JR				
ECON		2020	Microeconomics	** 3
			Core Fine Arts	** 3
FORY	3100		Dendrology (F) OR	3 **
FOPR	3390		Wood Science (P)	3 **
CIVL	3110		Hydraulics	4 **
FORY	3180		Measurements I	3 **
ELEC	3810		Fund of Elect Engr (P) OR	3 **
CIVL	3310		Geotechnical Engr (F)	4 **
BSEN	3210		Mech Power for Biosystems	3 **
BSEN		4250	Hydraulic Control Sys Des	** 3
BSEN		3230	Natural Resource Conserv Engr	** 3
BSEN		3240	Therm Process Ops in Biosys (P) OR	** 3
BSEN		5220	Intro to Spatial Tech for Biosys (F)	** 3
				16/17 15
SR				
			PHIL 1020 or 1040 Ethics	3 **
			Core Social Science Group I	** 3
FOEN	4220		Low Vol Road Design (F) OR	3 **
BSEN	4240		Mech & Elect Proc Ops in Biosys (P)	3 **
FOPR	4200		Forest Products Utilization (P) OR	3 **
FORY	5230		Silviculture (F)	4 **
BSEN		4310	Engr Design for Biosystems	** 4
FOEN	5230		Engr Wood Structures Design	** 3
FOEN		5710	Timber Harvest Analy Methods	** 3
			Forest Engineering Elective	** 3
UNIV	4AA0		EN1 Undergraduate Graduation	** 0
				12/13 13
TOTAL HOURS - 132/134				
Forest Engineering Elective: see advisor for approved course listing.				
(F) denotes courses for Forest Emphasis.				
(P) denotes courses for Products Emphasis.				

Department of Chemical Engineering

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.

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.

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 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 & I.....	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
CHEN		2AA0	Progress Assessment I.....	**	0
CHEN	2100		Principles of Chemical Engineering	4	**
CHEN		2610	Transport I.....	**	3
ENGL		2200	World Literature I.....	**	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 Equil	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
ENGL	2210		World Literature II.....	3	**
			Core History	**	3
				15	14

SUMMER			
CHEN	4860	ChE Lab II.....	2
PHIL	1040	Business Ethics.....	3
		CHEN Technical Elective 1	3
		Core Social Science Group II	3
			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	**
		CHEN Technical Elective 2	3
		CHEN Technical Elective 3 or ROTC	**
		CHEN Technical Elective 4 or ROTC	**
		Advanced Chemistry Elective	3
		Core Fine Arts	**
		Core Social Science Group I.....	**
UNIV	4AA0	EN1 Undergraduate Graduation	**
			14
			15

TOTAL HOURS - 134

Electives, Technical Electives, Advanced Chemistry Elective: See advisor 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, CHEN 5400 and Biomedical Engineering Technical Elective* (5 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, CHEN 4160 and Computer-Aided Chemical Engineering Technical Elective* (9 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, CHEN 5650 and Environmental Chemical Engineering Technical Elective* (9 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 2500 and 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, CHEN 5110, CHEN 4560, and CHEN 4570. These courses replace Technical Elective I-IV, CHEN 4460, CHEN 4470 and the Advanced Chemistry Elective.

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		3810	Civil Engineering Materials	**	4
				16	15
SR					
PHIL		1020	Introduction to Ethics	3	**
			Core Fine Arts	**	3
			Core Social Science.....	3	**
CIVL			Specialty Elective	6	6
CIVL			Technical Elective.....	3	3
CIVL			Senior Design Project.....	**	3
UNIV		4AA0	EN1 Undergraduate Graduation	**	0
				15	15

TOTAL HOURS - 134

Specialty Elective, Technical Elective: see advisor for approved course listing.

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
			Core History	3	3
ENGR	1100		Engineering Orientation.....	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	3
CHEM	1031		Fund of Chemistry I Lab.....	1	**
ENGL	2200		World 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	2210		World Literature II.....	3	
			Core Social Science.....	3	
STAT	3010		Stat Meth Sci & Engineering	3	
				9	

Environmental Science

The Environmental Science program, like the rather broad field of environmental science, is by its very nature highly interdisciplinary. Although, the Samuel Ginn College of Engineering administers the program through the Department of Civil Engineering, the College of Agriculture and the College of Sciences and Mathematics are equal partners in developing the curriculum, guiding student development and providing instruction.

Environmental quality issues tend to be complex and often a significant level of expertise in physics, chemistry, biology, and geology is needed just to understand and appreciate a specific problem. Moreover, formulating solutions often requires mathematical expertise as well as specific knowledge of the air, water, and soil environments. Thus, the program is structured to educate environmental scientists quite broadly, but also with considerable depth.

The program is specifically tailored to produce graduates who can enter and have a reasonable expectation of success in a field that is continually changing. The principal educational goals are to provide each student with a broad-based general education, a solid background in mathematics, physical science, and biological science, breadth of exposure to the environmental science field, and depth of knowledge in a specific area of environmental science of choice.

The curriculum is organized around a core of courses that are required of all students. Students desiring to specialize may select from groups of courses, called professional tracks, that emphasize environmental applications of biological science, physical science, soils science, or engineering science. A general environmental science track is also available.

Curriculum in Environmental Science

FR	F	S		F	S
BIOL		1020	Principles of Biology	**	4
CHEM	1030	1040	Fund. of Chemistry I & II and Labs (1501, 1511).....	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 History	3	3
AGEC	2100		Microcomputer Application.....	3	**
ENVI	1010		Intro to Environmental Science	0	**
ENVI	1020		Fund of Environmental Science.....	**	2
				17	16
SO					
BIOL	1030		Organismal Biology	4	**
PHYS	1500	1510	General Physics I & II	4	4
ENGL	2200	2210	World Literature 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	**	4
				16	17

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	**	
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	
			15	15	
SR					
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	5700	Software Process.....	3	**	
COMP	5710	Software Quality Assurance.....	**	3	
		COMP Elective.....	3	3	
		Free Elective or ROTC.....	**	3	
UNIV	4AA0	EN1 Undergraduate Graduation	**	0	
			15	13	

TOTAL HOURS - 132

COMP Electives: See advisor 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 within the technical community and to the general public, 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	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 I	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 Signals & Systems Analysis.....	**	3
ELEC		2210	Digital Electronics.....	**	3
ELEC	2200		Digital Logic Circuits.....	**	3
ELEC		2220	Computer Systems.....	**	3
				17	17

JR					
ENGL	2200	2210	World Literature 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 II	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
UNIV	4AA0		EN1 Undergraduate Graduation	**	0
				15	15

TOTAL HOURS - 128

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

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
COMP		1210	Fund of Computing I.....	**	3
ENGR	1110		Introduction to Engineering.....	2	**
ENGR	1000		Engineering Orientation.....	0	**
				16	17
SO					
MATH	2630		Calculus III.....	4	**
MATH	2650		Linear Diff Equations.....	3	**
MATH		2660	Topics in Linear Algebra.....	**	3
COMP		2710	Software Construction.....	**	3
ELEC	2010	2020	EE Lab I & II.....	1	1
ELEC	2110		Electric Circuit Analysis.....	3	**
ELEC		2120	Linear Signals & Systems Analysis.....	**	3
COMP	2210		Fundamentals of Computer Sci II.....	4	**
ELEC		2210	Digital Electronics.....	**	3
ELEC	2200		Digital Logic Circuits.....	3	**
ELEC		2220	Computer Systems.....	**	3
				18	16
JR					
CHEM		1030	Fundamentals of Chemistry I.....	**	3
CHEM		1031	Fundamentals of Chemistry I Lab.....	**	1
ENGL	2200	2210	World Literature I & II.....	3	3
			Core Fine Arts	**	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		4200	Digital System Design.....	**	3
ELEC		3800	Random Signals & Systems.....	**	3
				16	16

Samuel Ginn College of Engineering

SR					
			Core Social Science Group I & II.....	3	3
PHIL	1040		Business Ethics.....	**	3
INSY	3600		Engineering Economics.....	3	**
ELEC	4000		Senior Design Projects.....	**	3
ELEC	5200		Computer Arch & Design.....	3	**
ELEC	5220		Information Communication.....	3	**
			ECE Elective.....	**	5
			Elective.....	3	**
UNIV	4AA0		EN1 Undergraduate Graduation.....	**	0
				15	14

TOTAL HOURS - 128

ECE elective - see advisor for approved course listing.

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 technology and either electrical engineering or software engineering and network design and operation that will provide the technical proficiency needed for the professional practice of engineering in the wireless telecommunications 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 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
			Core History.....	3	3
ENGL	1100	1120	English Composition I & II.....	3	3
MATH	1610	1620	Calculus I & II.....	4	4
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	**
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 Signals & 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	World Literature I & II.....	3	3
COMP	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 Applications.....	**	3
ELEC		3400	Communication Systems.....	**	3
ELEC	3700		Analog Electronics.....	3	**
ELEC	3800		Random Signals & Systems.....	3	**
			Fine Arts Elective.....	**	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	5100		Wireless Comm Systems.....	3	**
ELEC		5110	Wireless Networks.....	**	3
ELEC	5130		RF Devices & Circuits * OR.....	3	**
ELEC	5220		Information Networks & Tech **.....	3	**
ELEC	5120		Telecomm Networks ** OR.....	3	**
ELEC	5410		Digital Signal Processing *.....	3	**
INSY	3410		Deterministic Operations Research ** OR.....	3	**
			Math/Science Elective*		
			Wireless Elective/ROTC.....	**	3
			Free Elective/ROTC.....	**	3
UNIV	4AA0		EN1 Undergraduate Graduation.....	**	0
				16	15

TOTAL HOURS - 128

* Hardware Specialization requires ELEC 5130, ELEC 5410, and a Math/Science Elective

** Network Specialization requires ELEC 5120, ELEC 5220, and INSY 3410

Wireless Software Engineering Option

FR	F	S		F	S
HIST			Core History.....	3	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
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
COMP		3240	Discrete Structures.....	**	3
ELEC		2010	EE Lab I.....	**	1
ELEC	2110		Electric Circuit Analysis.....	3	**
ELEC		2120	Linear Signals & Systems Analysis.....	**	3
ELEC	2200		Digital Logic Circuits.....	3	**
				17	16

JR					
			Core Social Science.....	3	**
ENGL	2200	2210	World Literature I & II.....	3	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

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	3220	Computer-Aided Engineering	3	**			
MECH	3230	Machine Design.....	**	3			
				16	15		
SR							
ENGL	2200	2210 World Literature I & II.....	3	3			
		Core Social Science Group I & II.....	3	3			
		Core Fine Arts	**	3			
		Business Ethics	**	3			
PHIL	1040		3	**			
MECH	4240	4250 Comprehensive Design I & II*	2	2			
		Technical Elective.....	3	6			
		Elective.....	3	**			
UNIV	4AA0	EN1 Undergraduate Graduation	**	0			
				17	17		

TOTAL HOURS – 128

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

JR							
MATH	2660	Linear Algebra	3	**			
		Core Social Science Group I.....	3	**			
		Core Fine Arts	**	3			
ENGL	2200	World Literature I	**	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	**			
		Technical Elective.....	**	3			
				16	16		
SR							
ENGL	2210	World Literature II	3	**			
MATL	4500	Materials Properties & Selection	4	**			
MATL	4900	Senior Design Project.....	**	3			
MATL	5100	Thermodynamics of Materials Syst.....	3	**			
MATL	5200	Crystallography	2	**			
MATL	5201	X-Ray Diffraction Lab	1	**			
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 advisor for approved list of courses.

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 practicing materials engineering who: (i) are technically proficient in engineering materials; (ii) are able to work on multidisciplinary teams and problems; (iii) are able to communicate their ideas effectively within the technical community and to the general public; (iv) will take their places in society as responsible citizens; (v) have the ability and appreciation for lifelong scientific inquiry, learning and creativity; and are thus prepared to meet the needs of industry and/or continue their studies towards advanced programs.

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

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.

Educational objectives of the bachelor of polymer and fiber engineering are as follows:

- Graduates will be able to analyze and understand processing-structure-property relationships in polymers, fibers and fibrous assemblies - conventional and non-conventional fabrics and composite materials.
- Graduates will have the necessary foundation in mathematics, the physical sciences, and engineering to pursue advanced degrees in polymers, fibers, and related disciplines.
- Graduates will take away from their courses, research projects, and general studies the skills necessary for problem solving, critical thinking, working in teams, and effective communication.
- Graduates will have acquired the skills necessary to learn throughout their careers.

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 I & II.....	3	3
COMP		1200	Introduction to Comp for Engr & Sci.....	**	2
ENGR		1100	Engineering Orientation.....	**	0
ENGR	1110		Introduction to Engineering.....	2	**
				16	16
SO					
			Core Social Science Group I.....	**	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					
ENGL	2200	2210	World Literature I & II.....	3	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
			Elective or ROTC.....	3	**
PFEN	3100		Fundamentals of Polymers	3	**
PFEN	3300		Fibrous Product Test. and Instr.....	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 Philosophy.....	**	3
			Core Social Science Group II.....	**	3
ELEC	3810		Fund of Electrical Engineering	3	**
PFEN	4300		Engr Fibrous Structure	4	**
PFEN	4400		Mech Flexible Structure.....	3	**
PFEN		4500	Fiber Reinf. Material.....	**	3
PFEN	4910	4920	Poly & Fiber Engr Design I & II.....	3	3
			Technical Elective or ROTC.....	**	3
UNIV		4AA0	EN1 Undergraduate Graduation	**	0
				16	15

TOTAL HOURS - 128

Technical Elective - see advisor for approved course listing.

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 I & II.....	3	3
COMP		1200	Introduction to Comp for Engr & Sci.....	**	2
ENGR		1100	Engineering Orientation.....	**	0
ENGR	1110		Introduction to Engineering.....	2	**
				16	16
SO					
			Core Social Science Group I.....	**	3
CHEM	2070	2080	Organic Chemistry I & II.....	3	3
CHEM	2071	2081	Organic Chemistry I & II lab	1	1
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	17
JR					
ENGL	2200	2210	World Literature I & II.....	3	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
			Elective or ROTC.....	3	**
PFEN	3100		Fundamentals of Polymers	3	**
PFEN	3200		Polymer Processing.....	**	4
PFEN		3500	Structure and Prop of Polymers and Fibers	**	3
CHEM	3160		Survey of Physical Chemistry	3	**
				18	16
SR					
			Core Fine Arts	3	**
			Core Philosophy.....	**	3
			Core Social Science Group II.....	**	3
ELEC	3810		Fund of Electrical Engineering	3	**
PFEN	4100		Polymer Characterization.....	4	**
PFEN	4200		Poly from Renewable Resources	2	**
PFEN		4500	Fiber Reinf. Material.....	**	3
PFEN	4910	4920	Poly & Fiber Engr Design I & II.....	3	3
			Technical Elective or ROTC.....	**	3
UNIV		4AA0	EN1 Undergraduate Graduation	**	0
				15	15

TOTAL HOURS - 128

Technical Elective - see advisor for approved course listing.