

College of Engineering

ADMINISTRATIVE OFFICER

Milton R. Bryant, *Dean*

ADMINISTRATIVE STAFF

Shield B. Lin, *Associate Dean*

PURPOSE AND GOALS

The modern mission of the College of Engineering, at the dawn of the new millennium, is to sustain an infrastructure that will attract and maintain a world-class faculty, that can produce graduates with the highest level of professional standards. These graduates will be prepared for a career of life-long learning that will result in leaders, productive workers, innovators and entrepreneurs who will positively impact the increasingly multi-disciplinary and diverse national economy. The College serves as a value added partner within the University to meet the challenge to excellence in education and research in engineering and to service and relevance to regional, national, and global communities.

This mission is accomplished through the following six goals:

1. Strive for excellence in engineering education through the dissemination and interpretation of knowledge through the educational programs.
2. Recruit and retain students who have demonstrated a capacity to excel in an environment that integrates advanced information technology with creativity, critical thinking, and problem solving.
3. Recruit and retain a cadre of world-class faculty effective in every endeavor of student-faculty interaction and committed to maintaining an academic standard that will ensure the students are highly competitive for graduate or professional school or for employment in the private or public sectors.
4. Promote scholarly activities through the continual development of our research centers and other collaborations and further enhancing our incorporation of undergraduate and graduate research activities.
5. Continue a strong external relations component that cultivates and integrates our corporate and alumni constituents into a partnership with the College.
6. Maintain the appropriate infrastructure and support services necessary to provide an atmosphere conducive to learning.

INSTRUCTIONAL ORGANIZATION

The College of Engineering is composed of six academic departments offering the degree programs listed below:

Degree Programs	Degrees Offered
<i>Chemical Engineering</i>	B.S.Ch.E.
<i>Civil Engineering</i>	B.S.C.E.
<i>Computer Science</i>	B.S.
<i>Electrical Engineering</i>	B.S.E.E.
<i>Mechanical Engineering</i>	B.S.M.E.

<i>Computer Engineering Technology</i>	B.S.CET.
<i>Electrical Engineering Technology</i>	B.S.EET.
<i>Computer-Aided Drafting and Design Technology</i>	B.S.I.T.

ACCREDITATION STATUS

The Chemical Engineering, Civil Engineering, Electrical Engineering, and Mechanical Engineering programs are accredited by the Engineering Accreditation Commission of Accreditation Board for Engineering and Technology (ABET), 111 Market Place, Suite 1050, Baltimore, MD 21202 – telephone: 410-347-7700.

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

The Computer Engineering Technology and Electrical Engineering Technology programs are accredited by the Technology Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202 – telephone: 410-347-7700.

SPECIAL PROGRAMS

Engineering Internship/Cooperative Education. The primary goal of an internship or cooperative education experience is to strengthen and enhance the theoretical knowledge gained through classroom or distance education-based experiences. The objectives of Internships and Cooperative Education are to:

1. Provide students with opportunities to obtain professional industrial/government internships.
2. Prepare graduates for immediate professional assignments without further on-the-job training.
3. Provide a closer partnership between employers and the College of Engineering.
4. Help students determine which type of organizational structure and corporate culture best suits them.

Students in the program are required to enroll in internship or cooperative education courses while they are employed in industry/government. They continue to be governed by college and university regulations concerning professional conduct during the employment period. Students are normally paid wages/salaries by the employing agency.

The Engineering and Science Concepts Institute (ESCI) is an innovative intensive eight-week freshman summer program that introduces recent high school graduates to the profession of engineering as a viable career choice. They will earn 10-11 hours of college course credits. The students must first be admitted to the university according to admission standards. The ESCI mission has made a paradigm shift to select students that not only meet many high academic standards, but who also have leadership skills and match the profiles of corporate interests.

The “team” concept is mirrored and students are placed in a “living-learning” environment. The program is committed to the beginning development of the whole individual. The goal is to develop individuals yet stress that much of the success of the individual is directly dependent upon the performance of the group. There is a saying in corporate America that the “family who works and plays together, stays together”-- a belief system that becomes invaluable to the concept of “team”. Each ESCI student must aspire to “getting along with others and learning how to build consensus”. First, this will be facilitated through the classroom experience and collaborative assignments where appropriate. Secondly, this will be accomplished through the living-learning center mentoring program that will facilitate team sports and group activities.

Finally, all students are provided with the necessary foundations in mathematics, engineering, and professional concepts for success in the field. Each course is augmented with a reinforcement seminar to

facilitate the learning process. ESCI is also designed to create a realistic awareness of the profession. Corporate partners, where feasible, are being incorporated into the learning process. This becomes an invaluable benefit to the student, to the University and to our partners.

COLLEGE PROFESSIONAL AND HONOR SOCIETIES

Among the honor societies designed to support, augment, and supplement the educational and professional development of students are the departmental honor societies and *Tau Beta Pi, National Engineering Honor Society*, through the Texas Kappa Chapter. In addition, the College of Engineering sponsors the following chapters of national societies:

The Society of Women Engineers, Prairie View Student Branch, is a professional society open for membership to female students majoring in an engineering curriculum at the university. The chapter is affiliated with the national professional engineering body, the Society of Women Engineers. The society fosters the intellectual, professional, personal and social development of student members.

The Prairie View A&M chapter of the *National Society of Black Engineers* is a professional society open to all engineering students at the university. The chapter fosters intellectual and professional development among its members and promotes growth and entry of more minority persons into the engineering profession.

COLLEGE ACADEMIC REQUIREMENTS

Along with meeting the general requirements of the university, students enrolled in the College of Engineering must maintain the following performance levels in order to satisfy degree requirements:

1. Earn an overall grade point average of 2.0 or better in courses taken outside of the college and earn a grade of C or better in English, mathematics, and science courses.
2. Earn a grade of C or better in each course taken within the college.
3. Earn a grade of C or better in the prerequisite before advancing to the next level course in a sequence for English, mathematics, and science courses.
4. Earn a grade of C or better in prerequisite courses before advancing to the next level course in college courses.
5. Demonstrate professional standards and ethical conduct.

Students who transfer from other colleges and universities should meet the University's scholastic regulations and additional core curriculum requirements for engineering.

ELIGIBILITY TO TAKE UPPER DIVISION COLLEGE COURSES

The College of Engineering has an eligibility standard for the students to take upper division college courses. Students in the engineering programs must complete a prescribed set of courses listed in the catalog section outlining specific degree programs and have a minimum Grade Point Average (GPA) of 2.5 to be eligible to enroll in upper division (3000 or 4000 level) courses in the College. Students transferring to the College of Engineering with 60 or more semester hours from another institution will be allowed a period of one semester to comply.

CORE CURRICULUM FOR ENGINEERING

The core curriculum concept provides for portability of a basic element of a college degree between higher education institutions. However, certain programs have specific requirements in their programs that must be satisfied for the purpose of accreditation. For a specific program, the core curriculum may look different to most efficiently satisfy both the core and program-specific requirements. For ABET-accredited engineering programs, for example, the math requirement in the core curriculum is best satisfied if the engineering student takes Differential Equations. The program-specific core curriculum requirements

presented for degree programs in the College of Engineering represent the suggested University Core Curriculum designed for an engineering student to minimize the coursework required.

Students who undertake a more general core curriculum may require additional coursework. For example, the College of Engineering requires a programming language course so that some 3-hour courses that satisfy the University Core Curriculum may not be acceptable for the College of Engineering degree programs.

REQUIREMENTS FOR GENERAL ENGINEERING AS A MINOR FIELD

Non-engineering majors may complete a minor in general engineering through satisfactory completion of 18 SCH from the following set of courses:

GNEG 1013 Modern Engineering
GNEG 2013 Logical Reasoning and Decision Analysis
GNEG 3113 Introduction to Engineering Project Management

Select three from the following courses:

CHEG 2123 Engineering Materials in Society
MCEG 2123 Energy Systems
CVEG 2123 Engineering and the Environment
ELEG 2313 The Digital Information Age

Department of Chemical Engineering

ADMINISTRATIVE OFFICER

Irvin W. Osborne-Lee, *Department Head*

FACULTY

Kamel H. Fotouh, *Chemical Engineering*

Jorge F. Gabitto, *Chemical Engineering*

Michael Gyamerah, *Chemical Engineering*

PURPOSE AND GOALS

Chemical engineering is unique in the engineering profession in that it requires a strong foundation in chemical principles, as well as in the physical and engineering sciences common to all branches of engineering. An education in chemical engineering is one of the broadest—the chemical engineer may find employment in all phases of technical operations. Chemical process industries supply society with a vast array of products, including chemicals, fuels, plastics, metals, foods, pharmaceuticals, textiles, and cryogenic materials. In recent years, chemical engineers have found employment in the microelectronics industry and in the advanced materials, biochemical and biomedical engineering fields. Chemical engineers also serve society by reducing and eliminating pollution.

The primary goal of the department is to prepare engineers who are well qualified to design and operate chemical processes. The goals of the department include the fostering of professional ethics, standards, and practices; the development of conceptual and analytical skills in problem solving; and the development of the student's perception and creative faculties. More specifically, the department has the following objectives, which are to:

1. Provide a curriculum of study that gives students a thorough background in the basic sciences, engineering sciences, and engineering design, and provide breadth through studies in the humanities and social sciences;
2. Provide students with a strong core of chemical engineering fundamentals in well-structured courses and to provide students with guidance in choosing technical electives;
3. Provide a broad enough base that graduates may pursue graduate studies if they so choose, and to ready graduates to pursue a successful professional career in new and emerging areas such as microelectronics, biochemical, pharmaceutical, and advanced materials areas, as well as traditional chemical engineering areas;
4. Prepare students for professional careers in chemical engineering and for leadership roles in the society which they serve by maintaining high levels of competence, ethics and safety consciousness;
5. Provide students with an ethical vision of life and the profession, so that they become a healthy and productive part of society, interacting in positive ways with colleagues and the public;
6. Enrich the profession and serve society by providing opportunities for faculty and students to contribute to the professional body of knowledge by engaging in research, scholarly consulting, and other creative activities which (1) support their interest, (2) serve the needs of society, and (3) are in agreement with the goals and objectives of the College and the University;
7. Raise the general level of engineering competence and achievement via the dissemination of knowledge developed or acquired through public service to citizens both state- and nationwide.

PROFESSIONAL AND HONOR SOCIETIES

Student organizations play an important role in helping students to adjust to the responsibilities of their profession and in recognizing high academic achievement. Students are encouraged to become active

members of the organizations sponsored by the department. The department sponsors the following organizations:

American Institute of Chemical Engineers (A.I.Ch.E.) - Student Chapter. This is a part of the national American Institute of Chemical Engineers organization, which is the premier professional society for chemical engineers nationwide. AIChE is the life-long home of chemical engineers nationwide. The student chapter promotes professionalism, professional development, and service to society.

Iota Beta Chapter of Omega Chi Epsilon. This is a chapter of the National Honorary Society Omega Chi Epsilon. The Objectives of this organization are to promote and recognize Chemical Engineering academic excellence, graduate research, professionalism, sociability, character, and leadership among the chemical engineering students.

American Chemical Society (A.C.S.) - Student Chapter. This chapter is a part of the national professional society for chemists and chemical engineers, and is sponsored in cooperation with the Department of Chemistry.

Society of Petroleum Engineers (S.P.E.) - Student Chapter. This chapter is a part of the national Society of Petroleum Engineers organization. The SPE is an international technical/professional organization dedicated to the advancement of technology associated with oil and gas exploration, production, refining, and processing. Student membership provides students the opportunity to meet practicing professionals and active members in the industry while still attending school.

National Organization of Black Chemists and Chemical Engineers (N.O.B.C.Ch.E) - Student Chapter. The chapter is part of the national NOBCCChE organization. Its goals are to promote professionalism and advance technical careers for African Americans, with chemistry and chemical engineers as a particular focus. Membership is open to all who share these objectives. This chapter is co-sponsored with the Department of Chemistry.

Students of chemical engineering are also eligible for membership in the other professional and honor societies of the college and the university.

BACHELOR OF SCIENCE IN CHEMICAL ENGINEERING DEGREE PROGRAM REQUIREMENTS

Core Curriculum **42 SCH**
All Chemical Engineering Core Curriculum requirements are shown in the suggested degree program.

College Requirements **47 SCH**
MATH 1124, 2024, 3023, 4173 14 SCH
CHEM 1011, 1021, 1033, 1043 8 SCH
PHYS 2511, 2521 2 SCH
CHEG 2043, 3003 6 SCH
CVEG 2454 4 SCH
ELEG 2053 3 SCH
MCEG 1213 3 SCH
CHEG, CVEG, ELEG, or MCEG 3051 1 SCH
CHEG, CVEG, ELEG, or MCEG 4473, 4483 6 SCH

Major Requirements **33 SCH**
CHEG 2013, 2053, 3011, 3013, 3023, 3043, 3053, 3063, 4011, 4031, 4033, 4043, 4183

Support Area Requirements **14 SCH**
CHEM 2033, 2043, 3413, 3422, 3423

Technical Electives 6 SCH

Total Degree Requirements 142 SCH

Chemical Engineering Suggested Technical Electives

CHEG 4103 Special Topics in Chemical Engineering
CHEG 4133 Process Modeling and Simulation
CHEG 4153 Bioengineering
CHEG 4163 Engineering Optimization
MCEG 4123 Energy System Design
MCEG 4093 Finite Element Design and Analysis
MCEG 4173 Computer-Aided Manufacturing
CHEM 4033 Biochemistry
CHEM 4053 Instrumental Analysis
CHEM 4063 Inorganic Chemistry
CHEM 4073 Topics in Physical Chemistry
CVEG 3013 Mechanics of Materials I
CVEG 4193 Systems Engineering
ELEG 3033 Physical Electronics
MATH 3073 Linear Algebra
MATH 4083 Advanced Calculus I
MATH 4223 Introduction to Complex Analysis
PHYS 3183 Modern Physics

Technical electives must be 3000 level or above. At least one technical elective must be taken in the department. Internship and Co-op courses are not suitable as technical electives.

Eligibility to Take Upper Division College Courses

The College of Engineering requires an eligibility standard for the students to take upper division college courses. Students in the Chemical Engineering Program must complete a prescribed list of courses in the following with a minimum Grade Point Average (GPA) of 2.5 to be eligible to enroll in upper division (3000 or 4000 level) courses in the College. Students transferring to the College of Engineering with 60 or more semester hours from another institution will be allowed a period of one semester to comply.

CHEM 1033 General Inorganic Chemistry
CHEM 1011 Inorganic Chemistry Lab
ENGL 1143 Technical Writing
PHYS 2013 Engineering Physics I
PHYS 2511 General Physics Lab I
MATH 1124 Calculus with Analytic Geometry I
MATH 2024 Calculus with Analytic Geometry II
MCEG 1213 Creative Engineering I
ELEG 1043 Computer Applications in Engineering

Requirements For Chemical Engineering as a Minor Field

Students must complete 27 semester credit hours as listed below to satisfy the requirements for a minor in the discipline of chemical engineering.

CHEG 2013 Material Science
CHEG 2043 Chemical Engineering Thermodynamics I
CHEG 2053 Material and Energy Balances
CHEG 3013 Heat, Mass, and Momentum Transfer
CHEG 3023 Unit Operations
CHEG 3043 Equilibrium Stage Separation Processes
CHEG 3053 Chemical Engineering Thermodynamics II
CHEG 3063 Chemical Reaction Kinetics and Reactor Design
Technical Elective (any CHEG 3000-4000 level course)

CHEMICAL ENGINEERING SUGGESTED DEGREE PROGRAM SEQUENCE

SUMMER SESSIONS

<i>First Semester</i>		<i>Hours</i>
MATH 1124	Calculus I	4
MCEG 1213	Creative Engineering I	3
ELEG 1043	Computer Appl. in Engineering	3
Total		10

FRESHMAN YEAR

<i>First Semester</i>		<i>Hours</i>	<i>Second Semester</i>		<i>Hours</i>
MATH 2024	Calculus II	4	CHEM 1043	General Inorganic Chemistry II	3
CHEM 1033	General Inorganic Chemistry I	3	CHEM 1021	Inorganic Chemistry Laboratory II	1
CHEM 1011	Inorganic Chemistry Laboratory I	1	PHYS 2013	Engineering Physics I	3
ENGL 1123	Freshman Composition I	3	PHYS 2511	General Physics Lab I	1
POSC 1113	American Government I	3	ENGL 1143	Technical Writing	3
SPCH 1003	Fund. of Speech Communication	3	POSC 1123	American Government II	3
			HIST 1313	U.S. to 1876	3
Total		17	Total		17

SOPHOMORE YEAR

<i>First Semester</i>		<i>Hours</i>	<i>Second Semester</i>		<i>Hours</i>
CHEG 2013	Materials Science	3	CHEG 2053	Material and Energy Balances	3
CHEG 2043	Chemical Engin. Thermo. I	3	CHEM 2043	Organic Chemistry II	3
CHEM 2033	Organic Chemistry I	3	ELEG 2053	Introduction to Elect. Engineering	3
PHYS 2023	Engineering Physics II	3	CVEG 2454	Statics and Dynamics	4
PHYS 2521	General Physics Lab II	1	CHEG 3053	Chemical Engin. Thermodynamics II	3
MATH 2043	Differential Equations	3			
Total		16	Total		16

SUMMER SESSIONS

<i>First Semester</i>		<i>Hours</i>
*CHEG 2156	Chemical Engineering Internship I	6
Total		6

JUNIOR YEAR

<i>First Semester</i>		<i>Hours</i>	<i>Second Semester</i>		<i>Hours</i>
CHEG 3003	Engineering Economy	3	CHEG 3023	Unit Operations	3
CHEG 3011	Chemical Engineering Lab I	1	CHEG 3063	Chem. React. Kin./Reactor Design	3
CHEG 3013	Heat, Mass, and Momentum Trans.	3	CHEG 4011	Chemical Engineering Lab II	1
CHEG 3043	Equilibrium Staged Sep. Processes	3	CHEM 3423	Physical Chemistry II	3
CHEM 3413	Physical Chemistry I	3	MATH 3023	Probability and Statistics	3
CHEM 3422	Physical Chemistry Lab I	2	MATH 4173	Advanced Math for Engineers	3
	Humanities	3			
Total		18	Total		16

SUMMER SESSIONS

<i>First Semester</i>		<i>Hours</i>
*CHEG 3156	Chemical Engineering Internship II	6
Total		6

		SENIOR YEAR			
<i>First Semester</i>		<i>Hours</i>	<i>Second Semester</i>		<i>Hours</i>
CHEG 3051	Professional Engineering I	1	CHEG 4031	Chemical Engineering Lab III	1
CHEG 4043	Process Design and Analysis	3	CHEG 4183	Design of Process Engin. Systems	3
CHEG 4033	Proc. Dynamics and Control	3	CHEG 4483	Senior Design and Professionalism II	3
CHEG 4473	Senior Design and Professionalism I	3		Technical Elective	3
HIST 1323	The U.S.-1876 to Present	3	POSC 2503	Introduction to Global Issues	3
	Technical Elective	3		Visual and Performing Arts	3
<i>Total</i>		<i>16</i>	<i>Total</i>		<i>16</i>

* Course may be taken for credit during a summer internship, but is not required in degree plan.

Department of Civil Engineering

ADMINISTRATIVE OFFICER

Ramalingam Radhakrishnan, *Department Head*

FACULTY

Raghava R. Kommalapati, *Civil Engineering*

Khandaker M.A. Rahman, *Civil Engineering*

Hsiang Y. Yeh, *Civil Engineering*

PURPOSE AND GOALS

Civil engineers are involved in the planning, design, construction, and operation of facilities essential to modern life. These include environmental, transportation, structures, water and wastewater systems, urban development, flood control, space satellites and launching facilities, and many others.

The goal of the Civil Engineering program is to provide the highest quality education and training for qualified students to make them productive civil engineers. Through its curriculum, the department educates its students academically and socially so that they can make a significant contribution to the society in which they live and work.

The Department of Civil Engineering as a component of the College of Engineering subscribes to and supports the goals of the College and the University. The objective of the program is to produce civil engineers for leadership in the profession. The major role of the department is dissemination of excellent instruction, with the ultimate goal of promoting graduate research and encouraging excellence. Specific objectives of the civil engineering program are:

1. Provide learning experiences to students in civil engineering with an engineering education attributing technical knowledge and expertise in environmental, structural, transportation and water resources areas through a curriculum of study which gives students a sound background in basic sciences, the engineering sciences, and engineering design as well as breadth and depth experiences through studies in the humanities and in the social sciences.
2. Prepare students for professional careers in civil engineering through a curriculum of study leading to the baccalaureate degree in civil engineering (B.S.C.E.).
3. Produce civil engineers who observe professional ethics, maintain a high standard of practice, have the breadth of vision to solve problems of today and the future, and provide leadership in the profession.
4. Prepare students for entry into graduate studies.
5. Provide opportunities for faculty and students to engage in research, creative and scholarly activities that are consistent with their interests and are compatible with the goals and objectives of the University, the College, and societal needs.
6. Serve the society and contribute to the body of knowledge of the profession and to raise the general level of engineering competence and achievement via the dissemination of knowledge developed or acquired through public service to the citizens of the state and the nation.

HONOR SOCIETIES, CLUBS, AND SERVICE ORGANIZATIONS

Student organizations play an important role in helping students to adjust to the responsibilities of their profession. They are encouraged to become active members of the organizations sponsored by the department.

The American Society of Civil Engineers (A.S.C.E.) - the student chapter, is a part of the national professional society for civil engineers.

The objectives of the *Civil Engineering Honors Club (C.E.H.C.)* are to promote scholarship, professionalism, sociability, character, and leadership among civil engineering students.

Students in the department are also eligible for membership in the professional and honor societies of the college and the university.

BACHELOR OF SCIENCE IN CIVIL ENGINEERING DEGREE PROGRAM REQUIREMENTS

Core Curriculum **42 SCH**

All Civil Engineering Core Curriculum requirements are shown in the suggested degree program.

College Requirements **49 SCH**

MATH 1124, 2024, 3023, 4063 14 SCH

CHEM 1011, 1021, 1033, 1043 8 SCH

PHYS 2511, 2521 2 SCH

CHEG 3003 3 SCH

CVEG 2043, 2053 6 SCH

ELEG 2053 3 SCH

MCEG 1213, 2013 6 SCH

CVEG, CHEG, ELEG, or MCEG 3051 1 SCH

CVEG, CHEG, ELEG or MCEG 4473, 4483 6 SCH

Major Requirements **38 SCH**

CHEG 2013, CVEG 2061, 2063, 3024, 3031, 3041, 3063, 3073, 4013, 4024, 4053, 4063, 4083, 4093

Technical Electives **6 SCH**

Total Degree Requirements **135 SCH**

Civil Engineering Suggested Technical Electives

CVEG 4123 Hydrology

CVEG 4143 Engineering Construction

MCEG 4063 Design and Analysis of Dynamic Systems

MATH 3073 Linear Algebra

MATH 4173 Advanced Mathematics

MATH 4083 Advanced Calculus I

MATH 4223 Introduction to Complex Analysis

CVEG 3223 Waste Management

CVEG 3233 Water Quality Management

CVEG 3243 Fundamentals of Air Pollution and Control

Technical elective must be 3000 level or above. At least one technical elective must be taken in the department. Internship and Co-op courses are not suitable as technical electives.

Eligibility To Take Upper Division College Courses

The College of Engineering requires an eligibility standard for students to take upper division college courses. Students in the Civil Engineering Program must complete the prescribed courses in the following list with a minimum Grade Point Average (GPA) of 2.5 to be eligible to enroll in upper division (3000 or 4000 level) courses in the College. Students transferring to the College of Engineering with 60 or more semester hours from another institution will be allowed a period of one semester to comply.

CHEM 1033 General Inorganic Chemistry

CHEM 1011 Inorganic Chemistry Lab

ENGL 1043 Technical Writing
 PHYS 2013 Engineering Physics I
 PHYS 2511 General Physics Lab I
 MATH 1124 Calculus with Analytic Geometry I
 MATH 2024 Calculus with Analytic Geometry II
 MCEG 1213 Creative Engineering I
 ELEG 1043 Computer Applications in Engineering

REQUIREMENTS FOR CIVIL ENGINEERING AS A MINOR FIELD

Option 1

Students must complete 18 SCH to satisfy the minor requirements.

Required courses, 9 SCH:

CVEG 2043-Engineering Mechanics I
 CVEG 2053-Engineering Mechanics II
 CVEG 2063-Mechanics of Materials I

Technical Electives, 9 SCH:

Approved 3000 and 4000 level CVEG courses.

Option 2: Environmental Engineering Concentration

Students must complete 18 SCH to satisfy the minor requirements.

Required courses, 9 SCH:

CVEG 2123 Engineering and the Environment or an Engineering 2000 level course.
 CVEG 3213 Elements of Environmental Engineering
 CVEG 3233 Water Quality Management

Technical Electives, 9 SCH:

CVEG 3223 Waste Management
 CVEG 3243 Fundamentals of Air Pollution
 CVEG 3063 Hydraulics or MCEG 3063 Fluid Mechanics
 CVEG 4024 Environmental Engineering
 CVEG 4063 Water Resources Engineering
 CVEG 4123 Hydrology
 CHEG 3063 Chemical Reaction Kinetics and Reactor Design

CIVIL ENGINEERING SUGGESTED DEGREE PROGRAM SEQUENCE

FRESHMAN YEAR					
<i>First Semester</i>		<i>Hours</i>	<i>Second Semester</i>		<i>Hours</i>
ENGL 1123	Freshman Composition I	3	ENGL 1143	Technical Writing	3
MATH 1124	Calculus I	4	MATH 2024	Calculus II	4
CHEM 1033	General Inorganic Chemistry I	3	CHEM 1043	General Inorganic Chemistry II	3
CHEM 1011	Inorganic Chemistry Lab I	1	CHEM 1021	Inorganic Chemistry Laboratory II	1
MCEG 1213	Creative Engineering I	3	ELEG 1043	Computer Appl. in Engineering	3
SPCH 1003	Fund. of Speech Communication	3	PHYS 2013	Engineering Physics I	3
			PHYS 2511	General Physics Lab I	1
Total		17	Total		18

SUMMER SESSIONS	
<i>First Semester</i>	<i>Hours</i>
*GNEG 2156	Engineering Cooperative Education I
Total	6

SOPHOMORE YEAR

<i>First Semester</i>		<i>Hours</i>	<i>Second Semester</i>		<i>Hours</i>
MATH 2043	Differential Equations I	3	MCEG 2013	Thermodynamics I	3
PHYS 2023	Engineering Physics II	3	ELEG 2053	Intro. to Electrical Engineering	3
PHYS 2521	General Physics Lab II	1	CVEG 2053	Engineering Mechanics II	3
POSC 1113	American Government I	3	CVEG 2061	Mechanics of Materials Lab I	1
CHEG 2013	Materials Science	3	CVEG 2063	Mechanics of Materials I	3
CVEG 2043	Engineering Mechanics I	3	MATH 3023	Probability and Statistics	3
Total		16	Total		16

SUMMER SESSIONS

<i>First Semester</i>	<i>Hours</i>
*CVEG 3156 Civil Engineering Internship I	6
Total	6

JUNIOR YEAR

<i>First Semester</i>		<i>Hours</i>	<i>Second Semester</i>		<i>Hours</i>
MATH 4063	Numerical Analysis	3	HIST 1323	The U.S.-1876 to Present	3
CVEG 3041	Surveying	1	CVEG 3024	Geotechnical Engineering	4
CVEG 3063	Hydraulics	3	CVEG 3031	Concrete Lab	1
CHEG 3003	Engineering Economy	3	CVEG 3073	Structural Analysis I	3
POSC 1123	American Government II	3	CVEG 3051	Professional Engineering I	1
HIST 1313	U.S. to 1876	3	POSC 2503	Introduction to Global Issues	3
				Humanities	3
Total		16	Total		18

SUMMER SESSIONS

<i>First Semester</i>	<i>Hours</i>
*CVEG 4156 Civil Engineering Internship II	6
Total	6

SENIOR YEAR

<i>First Semester</i>		<i>Hours</i>	<i>Second Semester</i>		<i>Hours</i>
CVEG 4013	Reinforced Concrete	3	CVEG 4024	Environmental Engineering	4
CVEG 4063	Water Resources Engineering	3	CVEG 4053	Transportation Engineering	3
CVEG 4083	Structural Design	3	CVEG 4093	Systems Engineering	3
CVEG 4473	Senior Design and Professionalism I	3	CVEG 4483	Senior Design and Professionalism II	3
	Visual and Performing Arts	3		Technical Elective	3
	Technical Elective	3			
Total		18	Total		16

* Course may be taken for credit during a summer internship, but is not required in degree plan.

Department of Computer Science

ADMINISTRATIVE OFFICER

Mohsen Beheshti, *Department Head*

FACULTY

R. Iyengar, *Computer Science*
J.K. Martin, *Computer Science*
J.D. Oliver, *Computer Science*
K. Paick, *Computer Science*
G. Rambally, *Computer Science*
S.H. Shakir, *Computer Science*
M. Tompkins, *Computer Science*
S. Yan, *Computer Science*
F. Yang, *Computer Science*
Y. Yang, *Computer Science*
Y. Zhang, *Computer Science*

PURPOSE AND GOALS

The Bachelor of Science in Computer Science Program is designed:

1. To provide a high quality degree program in computer science that will prepare students for lifelong learning as they pursue professional careers in computer science and leadership roles in the society in which they serve.
2. To provide our students with a strong foundational base, state-of-the art techniques, methodologies, and tools to specify, design and develop computer-based solutions to complex systems problems.
3. To provide opportunities for faculty and students to contribute to the body of knowledge that serves the profession, by engaging in research, scholarly and other activities which support their interests and are in agreement with the goals and objectives of the College, and the University.
4. To prepare our students to communicate well, both orally and in writing, on moral and ethical development, in a knowledge of the liberal arts, and on commitment to services to others.

PROFESSIONAL AND HONOR SOCIETIES

The department sponsors a certified student chapter of the Association for Computing Machinery. Membership (local and national) is open to all fulltime computer science majors. The department also sponsors Upsilon Pi Epsilon (Computer Science Honor Society) for all computer science majors with a GPA of 3.0 or above. Any students having completed 64 semester hours of course work (18 hours of core computer science courses) is eligible for induction into the society.

BACHELOR OF SCIENCE IN COMPUTER SCIENCE DEGREE PROGRAM REQUIREMENTS

Core Curriculum **42 SCH**

All Computer Science Core Curriculum are shown in the suggested degree program.

College Requirements **20 SCH**

MATH 1124, 2024, 2053, 3073 14 SCH

PHYS 2023, 2511, 2521 5 SCH

CHEM 1011 1 SCH

Major Requirements **49 SCH**

COMP 1211, 1221, 1223, 2013, 2033, 2103, 3043, 3053, 3063, 3113, 3223, 4001, 4072,4073(Digital Logic Circuits), 4082, 4113, 4123, 4133, 4953

Computer Science Electives (Department approved Computer Science Elective)..... **3 SCH**
Computer Science Electives (All upper division courses) **3 SCH**
Free Electives (Department approved upper division courses) **6 SCH**

Support Area Requirements..... **4 SCH**
 TECH 3203; HUPF 1011/2151

Total Degree Requirements **127 SCH**

Computer Science Suggested Electives

Electives must be 3000 level or above.

COMP 3003 Introduction to Web design and Multimedia

- COMP 3203 System Analysis and Design
- COMP 3213 Graphics and Visual Computing
- COMP 4053 Parallel Algorithm Design
- COMP 4063 Artificial intelligence
- COMP 4073 Special Problems
- COMP 4953 Simulation and Modeling & Analysis
- COMP 4843 Human-Computer Interaction
- COMP 4993 Independent Study

Eligibility To Take Upper Division College Courses

The college of Engineering requires an eligibility standard for the students to take upper division college courses. Students in Computer Science Program must complete a prescribed list of courses in the following with a minimum Grade Point Average (GPA) of 2.5 to be eligible to enroll in upper division (3000 or 4000 level) courses in the College. Students transferring to the College of Engineering with 60 or more semester hours from another institution will be allowed a period of one semester to comply.

- CHEM 1033 General Chemistry
- CHEM 1011 Inorganic Chemistry Laboratory
- MATH 1124 Calculus with Analytic Geometry I
- MATH 2024 Calculus with Analytic Geometry II
- COMP 1213 Computer Science I
- COMP 1211 Computer Science Laboratory I
- COMP 1223 Computer Science II
- COMP 1221 Computer Science Laboratory II
- ENGL 1133 Freshman Composition II

Requirements for Computer Science as a Minor Field **31 SCH**
 COMP 1211, 1213, 1221, 1223, 2013, and twelve semester hours of upper-division courses..... **23 SCH**
 MATH 1124, 2024 **8 SCH**

COMPUTER SCIENCE SUGGESTED DEGREE PROGRAM SEQUENCE

FRESHMAN YEAR					
<i>First Semester</i>		<i>Hours</i>	<i>Second Semester</i>		<i>Hours</i>
ENGL 1123	Freshman Composition I	3	ENGL 1133	Freshman Composition II	3
MATH 1124	Calculus I	4	HIST 1313	U.S. to 1876	3
CHEM 1033	General Chemistry	3	MATH 2024	Calculus II	4
CHEM 1011	Inorganic Chemistry Laboratory	1	SPCH 1003	Fund. of Speech Communication	3
COMP 1211	Computer Science Laboratory I	1	COMP 1221	Computer Science Laboratory II	1

COMP 1213	Computer Science I	3	COMP 1223	Computer Science II	3
Total		15	Total		17

SOPHOMORE YEAR

<i>First Semester</i>		<i>Hours</i>	<i>Second Semester</i>		<i>Hours</i>
COMP 2013	Data Structures	3	COMP 2033	Assembly Language	3
MATH 2053	Discrete Mathematics	3	HIST 1323	The U.S.-1876 to Present	3
COMP	Elective	3	COMP 2103	Discrete Structures	3
POSC 1113	American Government I	3	POSC 1123	American Government II	3
PHYS 2013	Engineering Physics I	3	PHYS 2023	Engineering Physics II	3
PHYS 2511	Physics Laboratory I	1	PHYS 2521	Physics Laboratory II	1
Total		16	Total		16

JUNIOR YEAR

<i>First Semester</i>		<i>Hours</i>	<i>Second Semester</i>		<i>Hours</i>
TECH 3203	Eng./Tech. Communications	3	COMP 3063	Operating Systems	3
	Upper-level Free Elective	3	COMP3053	Analysis of Algorithms	3
MATH 3073	Linear Algebra	3		Humanities	3
COMP 4073	Special Problems (Digital Logic)	3	COMP 3223	Software Engineering	3
COMP 3043	Computer Organization	3	COMP 3113	Object-Oriented Analy. and Design	3
MATH 3023	Probability and Statistics	3			
Total		18	Total		15

SENIOR YEAR

<i>First Semester</i>		<i>Hours</i>	<i>Second Semester</i>		<i>Hours</i>
COMP 4133	Formal Languages Automata	3	COMP 4113	Programming Languages Design	3
COMP 4001	Ethics and Soc. Issues in Computing	1	COMP	Upper-level Computer Science	3
	Social and Behavioral Science	3		Upper-level Free Elective	3
COMP 4072	Senior Design Project I	2	COMP 4082	Senior Design Project II	2
COMP 4123	Computer Networks	3	HUPF 1011/1251	Human Performance	1
COMP 4953	Database Management	3		Visual and Performing Arts	3
Total		15	Total		15

Department of Electrical Engineering

ADMINISTRATIVE OFFICER

John O. Attia, *Department Head*

FACULTY

Cajetan Akujuobi, *Electrical Engineering*

Warsame H. Ali, *Electrical Engineering*

Penrose S. Cofie, *Electrical Engineering*

John H. Fuller, *Electrical Engineering*

Kelvin K. Kirby, *Electrical Engineering*

Siew T. Koay, *Electrical Engineering*

A. Anil Kumar, *Electrical Engineering*

Charlie L. Tolliver, *Electrical Engineering*

Richard Wilkins, *Electrical Engineering*

PURPOSE AND GOALS

The primary purpose of the Electrical Engineering Program is to prepare students for a successful professional career in electrical engineering. The curriculum is structured to provide each student with a sound background in mathematics, physical sciences, engineering sciences and a thorough foundation in electrical engineering for the analysis and design of electrical and electronic circuits and systems.

The objectives of the Electrical Engineering program at Prairie View A&M University are to:

1. Produce graduates who will practice Electrical Engineering in one of the following areas of emphasis (i) microelectronics, (ii) computer engineering, (iii) communications and signal processing, (iv) power engineering and control systems.
2. Produce graduates who are prepared for engineering practice including understanding and appreciation for business practices, oral and written communications skills, professional integrity and ethical, social and political responsibility.
3. Produce graduates who have conceptual understanding to apply engineering science and mathematics to the analysis and design of electrical or electronic devices, circuits and systems.
4. Produce graduates who have the technical, cognitive and interpersonal skills that will allow them to secure employment within the State of Texas, or in the nation.
5. Prepare outstanding students to pursue graduate degrees.
6. Produce significant number graduates with experience in research.

PROFESSIONAL AND HONOR SOCIETIES

The *Eta Kappa Nu Electrical Engineering Honor Society* and the *Institute of Electrical and Electronic Engineer*. The two electrical engineering organizations have student chapters in the department. Additional organizations are listed in the section on college requirements. Electrical engineering majors are eligible for membership in the professional and honor societies of the college and university.

Institute of Electrical and Electronic Engineers (IEEE). A professional society open for membership to engineering students who are majoring in electrical engineering and to other students who have interests in electrical engineering. The chapter is affiliated with the national professional engineering society of the Institute of Electrical and Electronic Engineers.

Eta Kappa Nu Electrical Engineering Honor Society. A national honor society recognizing academic excellence in future engineers and those engineers who have made outstanding contributions to society. Membership is by invitation to the top junior and senior students majoring in electrical engineering.

**BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING DEGREE PROGRAM
REQUIREMENTS**

Core Curriculum	42 SCH
All Electrical Engineering Core Curriculum requirements are shown in the suggested degree program.	
College and Support Area Requirements	47 SCH
MATH 1124, 2024, 3023, 4173	14 SCH
CHEM 1011, 1021, 1033, 1043	8 SCH
PHYS 2511, 2521	2 SCH
CHEG 3003	3 SCH
CVEG 2454	4 SCH
ELEG 2023	3 SCH
MCEG 1213, 2013	6 SCH
ELEG, CHEG, CVEG, or MCEG 3051	1 SCH
ELEG, CHEG, CVEG, or MCEG 4473, 4483	6 SCH
Major Requirements	37 SCH
ELEG 3011, 3013, 3021, 3033, 3023, 3043, 3063, 4003, 4011, 4013, 4033, 4043, 4073, 4303; GNEG 2151	
Technical Electives	9 SCH
Electrical Engineering Laboratory Elective	1 SCH
Total Degree Requirements	136 SCH

ELECTRICAL ENGINEERING SUGGESTED TECHNICAL ELECTIVES

At least two technical electives must be taken in the Electrical Engineering department. In addition, one Electrical Engineering Laboratory elective should be taken to satisfy degree requirements. Internship and co-op courses are not suitable as technical electives.

Microelectronics Area

- ELEG 4223 Electronic and Photonic Materials and Devices
- ELEG 4263 VLSI Circuit Design
- ELEG 4273 Analog and Mixed Signal Techniques I
- ELEG 4393 Analog and Mixed Signal Techniques II

Communications/Signal Processing Area:

- ELEG 4053 Digital Signal Processing
- ELEG 4163 Digital Signal Processing Design and Testing Techniques
- ELEG 4313 Broadband Communication Systems I
- ELEG 4323 Broadband Communication Systems II

Computer Engineering Area:

- ELEG 4393 Computer Organization and Design
- ELEG 4253 Computer Interfacing and Communications
- ELEG 4263 VLSI Circuit Design

Power and Control Systems Area:

- ELEG 4243 Power Electronics

ELEG 4023 Power Systems Engineering
 ELEG 4283 Reliability Analysis of Electrical Facilities

Electrical Engineering Laboratory Electives:

ELEG 3041 Microelectronics Processing and Characterization Lab
 ELEG 4031 Communication Laboratory
 ELEG 4021 Power Laboratory
 ELEG 4151 Digital Signal Processing Solutions Laboratory
 ELEG 4291 Mixed Signal Testing Techniques Laboratory

Other Technical Electives:

CVEG 4093 Systems Engineering
 MCEG 3023 Thermodynamics II
 MCEG 3063 Fluid Mechanics
 MATH 4063 Numerical Analysis
 MATH 3073 Linear Algebra

Eligibility to Take Upper Division College Courses

The College of Engineering requires an eligibility standard for the students to take upper division college courses. Students in the Electrical Engineering Program must complete a prescribed list of courses in the following with a minimum Grade Point Average (GPA) of 2.5 to be eligible to enroll in upper division (3000 or 4000 level) courses in the College. Students transferring to the College of Engineering with 60 or more semester hours from another institution will be allowed a period of one semester to comply.

CHEM 1033 General Inorganic Chemistry
 CHEM 1011 Inorganic Chemistry Lab
 ENGL 1143 Technical Writing
 PHYS 2013 Engineering Physics I
 PHYS 2511 General Physics Lab I
 MATH 1124 Calculus with Analytic Geometry I
 MATH 2024 Calculus with Analytic Geometry II
 MCEG 1213 Creative Engineering I
 ELEG 1043 Computer Applications in Engineering

Requirements For Electrical Engineering as a Minor Field

Students must complete the following 23 SCH of courses to satisfy the minor requirements:

ELEG 2023 Network Theory I
 ELEG 3011 Circuits Laboratory
 ELEG 3013 Network Theory II
 ELEG 3033 Physical Electronics
 ELEG 3043 Electronics I
 ELEG 3063 Logic Circuits
 ELEG 3021 Logic Circuits Laboratory
 ELEG 3023 Signals and Systems
 ELEG 4013 Electromechanical Energy Conversion

ELECTRICAL ENGINEERING SUGGESTED DEGREE PROGRAM SEQUENCE

		FRESHMAN YEAR			
<i>First Semester</i>		<i>Hours</i>	<i>Second Semester</i>		<i>Hours</i>
ENGL 1123	Freshman Composition I	3	ENGL 1143	Technical Writing	3
MATH 1124	Calculus I	4	MATH 2024	Calculus II	4
CHEM 1033	General Inorganic Chemistry I	3	CHEM 1043	General Inorganic Chemistry II	3
CHEM 1011	Inorganic Chemistry Laboratory	1	PHYS 2013	Engineering Physics I	3
MCEG 1213	Creative Engineering	3	PHYS 2511	General Physics Lab I	1

SPCH 1003	Fund. of Speech Communication	3	ELEG 1043	Computer Appl. in Engineering	3
GNEG 2151	Engineering Research I	1	CHEM 1021	Inorganic Chemistry Laboratory	1
Total		18	Total		18

SOPHOMORE YEAR

<i>First Semester</i>		<i>Hours</i>	<i>Second Semester</i>		<i>Hours</i>
MATH 2043	Differential Equations	3	ELEG 2023	Network Theory I	3
PHYS 2023	Engineering Physics II	3	ELEG 3011	Circuits Lab	1
PHYS 2521	General Physics Lab II	1	MCEG 2013	Thermodynamics I	3
HIST 1313	U.S. to 1876	3	CVEG 2454	Statics and Dynamics	4
POSC 1113	American Government I	3	POSC 1123	American Government II	3
	Visual and Performing Arts	3	HIST 1323	The U.S.-1876 to Present	3
Total		16	Total		17

JUNIOR YEAR

<i>First Semester</i>		<i>Hours</i>	<i>Second Semester</i>		<i>Hours</i>
MATH 3023	Probability and Statistics	3	ELEG 3023	Signals and Systems	3
MATH 4173	Advanced Math for Engineers	3	ELEG 3043	Electronics I	3
ELEG 3013	Network Theory II	3	ELEG 4011	Electronics Lab	1
ELEG 3063	Logic Circuits	3	ELEG 3051	Professional Engineering I	1
ELEG 3021	Logic Circuits Lab	1	CHEG 3003	Engineering Economy	3
ELEG 3033	Physical Electronics	3	POSC 2503	Introduction to Global Issues	3
			ELEG 4303	Digital Design	3
Total		16	Total		17

SENIOR YEAR

<i>First Semester</i>		<i>Hours</i>	<i>Second Semester</i>		<i>Hours</i>
ELEG 4043	Electronics II	3	ELEG 4073	Control Systems	3
	Humanities	3	ELEG 4483	Senior Design II	3
ELEG 4003	Communication Theory	3	ELEG 4033	Electro Field Theory	3
ELEG 4473	Senior Design I	3		Technical Electives	6
ELEG 4013	Energy Conversion	3		Electrical Engin. Lab Elective	1
	Technical Elective	3			
Total		18	Total		16

Department of Engineering Technology

ADMINISTRATIVE OFFICER

Mohammed T. Hussein, *Interim Department Head*

FACULTY

Faizul Islam, *Electrical Engineering Technology*
Bobby Kennard, *Computer-Aided Drafting and Design*
Mohan A. Ketkar, *Electrical Engineering Technology*
David A. Kirkpatrick, *Electrical Engineering Technology*
Sarhan M. Musa, *Electrical Engineering Technology*
David Perez, *Computer Engineering Technology*
N.N. Sarker, *Computer Engineering Technology*

PURPOSE AND GOALS

The Department of Engineering Technology offers educational programs and experiences designed to prepare students to meet the challenging demands of industry, society, and the nation as a whole. The department is organized to offer instruction in computer engineering technology, electrical engineering technology, and computer-aided drafting and design. Each program prepares students to work as engineering technologist capable of applying engineering principles to design, construction, operation, and industrial production.

The goal of the Department of Engineering Technology is to provide students with the skills, knowledge, and experience that will produce competent engineering technologists. The technologist must be able to produce practical workable results quickly, install and operate technical systems, devise hardware from proven concepts, develop and produce products, manage construction processes, and provide sales support for products and systems.

SPECIAL EMPHASIS OPTIONS

In addition to the degree programs, students may select special options available in the electrical engineering technology and computer engineering technology degree programs.

ELIGIBILITY TO TAKE UPPER DIVISION COLLEGE COURSES

The College of Engineering requires an eligibility standard for the students to take upper division college courses. Students in the Engineering Technology Programs must complete a prescribed list of courses in the following with a minimum Grade Point Average (GPA) of 2.5 to be eligible to enroll in upper division (3000 or 4000 level) courses in the College. Students transferring to the College of Engineering with 60 or more semester hours from another institution will be allowed a period of one semester to comply.

MATH 1113 College Algebra
MATH 1123 Trigonometry
CPET 1013 Computer Application to Engineering Technology I
CPET 1023 Computer Application to Engineering Technology II
ELET 1111 Direct Current Circuits Laboratory
ELET 1113 Direct Current Circuits
ELET 1141 Alternating Current Circuits Laboratory
ELET 1143 Alternating Current Circuits

HONOR SOCIETIES, CLUB AND SERVICE ORGANIZATIONS

The *Computer Engineering Technology Association* is an academic organization. Membership is open to all students in computer engineering technology and any student in the College of Engineering. Members must maintain a 2.50 grade point average and must be in good standing at the University. The association's objective is to provide students with the opportunity to become more familiar with technical and scientific development; to share information, ideas and experiences; and to re-design on up-to-date computers and the many possible peripherals they may control.

The *Engineering Technology Association (ETA)* helps to increase and deepen the interest and knowledge of students enrolled in the electrical engineering technology program. It provides professional orientation in an effort to enlarge students' perspectives and makes them more aware of job opportunities in their field. Membership is open to all students enrolled in the electrical engineering technology program.

Institute of Electrical and Electronic Engineers (IEEE), Engineering Technology Chapter. A professional society open for membership to engineering technology students who are majoring in electrical engineering and to other engineering technology students who have interests in electrical engineering. The chapter is affiliated with the national professional engineering society of the Institute of Electrical and Electronic Engineers.

The *American Drafting and Design Association, (ADDA)* is open to students enrolled in drafting classes. Student chapter members are eligible to participate in all functions sponsored by ADDA.

BACHELOR OF SCIENCE IN COMPUTER ENGINEERING TECHNOLOGY PROGRAM

The Bachelor of Science degree program in computer engineering technology is designed to give students a solid foundation in mathematics, basic science, computer hardware and software. Students are provided with a sound technical foundation employing the latest techniques of the discipline. The program is designed to prepare students to assemble, calibrate, install, maintain, troubleshoot, and redesign modern computers, and the variety peripherals they may control, and network design, administration and management.

Graduates of the computer engineering technology program are in high demand because of the current expansion of computer and computer-related industries. Demand is heightened by the increasing application of computer technology to all aspects of engineering and industrial development, as well as to consumer and consumer-oriented industries. As a result, there is an increasing need for well-trained microprocessor application designers, interface designers, software specialists, and sales representatives.

COMPUTER ENGINEERING TECHNOLOGY DEGREE PROGRAM REQUIREMENTS

Core Curriculum42 SCH

All Engineering Technology Core Curriculum requirements are shown in the suggested degree program.

College Requirements24 SCH

PHYS 2014, 2024 8 SCH

TECH 1002, 3203 5 SCH

MATH 1123, 1124, 2024 11 SCH

Major Requirements49 SCH

CPET 1023, 2111, 2113, 3161, 3163, 3231, 3233, 4061, 4063, 4082, 4092, 4111, 4113, 4151, 4153, 4361, 4363, MCET 3103 and 11 semester credit hours from the software technology or computer hardware special emphasis option.

Support Area Requirements21 SCH

CHEM 1011, 1021 2 SCH

TECH 1103.....	3 SCH
ELET 1111, 1113, 1141, 1143, 2221, 2223, 2251, 2253.....	16 SCH

Total Degree Requirements136 SCH

Requirements for Computer Engineering Technology as a Minor Field25 SCH

Students must complete the following 24 SCH of courses to satisfy the requirements of the Minor of Computer Engineering Technology.

- CPET 1013 Computer Application to Engineering Technology I
- CPET 1023 Computer Application to Engineering Technology II
- CPET 2111 Digital Logic Laboratory
- CPET 2113 Digital Logic Circuits
- CPET 3013 Software Engineering Technology I
- CPET 3251 Digital Hardware Design Laboratory
- CPET 3253 Digital Hardware Design
- CPET 4061 Data Communication Methods Laboratory
- CPET 4063 Data Communication Methods
- CPET 4361 Computer Networking Laboratory
- CPET 4363 Computer Networking

TECHNICAL ELECTIVES FOR SPECIAL EMPHASIS OPTIONS

Computer Hardware

The computer hardware special emphasis option is designed to cover the electronics, hardware, and software aspects of computers in order to provide a graduate of the computer hardware option with a total computer systems perspective. Specific areas covered in the curriculum are electronics, digital circuits, computer architecture, programming languages ranging from assemblies to high level and microcomputer systems. The program interfaces with associate degree programs in computer engineering technology and related programs.

- CPET 3251 Digital Hardware Design Laboratory
- CPET 3253 Digital Hardware Design
- CPET 4381 Digital Signal Processing Applications Laboratory
- CPET 4383 Digital Signal Processing Applications
- CPET 4391 Programmable Microcontrollers Laboratory
- CPET 4393 Programmable Microcontrollers

Software Technology

The software technology special emphasis option curriculum is designed to cover both hardware and software concepts of computers in order to provide a graduate of the program a comprehensive computer system background. Specific areas covered in the curriculum are software for microprocessor based system management, microprocessor realtime systems, computer networks and software engineering technology management. Throughout this special emphasis option program, the student works with modern laboratory test equipment, state of the art computers and microprocessor trainers, and peripherals. The program interfaces with associate degree programs in computer engineering technology and related programs.

Software Technology

- CPET 3013 Software Engineering Technology I
- CPET 3031 Modern Programming Techniques Laboratory
- CPET 3033 Modern Programming Techniques
- CPET 4013 Software Engineering Technology II
- ELET 3023 Computer Applications to Electrical Problems

Technical electives require departmental approval.

COMPUTER ENGINEERING TECHNOLOGY SUGGESTED DEGREE PROGRAM SEQUENCE

FRESHMAN YEAR

<i>First Semester</i>	<i>Hours</i>	<i>Second Semester</i>	<i>Hours</i>
ENGL 1123 Freshman Composition I	3	ENGL 1133 Freshman Composition II	3
MATH 1113 Algebra	3	MATH 1123 Trigonometry	3
SPCH 1003 Fund. of Speech Communication	3	TECH 1103 Computer-Aided Drafting	3
ELET 1113 DC Circuits	3	ELET 1143 AC Circuits	3
ELET 1111 DC Circuits Laboratory	1	ELET 1141 AC Circuits Laboratory	1
TECH 1002 Applied Sciences Seminar	2	CPET 1023 Computer Applications II	3
CPET 1013 Computer Applications I	3		
Total	18	Total	16

SOPHOMORE YEAR

<i>First Semester</i>	<i>Hours</i>	<i>Second Semester</i>	<i>Hours</i>
ELET 2223 Basic Electronics I	3	MATH 2024 Calculus and Analytical Geom. II	4
ELET 2221 Basic Electronics Lab	1	PHYS 2024 General Physics II	4
MATH 1124 Calculus and Analytical Geom. I	4	ELET 2253 Basic Electronics II Lab	3
PHYS 2014 General Physics I	4	ELET 2251 Basic Electronics II Lab	1
POSC 1113 American Government I	3	CPET 2113 Digital Logic Circuits	3
Humanities	3	CPET 2111 Logic Laboratory	1
Total	18	Total	16

JUNIOR YEAR

<i>First Semester</i>	<i>Hours</i>	<i>Second Semester</i>	<i>Hours</i>
POSC 1123 American Government II	3	Social and Behavioral Science	3
CHEM 1013 General Inorganic Chemistry	3	CPET 3233 Micropro Assembly Lang	3
CHEM 1011 Inorganic Chemistry Laboratory	1	CPET 3231 Micropro Assembly Lang Lab	1
HIST 1313 U.S. to 1876	3	Technical Elective	1
CPET 3163 CPU Arch. Hardware	3	TECH 3203 Engin./Tech. Communication	3
CPET 3161 CPU Arch Hardware	1	CHEM 1023 General Inorganic Chemistry II	3
MCET 3103 Math Applications for Technology	3	CHEM 1021 Inorganic Chemistry Laboratory II	1
		Visual and Performing Arts	3
Total	17	Total	17

SENIOR YEAR

<i>First Semester</i>	<i>Hours</i>	<i>Second Semester</i>	<i>Hours</i>
CPET 4063 Data Communication Methods	3	CPET 4363 Computer Networking	3
CPET 4061 Data Communication Methods Lab	1	CPET 4361 Computer Network Lab	1
Technical Electives	6	CPET 4153 Micro Perpheral Hdw Lab	3
CPET 4113 Appl. Micropro Software	3	HIST 1323 The U.S.-1876 to Present	3
CPET 1111 Appl. Micropro Software Lab	1	CPET 4151 Microperipheral Hardware Lab	1
CPET 4082 Senior Project I	2	Technical Elective	5
		CPET 4092 Senior Project II	2
Total	16	Total	18

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING TECHNOLOGY PROGRAM

The Electrical Engineering Technology Program offers a Bachelor of Science degree in electrical engineering technology. Students in this program may choose to concentrate either in communication electronics or digital electronics.

The communication electronics option is designed to prepare graduates who are highly skilled in the use of science, mathematics, computers, and electronics for the communications electronics industry. Graduates with a background in communication electronics are in high demand because of the impact of satellites and computers on the communication industry. This demand is heightened by the increasing development of new and advanced methods of transmitting and receiving of digital data in all areas of the industry.

The digital electronics option is concerned with the design, fabrication, and utilization of integrated circuits, discrete components, and semiconductors used in various electronic products. Also, students majoring in electrical engineering technology will have an opportunity to enroll in robotic and laser technology courses.

Opportunities are excellent and graduates are qualified to apply their knowledge in a number of electronics and related positions. With the increased use of communications and digital electronic products in the United States, job opportunities for graduates of this program are likely to grow faster than those in any other area.

ELECTRICAL ENGINEERING TECHNOLOGY DEGREE PROGRAM REQUIREMENTS

Core Curriculum42 SCH

All Engineering Technology Core Curriculum requirements are shown in the suggested degree program.

College Requirements24 SCH

PHYS 2014, 2024.....	8 SCH
TECH 1002, 3203.....	5 SCH
MATH 1123, 1124, 2024.....	11 SCH

Major Requirements53 SCH

ELET 1111, 1113, 1141, 1143, 2221, 2223, 2251, 2253, 3023, 3241, 3243, 3451, 3453, 3521, 3523, 4082, 4092, 4241, 4243, MCET 3103 and 11 semester credit hours from the communications electronics or digital electronics special emphasis option.

Support Area Requirements16 SCH

CPET 1023, 2111, 2113, 4181, 4183.....	11 SCH
CHEM 1011, 1021.....	2 SCH
TECH 1103.....	3 SCH

Total Degree Requirements135 SCH

Requirements for Electrical Engineering Technology as a Minor Field24 SCH

Students must complete at least 24 SCH of courses from the following list to satisfy the requirements of the Minor of Electrical Engineering Technology.

- ELET 1111 Direct Current Circuits Laboratory
- ELET 1113 Direct Current Circuits
- ELET 1141 Alternating Current Circuits Laboratory
- ELET 1143 Alternating Current Circuits
- ELET 2221 Basic Electronics Laboratory I
- ELET 2223 Basic Electronics I
- ELET 2251 Basic Electronics Laboratory II
- ELET 2253 Basic Electronics II
- ELET 3241 Network Analysis Laboratory
- ELET 3243 Network Analysis
- ELET 3701 Communication Circuits Laboratory I
- ELET 3703 Communication Circuits I

ELET 4801 Communication Circuits II Laboratory
 ELET 4803 Communication Circuits II
 ELET 4241 Operational Amplifier Theory and Applications Laboratory
 ELET 4243 Operational Amplifier Theory and Applications

TECHNICAL ELECTIVES FOR SPECIAL EMPHASIS OPTIONS

Communication Systems

The communications electronics special emphasis option is designed to provide students with a strong background in all aspects of electrical/electronics that are involved the transmission, reception, and production of audio, video, and digital data. Students in the communications electronics option will be exposed to state-of-the-art equipment, including satellite transmission/reception systems and analog/digital information transmission technology. Graduates will be prepared to work in the communications industry as broadcast engineers, production engineers, technical directors, and transmission systems specialists. The program interfaces with associate degree programs in electrical/electronics engineering technology and with related programs.

ELET 3003 Antennas and Transmission Systems
 ELET 3701 Communication Circuits I Laboratory
 ELET 3703 Communication Circuits I
 ELET 4801 Communication Circuits II Laboratory
 ELET 4803 Communication Circuits II
 CPET 4061 Data Communication Methods Laboratory
 CPET 4063 Data Communication Methods
 ELET 4903 Communication Circuits III
 ELET 4901 Communication Circuits III

Digital Electronics

The digital electronics special emphasis option is available to students interested in applications of digital electronics in automation and robotics, and electrical/electronics products and the industrial and electrical systems. This option combines elements of the design and development of digital electronics and the fabrication and manufacture of printed circuits, components, and microelectronics. Graduates of this program find career opportunities in government and industry, particularly in high technology companies utilizing digital electronics technology. The program is designed to interface with associate degree programs in electrical/electronics engineering technology and with related programs.

ELET 3603 Digital Integrated Circuit Devices and Applications
 ELET 4241 Operational Amplifier Theory and Applications Laboratory
 ELET 4243 Operational Amplifier Theory and Applications
 ELET 4513 Advanced Integrated Circuits

Technical electives require departmental approval.

ELECTRICAL ENGINEERING TECHNOLOGY SUGGESTED DEGREE PROGRAM SEQUENCE

		FRESHMAN YEAR			
<i>First Semester</i>		<i>Hours</i>	<i>Second Semester</i>		<i>Hours</i>
ENGL 1123	Freshman Composition I	3	ENGL 1133	Freshman Composition II	3
MATH 1113	Algebra	3	MATH 1123	Trigonometry	3
SPCH 1003	Fund. of Speech Communication	3	TECH 1103	Computer-Aided Drafting	3
ELET 1113	DC Circuits	3	ELET 1143	AC Circuits	3
ELET 1111	DC Circuits Laboratory	1	ELET 1141	AC Circuits Laboratory	1

TECH 1002	Applied Sciences Seminar	2	CPET 1023	Computer Applications II	3
CPET 1013	Computer Applications I	3			
Total		18	Total		16

SOPHOMORE YEAR

<i>First Semester</i>		<i>Hours</i>	<i>Second Semester</i>		<i>Hours</i>
ELET 2223	Basic Electronics I	3	MATH 2024	Calculus and Analytical Geom. II	4
ELET 2221	Basic Electronics Lab	1	PHYS 2024	General Physics II	4
MATH 1124	Calculus and Analytical Geom. I	4	ELET 2253	Basic Electronics II Lab	3
PHYS 2014	General Physics I	4	ELET 2251	Basic Electronics II Lab	1
POSC 1113	American Government I	3	CPET 2113	Digital Logic Circuits	3
	Humanities	3	CPET 2111	Logic Laboratory	1
Total		18	Total		16

JUNIOR YEAR

<i>First Semester</i>		<i>Hours</i>	<i>Second Semester</i>		<i>Hours</i>
POSC 1123	American Government II	3		Social and Behavioral Science	3
ELET 3521	Instrument and I/O Transducers Lab	1	TECH 3203	Engin./Tech. Communication	3
ELET 3523	Instrument and I/O Transducers	3	CHEM 1023	General Inorganic Chemistry II	3
MCET 3103	Math Apps for Tech	3	CHEM 1021	Inorganic Chemistry Laboratory II	1
ELET 3453	Robotics I	3	ELET 3203	Computer Applications Elect. Prob.	3
ELET 3451	Robotics I Laboratory	1	ELET 3243	Network Analysis	3
CHEM 1013	General Inorganic Chemistry	3	ELET 3241	Network Analysis Lab	1
CHEM 1011	Inorganic Chemistry Laboratory	1			
Total		18	Total		17

SENIOR YEAR

<i>First Semester</i>		<i>Hours</i>	<i>Second Semester</i>		<i>Hours</i>
ELET 4241	Operat. Amp Thy. and Apps. Lab	1	CPET 4181	Single Chip Microprocessor Lab	1
ELET 4243	Operat. Amp Thy. and Apps.	3	CPET 4183	Single Chip Microprocessor	3
HIST 1313	U.S. to 1876	3	HIST 1323	The U.S.-1876 to Present	3
	Technical Elective	6		Technical Elective	5
ELET 4082	Senior Project I	2	ELET 4092	Senior Project II	2
	Visual and Performing Arts	3			
Total		18	Total		14

**BACHELOR OF SCIENCE IN INDUSTRIAL TECHNOLOGY PROGRAM
(COMPUTER-AIDED DRAFTING AND DESIGN)**

This program prepares students for design, manufacturing, and management positions in industry. Industrial technologists are involved with the applied professional functions of industry rather than its theoretical aspects. Scientific and engineering principles are used to solve technical problems or to coordinate personnel-oriented needs at the supervisory or production management levels. The degree program prepares students for employment in the various design areas of computer-aided drafting and design, and engineering.

INDUSTRIAL TECHNOLOGY DEGREE PROGRAM REQUIREMENTS

Core Curriculum**42 SCH**

All Industrial Technology Core Curriculum requirements are shown in the suggested degree program. .

College Requirements **7 SCH**
 MATH 1123, 1124

Major Requirements **54 SCH**
 TECH 1002, 1033, 1103, 2003, 2103, 2163, 2313, 3013, 3203, 3223, 3233, 3383, 4072,
 4082, 4103, 4273, 4403 and 6 semester credit hours of technical electives.

Support Area Requirements **27 SCH**
 CPET 1023, 2111, 2113 7 SCH
 ELET 1111, 1113 4 SCH
 CHEM 1011, 1021 2 SCH
 PHYS 2014, 2024 8 SCH
 Management Electives 6 SCH

Total Degree Requirements **130 SCH**

INDUSTRIAL TECHNOLOGY SUGGESTED DEGREE PROGRAM SEQUENCE

FRESHMAN YEAR

<i>First Semester</i>	<i>Hours</i>	<i>Second Semester</i>	<i>Hours</i>
ENGL 1123 Freshman Composition I	3	ENGL 1133 Freshman Composition II	3
MATH 1113 College Algebra	3	MATH 1123 Trigonometry	3
CPET 1013 Computer Applications I	3	TECH 1103 Computer-Aided Drafting I	3
SPCH 1003 Fund. of Speech Communication	3	TECH 2003 Basic CAM	3
TECH 1002 Engineering/Tech Seminar	2	CPET 1023 Computer Appl. II	3
TECH 1033 Engineering Graphics	3		
Total	17	Total	15

SOPHOMORE YEAR

<i>First Semester</i>	<i>Hours</i>	<i>Second Semester</i>	<i>Hours</i>
HIST 1313 U.S. to 1876	3	HIST 1323 The U.S.-1876 to Present	3
	3	MATH 1124 Calculus and Analytical Geom. I	4
ELET 1113 DC Circuits	3	TECH 2163 Architectural Drafting	1
ELET 1111 DC Circuits Lab	1	CPET 2111 Digital Logic Lab	3
	3	CPET 2113 Digital Logic Circuits	3
TECH 2103 Computer-Aided Draft II	3		3
Total	16	Total	17

JUNIOR YEAR

<i>First Semester</i>	<i>Hours</i>	<i>Second Semester</i>	<i>Hours</i>
PHYS 2014 General Physics I	4	TECH 3223 Electromechanical Drafting	3
TECH 3383 Piping Drafting	3	TECH 3233 Industrial Mgmt. and Supervision	3
TECH 2313 Quality Assurance	3	TECH 3203 Engin./Tech. Communication	3
POSC 1113 American Government I	3	PHYS 2024 General Physics II	4
TECH 3013 Industrial Design	3	POSC 1123 American Government II	3
Total	16	Total	16

SENIOR YEAR

<i>First Semester</i>	<i>Hours</i>	<i>Second Semester</i>	<i>Hours</i>
TECH 4403 Machine Drafting	3		6
TECH 4103 Advanced Comp-Aid Design	3	TECH 4082 Senior Project II	2

Engineering Technology Programs and Degree Plans

	Social and Behavioral Science	3	CHEM 1023	General Inorganic Chemistry II	3
TECH 4273	Industrial Safety Management	3	CHEM 1021	Inorganic Chemistry Laboratory II	1
TECH 4072	Senior Project I	2		Management Elective	3
CHEM 1013	General Inorganic Chemistry	3			
CHEM 1011	Inorganic Chemistry Laboratory	1			
Total		18	Total		15

Department of Mechanical Engineering

ADMINISTRATIVE OFFICER

Shield B. Lin, *Department Head, Mechanical Engineering*

FACULTY

Paul O. Biney, *Mechanical Engineering*
Ronald D. Boyd, *Mechanical Engineering*
Ing Chang, *Mechanical Engineering*
Ali E. Ekhlassi, *Mechanical Engineering*
Surjit S. Grewal, *Mechanical Engineering*
Ziaul Huque, *Mechanical Engineering*
Houshang Masudi, *Mechanical Engineering*
James O. Morgan, *Mechanical Engineering*
Jianren Zhou, *Mechanical Engineering*

PURPOSE AND GOALS

As one of the broadest engineering branches, mechanical engineering includes design, analysis, and manufacturing associated with (1) energy, and (2) structures and motion in mechanical systems. Mechanical engineers design machines, processes, and systems utilizing mechanical and thermal power. The work of mechanical engineers includes, but is not limited to, the following areas: machinery design and construction, design and analysis of thermal systems, manufacturing, instrumentation and controls, fluid and solid mechanics, plant engineering, materials specification and evaluation, research and development, and technical sales. Many mechanical engineers are promoted to management and administrative positions.

Because of the global consequences of many engineering endeavors, and because of the continually changing technological climate, the department emphasizes an integrated curriculum that overlaps other engineering branches and the physical sciences. Graduates of the mechanical engineering curriculum will be prepared to be technical leaders in tomorrow's society.

The goal of the Mechanical Engineering Program is to produce industrial, scientific, and technological leaders capable of systematically identifying, addressing, and solving technical problems whose solutions will benefit society. Specific objectives of the Mechanical Engineering Program are to produce graduates who have:

1. the techniques and skills necessary for modern mechanical engineering practices, and an ability to function effectively in multi-disciplinary teams;
2. an ability in life-long learning skills, a knowledge of contemporary issues, and an ability to communicate effectively;
3. an understanding of global and societal context in the aspects of professional and ethical responsibility and the impact of engineering solutions on society;
4. the qualifications to be employed by public and private sectors in the State of Texas and the nation; and
5. the qualifications to pursue graduate degrees.

ELIGIBILITY TO TAKE UPPER DIVISION COLLEGE COURSES

The College of Engineering requires an eligibility standard for the students to take upper division college courses. Students in the Mechanical Engineering Program must complete a prescribed list of courses in the following with a minimum Grade Point Average (GPA) of 2.5 to be eligible to enroll in upper division

(3000 or 4000 level) courses in the College. Students transferring to the College of Engineering with 60 or more semester hours from another institution will be allowed a period of one semester to comply.

- CHEM 1033 General Inorganic Chemistry
- CHEM 1011 Inorganic Chemistry Lab
- ENGL 1143 Technical Writing
- PHYS 2013 Engineering Physics I
- PHYS 2511 General Physics Lab I
- MATH 1124 Calculus with Analytic Geometry I
- MATH 2024 Calculus with Analytic Geometry II
- MCEG 1213 Creative Engineering I
- ELEG 1043 Computer Applications in Engineering

PROFESSIONAL AND HONOR SOCIETIES

American Society of Mechanical Engineers (ASME). The department sponsors the student chapter of American Society of Mechanical Engineers, the national professional society for mechanical engineering that seeks to develop professional integrity, ethics, and organization skills among the mechanical engineering students on the campus.

Pi Tau Sigma National Honor Society. The mechanical engineering department has a chapter of Pi Tau Sigma, the National Mechanical Engineering Honor Society to recognize and honor outstanding mechanical engineering students on the campus.

**BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING DEGREE PROGRAM
REQUIREMENTS**

Core Curriculum	42 SCH
All Mechanical Engineering Core Curriculum requirements are shown in the suggested degree program.	
College and Support Area Requirements	49 SCH
MATH 1124, 2024, 3023, 4173	14 SCH
CHEM 1011, 1021, 1033, 1043	8 SCH
PHYS 2511, 2521	2 SCH
CHEG 3003	3 SCH
CVEG 2043, 2053	6 SCH
ELEG 2053	3 SCH
MCEG 1213, 2013	6 SCH
MCEG, CHEG, CVEG, or ELEG 3051	1 SCH
MCEG, CHEG, CVEG, or ELEG 4473, 4483	6 SCH
Major Requirements	39 SCH
MCEG 2023, 3011, 3013, 3021, 3023, 3031, 3033, 3043, 3053, 3063, 4043, 4063, 4093, 4123; CVEG 2063	
Technical Electives	6 SCH
Total Degree Requirements	136 SCH

Mechanical Engineering Suggested Technical Electives

Technical electives must be 3000 level or above. At least one technical elective must be taken in the department. Internship and co-op courses are not suitable for technical electives.

- MCEG 3073 Automatic Controls
- MCEG 3193 Introduction to Robotics

MCEG 4143 Engineering Information Technology
 MCEG 4163 Special Topics
 MCEG 4183 Gas Dynamics
 CHEG 4153 Bioengineering
 CHEG 4163 Engineering Optimization
 CVEG 3073 Structural Analysis I
 CVEG 4024 Environmental Engineering
 CVEG 4063 Water Resources Engineering
 CVEG 4093 Systems Engineering
 ELEG 3033 Physical Electronics
 ELEG 3063 Logic Circuits
 MATH 3073 Linear Algebra
 MATH 4063 Numerical Analysis

Requirements For Mechanical Engineering as a Minor Field

Students must complete the following 18 SCH of courses to satisfy the Minor requirements.

MCEG 3023 Thermodynamics II
 MCEG 3033 Manufacturing Processes
 MCEG 3043 Machine Design I
 MCEG 3063 Fluid Mechanics
 and 6 semester hours of approved 3000 or 4000 level MCEG courses.

MECHANICAL ENGINEERING SUGGESTED DEGREE PROGRAM SEQUENCE

FRESHMAN YEAR

<i>First Semester</i>		<i>Hours</i>	<i>Second Semester</i>		<i>Hours</i>
MATH 1124	Calculus I	4	MATH 2024	Calculus II	4
MCEG 1213	Creative Engineering I	3	ELEG 1043	Computer Appl. in Engineering	3
SPCH 1003	Fund. of Speech Communication	3	PHYS 2013	Engineering Physics I	3
ENGL 1123	Freshman Composition I	3	PHYS 2511	General Physics Lab	1
CHEM 1033	General Inorganic Chemistry I	3	ENGL 1143	Technical Writing	3
CHEM 1011	Inorganic Chemistry Laboratory	1	CHEM 1043	General Inorganic Chemistry II	3
			CHEM 1021	Inorganic Chemistry Laboratory	1
Total		17	Total		18

SOPHOMORE YEAR

<i>First Semester</i>		<i>Hours</i>	<i>Second Semester</i>		<i>Hours</i>
HIST 1313	U.S. to 1876	3	MATH 2043	Differential Equations	3
CVEG 2043	Engineering Mechanics I	3	CVEG 2053	Engineering Mechanics II	3
POSC 1113	American Government I	3	CVEG 2063	Mechanics of Materials I	3
POSC 2503	Introduction to Global Issues	3	MCEG 2013	Thermodynamics I	3
PHYS 2023	Engineering Physics II	3	HIST 1323	The U.S.-1876 to Present	3
PHYS 2521	General Physics Lab II	1	POSC 1123	American Government II	3
Total		16	Total		18

SUMMER SESSIONS

<i>First Semester</i>		<i>Hours</i>
*MCEG 3156	Mechanical Engineering Internship I	6
Total		6

JUNIOR YEAR

<i>First Semester</i>		<i>Hours</i>	<i>Second Semester</i>		<i>Hours</i>
MCEG 3043	Machine Design I	3	MCEG 3013	Heat Transfer	3
MCEG 3023	Thermodynamics II	3	ELEG 2053	Introduction to Electrical Engin.	3
MCEG 2023	Materials Science and Engineering	3	MCEG 3033	Manufacturing Processes	3
MCEG 3053	Kinematic Design and Analysis	3	MCEG 3031	Manufacturing Processes Lab	1
MCEG 3063	Fluid Mechanics	3	MCEG 3021	Thermal Science Lab	1
MCEG 3011	Measurement/Instrumentation Lab	1	MATH 3023	Probability and Statistics	3
				Visual and Performing Arts	3
			MCEG 3051	Professional Engineering I	1
Total		16	Total		18

SUMMER SESSIONS

<i>First Semester</i>	<i>Hours</i>
*MCEG 4156 Mechanical Engineering Internship II	6
Total	6

SENIOR YEAR

<i>First Semester</i>		<i>Hours</i>	<i>Second Semester</i>		<i>Hours</i>
MCEG 4473	Senior Design and Professionalism I	3	MCEG 4483	Senior Design and Professionalism II	3
MCEG 4093	Finite Element Analysis and Design	3	MCEG 4123	Energy System Design	3
MCEG 4043	Machine Design II	3	MCEG 4063	Dynamic Systems and Controls	3
CHEG 3003	Engineering Economy	3		Technical Elective	3
MATH 4173	Advanced Math for Engineers	3		Humanities	3
	Technical Elective	3			
Total		18	Total		15

* Course may be taken for credit during a summer internship, but is not required in degree plan.

concepts are illustrated by applications involving graphs, trees, networks and related algorithms. Prerequisites: MATH 2053, COMP 1223 and COMP 1211.

COMP 3003. Introduction to Web Design and Multimedia. (3-0) Credit 3 semester hours. The role of Internet, and Internet tools in business; design and development of simple Internet applications using HTML; basics of scripting languages; development of home pages incorporating graphics, and multimedia. Prerequisite: Consent Of Advisor.

COMP 3033. Digital Logic Circuits. (3-0) Credit 3 semester hours. The design and implementation of digital logic circuits. Combinational and sequential circuit analysis. Digital circuit design optimization methods using random logic gates, multiplexers, decoders, registers, counters, and programmable logic arrays. Prerequisite: COMP 2033.

COMP 3043. Computer Organization. (3-0) Credit 3 semester hours. The study of a computer as a series of levels, each one built on its predecessor. Digital logic level, the microprogramming level, the conventional machine level, the operating systems level, and the assembly language level. Prerequisite: COMP 2033.

COMP 3053. Analysis of Algorithms. (3-0) Credit 3 semester hours. Introduction to algorithm design and analysis, computational complexity, and NP-completeness theory. The course will emphasize how to design and choose appropriate algorithms and data structures to solve a given problem efficiently. Design methods covered will include divide-and-conquer techniques, greedy methods, and dynamic programming. Prerequisites: COMP 2013 and COMP 2103.

COMP 3063. Operation Systems. (3-0) Credit 3 semester hours. Basic functions of operating systems including device management, multi-programming, job management, memory management, and input/output processing. Prerequisites.: COMP 2013 and COMP 3043.

COMP 3113. Object-Oriented Analysis and Design. (3-0) Credit 3 semester hours. Application and benefits of the object-oriented software process model. Special consideration will be given to concepts, models, notations, and methods required to effectively and efficiently design and implement complex software applications using a practical, state-of-the-art object-oriented method. Concepts intrinsic to object-oriented technology such as data abstraction, encapsulation, inheritance and polymorphism will also be covered. State-of-the art design and implementation tools, such as the universal modeling language (UML) and a high-level object-oriented language such as C++ will be used to illustrate these concepts. Prerequisite: COMP 2013.

COMP 3143. Introduction to Java. (3-0) Credit 3 semester hours. An introduction to the Java Programming language. Includes coverage of Java Development Kit (JDK), applications, creating applets for enhancing web page and introduction to object model, object oriented programming. Prerequisite: Proficiency in at least one programming language.

COMP 3203. System Analysis and Design. (3-0) Credit 3 semester hours. Studying analytical models of system design with emphasis on evaluating system for efficiency, maximum utilization and appropriateness, and on structuring and designing systems. Prerequisites: COMP 1223 and COMP 1221.

COMP 3213. Graphics and Visual Computing. (3-0) Credit 3 semester hours. Principles of interactive computer graphics; Topics include fundamental techniques in graphics, graphic systems, graphic communication, geometric modeling, rendering, computer animation, visualization and virtual reality and other recent developments in computer graphics. Prerequisites: COMP 2013 and COMP 2103.

COMP 3223. Software Engineering. (3-0) Credit 3 semester hours. Formal software development, including the software life-cycle, modular and top-down design, validation and verification, and maintainable systems. Prerequisite: COMP 2013.

COMP 4001. Ethics and Social Issues in Computing. (1-0) Credit semester hour. Social and ethical implications of computing. Topics include history of computing, social context of computing, methods and tools of analysis, professional and ethical responsibilities, risks and liabilities of computer-based systems, intellectual property, privacy and civil liberties. Prerequisite: Senior standing.

COMP 4053. Parallel Algorithm Design. (3-0) Credit 3 semester hours. Hardware organization of vector, array, and parallel processors for high performance computations. Study of interconnection networks and parallel processing. Automatic vectorization and parallelization of scalar programs. Implementation of parallel algorithms for scientific applications. Prerequisites: COMP 3043 and COMP 3053.

COMP 4063. Artificial Intelligence. (3-0) Credit 3 semester hours. Introduction to artificial intelligence and expert systems. Topics covered will include heuristic search methods, first-order logic, forward and backward inference, knowledge representation, and machine learning, including neural networks. Prerequisite: COMP 3053.

COMP 4072. Senior Design Project I. (2-0) Credit 2 semester hours. This is the first part of a two-part senior design course for computer science majors. Students will do computer systems design; work as a design-team member; conceptual design methodology, design evaluations, total project planning and management techniques, design optimization, systems manufacturing cost considerations. Emphasis is placed upon students' activities as design professionals. Prerequisite: Senior standing.

COMP 4073. Special Topics. (3-0) Credit 3 semester hours. Selected current and emerging topics in Computer Science. Course may be repeated for credit when topics vary. Prerequisite: Consent of advisor.

COMP 4082. Senior Design Project II. (2-0) Credit 2 semester hours. This course is a continuation of COMP 4072. Students should complete the design project in this course, give a formal presentation and submit a bound research paper. Students will be introduced to proposal writing, patents, and literature searches. Prerequisite: COMP 4072.

COMP 4083. Senior Project II. (3-0) Credit 3 semester hours. This course is a continuation of COMP 4072. Students should complete and implement the design project in this course, make a formal presentation, and submit a bound research paper. Students will be introduced to proposal writing, patents, literature searches, and professional standards in writing and presentation. Prerequisite: COMP 4072.

COMP 4113. Programming Language Design. (3-0) Credit 3 semester hours. Overview of programming languages, syntactic and semantic specification virtual machines and fundamental issues in language design. Analysis of imperative, object-oriented, and declarative language paradigms. Several programming languages will be analyzed. Prerequisites: COMP 2013 and COMP 2103.

COMP 4123. Computer Networks. (3-0) Credit 3 semester hours. Introduction to the networking of computer systems. This course includes the study of both local area networks (LAN) and wide area network (WAN) data transmission, communications software, the architecture of networks, and network communication protocols. Prerequisite: COMP 3063.

COMP 4133. Formal Languages and Automata. (3-0) Credit 3 semester hours. Introduction to formal grammars, including Backus-Naur notation. The formal theory behind the design of a computer language is studied. The corresponding types of automata that may serve as recognizers and generators for a language will be described. Prerequisites: COMP 2013 and COMP 2103.

COMP 4843. Human-Computer Interaction. (3-0) Credit 3 semester hours. Focuses on the dynamics of human-computer interaction (HCI). Provides a broad overview of HCI as a sub-area of computer science and explores user-centered design approaches in information systems applications. Addresses the user interface and software design strategies, user experience levels, interaction styles, usability engineering, and collaborative systems technology. Students will perform formal software evaluations and usability tests. Prerequisite: COMP 3223.

COMP 4943. Simulation and Modeling & Analysis. (3-0) Credit 3 semester hours. Use of logical and mathematical models to represent and simulate events and processes as well as computer, information, and communications systems. Introduction to computer modeling techniques and discrete-event simulation, model development and testing, and output and problem analysis. The application of these techniques to a multiprocessor system model and an Ethernet model. The course includes an examination of model and simulation development programs such as GPSS, SIMULA, and SIMSCRIPT. Prerequisites: COMP 1223, COMP 1221 and MATH 3023 or consent of advisor.

COMP 4953. Data Base Management. (3-0) Credit 3 semester hours. File structures and access methods, database modeling design and user interface, components of database management systems. Information storage and retrieval, query languages, high-level language interfaces with database systems. Prerequisite: COMP 2013.

COMP 4993. Independent Study. (0-0) Credit 3 semester hours. Reading, research and/or field work on selected topics. Prerequisite: Consent of instructor.

CPET 1013. Computer Application to Engineering Technology I. (2-2) Credit 3 semester hours. A course in computer application to engineering technology covering C++ programming subroutines, computer operating systems, scientific word processors, data tabulation and analysis. Development of techniques in assignment layouts, signal analysis and the use of simulated software included. **(COSC 1300)

CPET 1023. Computer Application to Engineering Technology II. (2-2) Credit 3 semester hours. A continuation of CPET 1013 in C++ programming techniques, programming languages, screen editor, and ORCAD software. Development of techniques and skills in statistical analysis, simulated software and related scientific software packages included.

CPET 2006. Cooperative Education I. (0-6) Credit 6 semester hours. A cooperative arrangement between the University and a company or government agency that provides experiences for students majoring in Computer Engineering Technology. The work assignment must be commensurate with the student's major. A subsequent written report is required. Prerequisite: Department head's approval is required.

CPET 2111. Digital Logic Laboratory. (0-3) Credit 1 semester hour. Laboratory experiments and reports in combinational and sequential logic using logic gates and flip-flops, and other logic devices. Experiments stress applications in Computer Engineering Technology. Prerequisite: credit for or concurrent enrollment in CPET 2113.

CPET 2113. Digital Logic Circuits. (3-0) Credit 3 semester hours. Digital logic with topics in number systems and codes, Boolean algebra and logic minimization methods, and combinational and sequential logic using logic gates and flip flops and other logic devices. Applications in Computer Engineering Technology are stressed. Prerequisites: Credit for or concurrent enrollment in CPET 2111.

CPET 3013. Software Engineering Technology I. (2-2) Credit 3 semester hours. Using a high level programming language for software and hardware design. Advanced concepts in a high level programming language manipulating files, tasking and real time interfacing with the computer hardware, Prerequisite: CPET 1013

CPET 3031. Modern Programming Techniques Lab. (0-3) Credit 1 semester hour. This course will emphasize applications in software methodology. Students will be introduced to software development environment. Rapid prototyping of requirements and team projects will be introduced, each tied to the relevant topics that are being taught in the lecture class of CPET 3033. Prerequisites: Concurrent enrollment in CPET 3033.

CPET 3033. Modern Programming Techniques. (2-2) Credit 3 semester hours. Structure methods of developing complex computer programs. Top down design, hierarchy diagrams, HIPO charts, composite design, structure analysis, and team-programming. Students will develop and write sections of complex programs. Prerequisite: CPET 1013.

CPET 3161. CPU Architecture Hardware Laboratory. (0-3) Credit 1 semester hour. Laboratory experiments to determine performance characteristics of commercially available microcomputers. Write codes for 8-bit through 32-bit processors to exercise the hardware. Prerequisite: Credit for or concurrent enrollment in CPET 3163.

CPET 3163. CPU Architecture Hardware. (3-0) Credit 3 semester hours. The performance characteristics of commercially available computers. Students will study 8-bit through 32-bit processors. Selection and use of processors. Prerequisites: CPET 2113 and credit for or concurrent enrollment in CPET 3161.

CPET 3231. Microprocessor Assembly Language Laboratory. (0-3) Credit 1 semester hour. Exercises in basic mnemonic instructions for microprocessors/microcomputers and the implementation of algorithms in software and firmware for various types of engineering technology applications. Prerequisite: Credit for or concurrent enrollment in CPET 3233.

CPET 3233. Microprocessor Assembly Language. (3-0) Credit 3 semester hours. Basic Mnemonic instructions for microprocessor/microcomputer and the implementation of algorithms in software and firmware for various types of engineering technology applications. Prerequisites: CPET 2113 and credit for or concurrent enrollment in CPET 3231.

CPET 3251. Digital Hardware Design Laboratory. (0-3) Credit 1 semester hour. Laboratory experiments in design of digital computers and computer controlled devices. The internal operation of a microprocessor and computer. Registers and timing control, programmable gate arrays, array processors as computer models. Prerequisite: credit or concurrent enrollment in CPET 3253.

CPET 3253. Digital Hardware Design. (3-0) Credit 3 semester hours. Basic concepts used on the design of digital computers and computer-controlled devices. The internal operation of a microprocessor and computer. Registers and timing control, programmable gate arrays, array processors as computer models. Students will use individual board computers for doing simulation. Prerequisites: CPET 2113 and credit for or concurrent enrollment in CPET 3251.

CPET 4013. Software Engineering Technology II. (2-2) Credit 3 semester hours. Introduction to software engineering development and management for microprocessor base systems. The course will introduce microprocessor software systems development, and the study of advanced analysis on microprocessor software engineering systems. Prerequisite: CPET 3013.

CPET 4061. Data Communication Methods Laboratory. (0-3) Credit 1 semester hour. Laboratory experiments in data communication devices. Modems, multiplexers, concentrators, protocols, error checking, front-end processors, USARTS, simplex/duplex transmission, and telecommunications. Prerequisite: Credit for or concurrent enrollment in CPET 4063.

CPET 4063. Data Communication Methods. (3-0) Credit 3 semester hours. Functional and operational aspects of data communication devices and software, including modems, control units, multiplexers, concentrators, front-end processors, codes and procedures, protocols, error checking, and networking. Prerequisites: CPET 3163 and credit for or concurrent enrollment in CPET 4061.

CPET 4082-4092. Senior Project. (1-3) Credit 2 semester hours each. A two-semester sequence for individual projects supervised by a faculty member of the department. The portions of the first semester course (4082) are devoted to group discussion of professional aspects of engineering technology: research writing, engineering ethics, research protocols, patent considerations. A written proposal describing the

project is required. Oral presentation throughout the semester on the research project using a conference style format. Prerequisite: Senior standing in the department and permission of the instructor required.

CPET 4111. Applications of Microprocessor Software Laboratory. (0-3) Credit 1 semester hour. Exercises in industrial applications programs. Use of micro assemblers to write floating point mathematical routines, special purposes languages. Engineering Technology applications are stressed. Prerequisite: Credit for or concurrent enrollment in CPET 4113.

CPET 4113. Software Applications of Microprocessors. (3-0) Credit 3 semester hours. Assembler-level programming of microprocessors and microcomputers with emphasis on writing industrial application programs. Use of micro assemblers to write floating point mathematical routines, special purpose languages, simulate other microprocessor instructions sets, generate relocatable code, and linking leaders. Applications for Engineering Technology are stressed. Prerequisites: CPET 3233, MATH 2014, and credit for or concurrent enrollment in CPET 4111.

CPET 4151. Micro Computer Peripheral Hardware Laboratory. Prerequisite: Credit or concurrent enrollment in CPET 4153.

CPET 4153. Micro Computer Peripheral Hardware. (3-0) Credit 3 semester hours. The elements of microprocessor peripheral hardware and its interfacing. Students will configure and construct microprocessor systems. Topics include series and parallel I/O devices, DMA and interrupt control devices, bus arbitration, and memory management units. Prerequisites: CPET 3163, and credit for or concurrent enrollment in CPET 4151.

CPET 4181. Single Chip Microprocessor Laboratory. (0-3) Credit 1 semester hour. Experiments with single chip microprocessors to study hardware limitations, hardware flexibility, and capabilities of 8-bit, 16-bit and 32-bit intelligent devices. Applications of single chip microprocessors in Engineering Technology. Prerequisite: Credit for or concurrent enrollment in CPET 4183.

CPET 4183. Single Chip Microprocessors. (3-0) Credit 3 hours. A study of the hardware limitations of a single chip system. Hardware flexibility and capabilities of eight-bit, 16-bit, and 32-bit intelligent devices. Applications for Engineering Technology are stressed. Prerequisite: CPET 2113 and credit for or concurrent enrollment in CPET 4181.

CPET 4361. Computer Networking Laboratory. (0-3) Credit 1 semester hour. Experiments and reports involving the hardware and software for computer networks. Experimental topics include LANS, WANS, networking components and techniques, standards and protocols, and networks on a chip. Prerequisite: Credit for or concurrent enrollment in CPET 4363.

CPET 4363. Computer Networking. (3-0) Credit 3 semester hours. A study of the hardware and software in computer networks. Topics include LANS, WANS, networking components and techniques, standards and protocols, networks on a chip, and networking trends. Prerequisites: CPET 4063 and credit for or concurrent enrollment in CPET 4361.

CPET 4381. Digital Signal Processing Applications Laboratory. (0-3) Credit 1 semester hour. Experiments in Signal Processing using commercial DSP processors for performing various image and speech processing tasks. Emphasis on learning DSP programming techniques. Prerequisite: CPET 3233 and credit for or concurrent enrollment in CPET 4383.

CPET 4383. Digital Signal Processing Applications. (3-0) Credit 3 semester hours. Analog-to-digital and digital-to-analog conversion, discrete-time systems, discrete Fourier Transforms, applications in areas of speech recognition, and digital image processing. Architecture and programming of DSP processors. Prerequisite: CPET 2113 and credit for or concurrent enrollment in CPET 4381.

CPET 4391. Programmable Microcontrollers Laboratory. (0-3) Credit 1 semester hour. Laboratory experiments using microcontrollers to control various devices. Read input from sensors, perform analysis

through software, then provide corresponding control signals. Interfacing microcontrollers to computers. Prerequisite: Credit for or concurrent enrollment in CPET 4393.

CPET 4393. Programmable Microcontrollers. (3-0) Credit 3 semester hours. Introduction to programmable microcontrollers, application of microcontrollers in industrial environment for controlling machines and devices. Downloading control software to microcontrollers from computers. Prerequisite: CPET 3253 and credit for or concurrent enrollment in CPET 4391.

CVEG 2043. Engineering Mechanics I. (3-0) Credit 3 semester hours. Fundamental concepts and principles; vector algebra and applications; equilibrium of particles and rigid bodies in two and three dimensions, moments and couples; distributed forces, centroids, moments of inertia, friction, introduction to analysis of structures. Prerequisites: PHYS 2013.

CVEG 2053. Engineering Mechanics II. (3-0) Credit 3 semester hours. Kinematics and kinetics of particles and of rigid bodies as applied to engineering problems; Newton's laws of motion; work and energy; impulse and momentum; translations; rotation; plane motion; motion about a point; general motions; and periodic motions. Prerequisite: CVEG 2043.

CVEG 2061. Mechanics of Materials Laboratory I. (0-3) Credit 1 semester hour. Determination of selected mechanical properties of several engineering materials, including iron-carbon alloys, aluminum alloys, bricks, wood, and plastics, standard methods of testing and procedures; instrumentation and interpretation of results; and presentation of results in reports and report writing. Corequisite: CVEG 2063.

CVEG 2063. Mechanics of Materials I. (3-0) Credit 3 semester hours. Behavior of engineering materials, plane stress, plane strain, stress-strain relationship, shear and moment diagrams, torsion, flexural and combined loadings. Introduction to deflections, concepts of stress at a point; stresses in pressured containers; and theories of failures and thermal stresses. Prerequisite: CVEG 2043 or CVEG 2454 and MATH 2024.

CVEG 2123. Engineering and the Environment. (3-0) Credit 3 semester hours. An introduction to the design of systems, processes and facilities and their impact on the environment. Topics include safety, waste management and ecological aspects with the focus on sustainability and environmental protection. Prerequisite: MATH 1113 or equivalent.

CVEG 2454. Statics and Dynamics. (4-0) Credit 4 semester hours. Fundamental concepts; equilibrium of particles and rigid bodies; centroids; moments of inertia; friction; introduction to analysis of structures. Kinematics and Kinetics of particles and of rigid bodies; equations of motion; work and energy; impulse and momentum. Prerequisites: PHYS 2013.

CVEG 3024. Geotechnical Engineering. (3-3) Credit 4 semester hours. Index and strength properties of soil; moisture and its movement in soil; moisture density relationships; settlement; consolidation; permeability; foundations; retaining walls; stability of slopes; testing of soil for index and strength properties; soil classification; soil exploration and identification; and laboratory sessions. Prerequisite: CVEG 2063.

CVEG 3031. Concrete Laboratory. (0-3) Credit 1 semester hour. Determination of mechanical and strength properties in the laboratory, according to standard methods, of cement, concrete, and its ingredients. Prerequisites: CVEG 2061 and 2063

CVEG 3041. Surveying. (0-3) Credit 1 semester hour. Principles of surveying; use of surveying instruments, topographical surveys and traverses; field practice and computations. Prerequisite: MATH 1124.

CVEG 3051 Professional Engineering I (0-3) Credit 1 semester hour. Fundamentals of engineering and related science subjects include chemistry, computers, dynamics, electric circuits, engineering economics, ethics, fluid mechanics, materials science, mathematics, mechanics of materials, statistics, and

thermodynamics. Passing a mock exam for “fundamentals of engineering” is a requirement of passing this course. Prerequisite: junior standing in engineering major. Course equivalence: CHEG 3051, ELEG 3051 or MCEG 3051.

CVEG 3063. Hydraulics. (2-3) Credit 3 semester hours. Fluid statics; pressure on submerged bodies; continuity equation; Bernoulli equation; principles of momentum and energy; fundamentals of hydraulic modeling; open channel flow; pressure conduit flow; flow measurement; laboratory sessions on selected topics. Prerequisites: CVEG 2053 and MATH 2043.

CVEG 3073. Structural Analysis I. (3-0) Credit 3 semester hours. Analysis of determinate structures; reactions, member forces of trusses, shears and bending moments of beams and frames; influence lines; moving loads; deflections; analysis of indeterminate structures by approximate method and energy method; computer application. Prerequisite: CVEG 2063.

CVEG 3156. Civil Engineering Internship I. (0-0) Credit 6 semester hours. An internship program of work experience with an approved engineering oriented firm or agency or consulting firm or engineering public service agency serving the civil engineering profession. A comprehensive written report of the work-learning experience is required. Prerequisite: Approval by the Chairman.

CVEG 3213. Elements of Environmental Engineering. (3-0) Credit 3 semester hours. Basic Principles of environmental engineering; environmental thermodynamics, material balance, reaction kinetics and reactor design concepts applied to environmental engineering; applications to waste treatment process design; Overview of water, soil, and air pollution. Prerequisite: CVEG 2123 or an engineering 2000 level course.

CVEG 3223. Waste Management. (3-0) Credit 3 semester hours. Historical perspectives, legislative trends and regulations of solid and hazardous waste management; sources, characteristics and engineering principles of solid and hazardous waste; treatment and disposal methods for solid and hazardous wastes. Prerequisite: CVEG 3213.

CVEG 3233. Water Quality Management. (3-0) Credit 3 semester hours. Water quality characteristics (physical, chemical and biological); mathematical models to describe the movement of contaminants in the water bodies including rivers, lakes, oceans and groundwater; Contaminant interactions with soil, air and water. Prerequisite: CVEG 3213.

CVEG 3243. Fundamentals of Air Pollution and Control. (3-0) Credit 3 semester hours. Fundamentals of air pollution; regulatory aspects; effects and sources of air pollution; atmospheric physics and chemistry; simple air quality models; basics of air pollution control. Prerequisite: CVEG 3213.

CVEG 4013. Reinforced Concrete. (3-0) Credit 3 semester hours. Properties of concrete and reinforcements; design methods; codes; load; flexure, shear, bonds, and deflections; analysis and design of different kinds of beams and columns; introduction to design of footings, slabs, and retaining walls; and introduction to computer-aided design. Prerequisite: CVEG 2063.

CVEG 4024. Environmental Engineering. (3-3) Credit 4 semester hours. Environmental problems; water requirements and waste volumes; water supply, treatment, and distribution; disposal of solid waste; disposal of wastewater and wastewater collection systems; wastewater treatment; and air pollution control. Prerequisite: CVEG 3063.

CVEG 4053. Transportation Engineering. (2-3) Credit 3 semester hours. Transportation systems; history; types; investigation; planning and design of highways, waterways, airports, pipelines, beltways; construction, and operation; urban renewal problems; rapid and mass transit; and introduction to testing of bituminous materials according to standards. Prerequisite: Senior standing and approval by advisor.

CVEG 4063. Water Resources Engineering. (3-0) Credit 3 semester hours. Control and utilization of water; flood control; water distribution systems; open channel flows; hydraulic structures; and model studies. Prerequisite: CVEG 3063.

CVEG 4083. Structural Design. (2-3) Credit 3 semester hours. Design of tension and compression members, trusses, buildings and bridges, rolled steel beams, plate girders, riveted, welded and pinned joints; introduction to design of multistory frames and plastic analysis; and timber structures. Prerequisite: CVEG 3073.

CVEG 4093. Systems Engineering. (3-0) Credit 3 semester hours. Introduction to systems analysis and design; problem modeling; optimization; linear programming; dynamic programming; network analysis; critical path; economic analysis; and decision theory. Prerequisites: MATH 3023.

CVEG 4103. Special Topics. (3-0) Credit 3 semester hours. Selected current and emerging topics in Civil Engineering depending on need determined by the department. Prerequisites: senior standing and approval by the advisor.

CVEG 4123. Hydrology. (3-0) Credit 3 semester hours. Hydrologic cycle; precipitation; run-off; infiltration; hydrological analysis; unit hydrograph; statistical methods; surface and ground water; flood forecasting; flood routing; flood control; and computer applications. Prerequisite: CVEG 3063.

CVEG 4143. Engineering Construction. (3-0) Credit 3 semester hours. Modern construction methods; history, organization management, planning, and machinery; importance of working drawings programming and economy of good planning; and importance of inspection and checks, including visits to works and reports on such visits. Corequisite: CVEG 3024.

CVEG 4156. Civil Engineering Internship II. (0-0) Credit 6 semester hours. An internship program of advanced work experience with an approved engineering oriented firm, or agency, or consulting firm, or engineering public service agency providing practical work experience of the profession on the job. A comprehensive written report of the work-learning experience is required. Prerequisite: Approval by the Chairman.

CVEG 4473. Senior Design and Professionalism I. (1-4) Credit 3 semester hours. This is a capstone engineering design of an industrial or advanced team project. Elements of ethics and professionalism in engineering practice will be integrated into the project experience. The design achievement will be demonstrated by written report, oral presentation, and professional standards and ethics examinations. Prerequisite: CVEG 3024, CVEG 3073, senior standing and approval by the advisor. Course equivalence: CHEG 4473, ELEG 4473 or MCEG 4473.

CVEG 4483. Senior Design and Professionalism II. (1-4) Credit 3 semester hours. A continuation of CVEG 4473 with required design modifications of the team project necessary to produce a working prototype of the design initiated in Senior Design and Professionalism I. Results of the design are presented in a formal, final oral presentation, as well as final report. Professionalism education will reinforce the importance of professional ethics, corporate culture, life-long learning, and globalization. Prerequisite: CVEG 4473. Course equivalence: CHEG 4483, ELEG 4483 or MCEG 4483.

CVEG 4991-4992-4993. Independent Study. (0-0) Credit 1, 2, or 3 semester hours. Readings, research, and/or field work in selected topics. Prerequisite: consent of advisor.

ELEG 1043. Computer Applications in Engineering. (2-2) Credit 3 semester hours. C-Programming language; fundamentals, program looping, conditioning statements, arrays, functions, structures, character strings, pointers, preprocessors, input and output. Engineering problem solving using computers, use of engineering software and commercial packages. Prerequisite or corequisite: MATH 1113. **(COSC 1300)

ELEG 2023. Network Theory I. (3-0) Credit 3 semester hours. Study of basic circuit laws and theorems. Study of circuit analysis techniques, use of controlled sources, and transient and sinusoidal circuit analysis. Prerequisites: PHYS 2023, MATH 2024; Prerequisite or corequisite: MATH 2043.

ELEG 2053. Introduction to Electrical Engineering. (3-0) Credit 3 semester hours. Introductory course for non-majors. Basic circuit theory, analysis of DC circuits; transient analysis of RLC circuits; steady state analysis; transformers; dc machines and induction motors; diode circuits; operational amplifiers; numbering systems, logic gates and combinational circuits. Corequisite or prerequisite: MATH 2043, and Prerequisite: PHYS 2023.

ELEG 2083. Introduction to Digital Signal Processing (DSP) Solutions. (2-2) Credit 3 semester hours. Introduction to signal processing for discrete-time and continuous-time signals. Survey of filtering techniques. Basic principle of frequency response, Fourier Transform and Z-transform. Basic principles of computer-based signal processing. Prerequisite: ELEG 1043

ELEG 2313. The Digital Information Age. (3-0) Credit 3 semester hours. Introductory course for non-engineering majors. Introduction to the ideas and principles of digital information systems. The topics include digital sensors, digitizing analog signals, digital logic, computers, information coding, transmission and manipulation. Applications include digital scales, air-bag inflation systems, smart cards, bar-code scanners, digital cellular telephony, and modems. Prerequisites: MATH 1113 or equivalent

ELEG 3011. Circuits Laboratory. (0-3) Credit 1 semester hour. Operation of basic laboratory-type test and measurement equipment. Experimentation in basic current-voltage relations, circuit laws, and network analysis of linear DC and AC circuits. Use of oscilloscope in circuit analysis. RL, RC, RLC circuits, series and parallel resonance, Op-Amp circuits, analysis of linear DC and AC circuits and transient circuit experimentation. Prerequisite or corequisite: ELEG 2023.

ELEG 3013. Network Theory II. (3-0) Credit 3 semester hours. Continuation of transient and sinusoidal analysis. Study of average and RMS power, polyphase circuits, complex frequency, frequency response, and magnetic circuits. Prerequisite: ELEG 2023.

ELEG 3021. Logic Circuits Laboratory. (0-3) Credit 1 semester hour. Experimentation in combinational and sequential logic circuitry. Design of counters, adders, digital display circuitry, shift registers, and control logic. Prerequisite or corequisite: ELEG 3063.

ELEG 3023. Signals and Systems. (3-0) Credit 3 semester hours. Basic discrete and continuous time signals, properties of systems, linear time invariant systems, Fourier analysis, z-transformers, LaPlace Transform. Prerequisite: ELEG 3013.

ELEG 3033. Physical Electronics. (3-0) Credit 3 semester hours. Crystal structure; atomic bonding; phase relationships and kinetics. Band theory, Fermi-Dirac Statistics; conduction and introduction to semiconductor device physics. Introduction to MOS fabrication and design. Prerequisites: PHYS 2023, CHEM 1033; Prerequisite or corequisite: MATH 2043.

ELEG 3041. Microelectronic Processing and Characterization Lab. (0-2) Credit 1 semester hour. Basic processes of microelectronic fabrication; doping, oxidation, photolithography, etching, metalization and clean room practices. Basic materials and device characterization. Prerequisite or corequisite: ELEG 3033.

ELEG 3043. Electronics I. (3-0) Credit 3 semester hours. Operational amplifiers. Diodes and nonlinear circuits. Field effect transistors. Analysis and design of linear amplifiers. Biasing, small and large signal behavior. Operation of bipolar junction transistors. Prerequisite or corequisite: ELEG 3033 and Prerequisite: ELEG 3013.

ELEG 3051. Professional Engineering I. (0-3) Credit 1 semester hour. Fundamentals of engineering and related science subjects including chemistry, computers, dynamics, electric circuits, engineering

economics, ethics, fluid mechanics, materials science, mathematics, mechanics of materials, statistics, and thermodynamics. Passing a mock exam for “fundamentals of engineering” is a requirement of passing this course. Prerequisite: junior standing in engineering major. Course equivalents: CHEG 3051, CVEG 3051 or ELEG 3051.

ELEG 3063. Logic Circuits. (3-0) Credit 3 semester hours. Numbers systems and codes. Boolean algebra and logic minimization methods. Combinational and sequential design using logic gates and flip flops. Prerequisite: ELEG 2023

ELEG 3156. Engineering Internship I. (0-0) Credit 6 semester hours. An internship program or work experience with an approved engineering firm or engineering oriented business agency, planning, public service agency, or consulting firm, providing an introduction to the profession. Prerequisite: approval by the chairman of the department.

ELEG 4003. Communication Theory. (3-0) Credit 3 semester hours, Fourier transforms, signal spectra, correlation, convolution, and sampling, Transmission and processing of signals, system representation, filters, signal distortion, linear, angle and pulse modulation. Effect of noise interference on communications. Prerequisites: ELEG 3023 and ELEG 3043.

ELEG 4011. Electronics Laboratory. (0-3) Credit 1 semester hour. Applications of semiconductors diodes. Operational characteristics of transistor amplifiers (inverters, emitter follower, difference, etc.) FET characteristics and applications. Operational amplifier characteristics and circuit implementation. Frequency response of amplifiers. Prerequisite: ELEG 3011, Prerequisite or corequisite: ELEG 3043

ELEG 4013. Electromechanical Energy Conversion. (3-0) Credit 3 semester hours. Electric and magnetic devices, force and torque measurements, iron core transformers, single phase and polyphase power circuits analysis. Introduction to per unit system. Prerequisites: MATH 4173 and ELEG 3013.

ELEG 4021. Power Laboratory. (0-3) Credit 1 semester hour. Operational characteristics of DC and AC machines; power circuit analysis. Prerequisite or corequisite: ELEG 4013.

ELEG 4023. Power Systems Engineering. (3-0) Credit 3 semester hours. Elementary synchronous machines. General considerations of power generation, transmission, distribution and utilization, survey of load flow, faults, transient stability and economic power dispatch. Prerequisite: ELEG 4013.

ELEG 4031. Communications Lab. (0-3) Credit 1 semester hour. Laboratory practice of communications theory, AM and FM modulation, transmission and reception. Analysis of signals and effect of noise interference on communications. Prerequisite or corequisite: ELEG 4003.

ELEG 4033. Electromagnetic Field Theory I. (3-0) Credit 3 semester hours. Review of relevant mathematics, electricity, and magnetism. Study of dielectrics, Poisson’s and LaPlace’s equations, magnetic flux, magnetic fields, and magnetic boundary conditions, Ampere’s Circuital law, time varying fields and Maxwell’s equations. Prerequisites: ELEG 2023 and MATH 4173.

ELEG 4043. Electronics II. (3-0) Credit 3 semester hours. Design and analysis of single and multistage transistor amplifiers, difference amplifiers, frequency response of amplifiers. Feedback concepts. Analysis and design using discrete and integrated devices. Prerequisite: ELEG 3043.

ELEG 4053. Digital Signal Processing. (3-0) Credit 3 semester hours, Introduction, review of signals and systems, sampling and z-transforms, discrete Fourier transform, fast Fourier transform, nonrecursive filter design, recursive filter design. Use of Matlab and DSP’s in signal analysis. Prerequisite: ELEG 3023.

ELEG 4073. Servomechanism and Control Systems. (3-0) Credit 3 semester hours. Model of physical systems, system responses, system characteristics, stability design, frequency response analysis and design, discrete -time systems. Prerequisites: ELEG 3023 and MATH 4173.

ELEG 4103. Special Topics. (3-0) Credit 3 semester hours. Selected current and emerging topics in Electrical Engineering. Courses may be repeated for credit when topics vary. Prerequisite: Consent of advisor

ELEG 4151. Digital Signal Processing (DSP) Solutions Lab. (0-3) Credit 1 semester hour. DSP studies using a Computer-Based Approach. Discrete-Time Signals in the Time-Domain, Discrete-Time Systems in the Time-Domain, Discrete-Time signals in the Frequency-Domain, LTI Discrete-Time Systems in the Frequency-domain, Digital Processing of Continuous-Time Signals, Digital Filter Structures, Design, and implementation, Analysis of Finite Word-Length Effects, Multirate DSP, and Adv. Projects. Corequisite: ELEG 4053 or ELEG 4163

ELEG 4156. Engineering Internship II. (0-0) Credit 6 semester hours. An internship program or work experience with an approved engineering firm or engineering oriented business agency, planning agency, public service agency, or consulting firm which provides an introduction to the profession. Prerequisite: approval by the chairman of the department.

ELEG 4163. Digital Signal Processing (DSP) Design and Testing Techniques. (3-0) Credit 3 semester hours. Fundamental techniques of Digital Signal Processing design, algorithm development, system simulation, real-time prototype of DSP systems. Fundamental techniques of DSP testing, DSP software, hardware and different DSP applications. Corequisite: ELEG 4053.

ELEG 4223. Electronic and Photonic Materials and Devices. (3-0) Credit 3 semester hours. Properties of insulators, conductors, semiconductors, electro-optical and magnetic materials. Basic operation of opto-electronic devices and systems. Prerequisite: ELEG 3033

ELEG 4243. Power Electronics. (3-0) Credit 3 semester hours. Characteristics of solid state power switches, controlled rectifiers and inverters; DC choppers; AC power controllers; applications to power supplies, electric machine drives, HVDC power transmission and space power systems. Prerequisite: ELEG 3043; Prerequisite or corequisite: ELEG 4013.

ELEG 4253. Computer Interfacing and Communications. (3-0) Credit 3 semester hours. Hardware and software aspects of interfacing microcomputers to memory, peripheral and communication devices. Prerequisite: ELEG 3063; Prerequisite or corequisite: ELEG 4303.

ELEG 4263. VLSI Circuit Design. (3-0) Credit 3 semester hours. Analysis and design of monolithic integrated circuits, device modeling; CAD tools and computer-aided design, design methodologies of VLSI circuits. Prerequisite: ELEG 3043, 3063; Prerequisite or corequisite: ELEG 4043

ELEG 4273. Analog and Mixed Signal Techniques I. (3-0) Credit 3 semester hours. Overview of analog and digital logic circuits, mixed signal circuits and systems, mixed signal test specification process, DC and parametric measurements, tester hardware, DSP-based testing, simulation and design techniques, power management circuits and systems. Prerequisites: ELEG 3043 and ELEG 3063. Corequisite: ELEG 4003

ELEG 4283. Reliability Analysis of Electrical Facilities. (2.5-1) Credit 3 semester hours. Overview of reliability and probabilistic theory, Monte Carlo simulations, preventive and predictive maintenance methodology, computerized maintenance management systems, generation, transmission and distribution networks and loads, field study and power deregulation. Prerequisites: MATH 3023 and ELEG 4013

ELEG 4291. Mixed Signal Testing Techniques Lab. (0-3) Credit 3 semester hours. Mixed signal Measurements, Mixed signal Parameters Measurements, Signal sourcing Techniques, Signal capturing Techniques, Frequency Domain Measurements, DSP based testing, DAC testing, ADC testing, Template test and Analog Circuit Review. Corequisite: ELEG 4273

ELEG 4293. Analog and Mixed Signal Techniques II. (3-0) Credit 3 semester hours. Sampled channel testing. Focused calibrations, DAC testing, ADC testing, DIB design. Design for test (DFT), Data Analysis and Test Economics. Current issues relating to Mixed Signal Systems. Prerequisite: ELEG 4273

ELEG 4303. Introduction to Digital Design. (3-0) Credit 3 semester hours. Memory and programmable logic, register transfer and computer operations, control logic design, computer instructions and addressing modes, design of a CPU input-output communication memory management. Prerequisite: ELEG 3063, 3021.

ELEG 4313. Broadband Communication Systems I. (3-0) Credit 3 semester hours. Introduction to types of high-speed communication system (broadband), telephone subscriber loop environment, twisted-pair channel modeling, transceiver front-end noise models. Channel capacity testing and analysis techniques of XDSL systems. XDSL modulation techniques and deployment considerations. Prerequisites: ELEG 3023

ELEG 4323. Broadband Communication Systems II. (3-0) Credit 3 semester hours. Topics include Hybrid Circuits, Analog Front end precision issues, channel equalization, Echo cancellation, Error Correction and Trellis Coding. Varieties of Digital Subscriber Line (XDSL), testing issues relating to XDSLs. Standards and standard related issues with emphasis on Asymmetric Digital Subscriber Line. Prerequisite: 4313

ELEG 4393. Computer Organization and Design. (3-0) Credit 3 semester hours. Computer interconnection structures, operating systems, microprocessors, RISC processors, and multiprocessors. Prerequisite or corequisite: ELEG 4303.

ELEG 4473. Senior Design and Professionalism I. (1-4) Credit 3 semester hours. This is a capstone engineering design of an industrial or advanced team project. Elements of ethics of ethics and professionalism in engineering practice will be integrated into the project experience. The design achievement will be demonstrated by written report, oral presentation, and professional standards and ethics examinations. Prerequisites: CHEG 3003, ELEG 3063, ELEG 3043 and senior standing. Course equivalence: CHEG, CVEG or MCEG 4473.

ELEG 4483. Senior Design and Professionalism II. (1-4) Credit 3 semester hours. A continuation of ELEG 4473 with required design modifications of the team project necessary to produce working prototype of the design initiated in Senior Design and Professionalism I. Results of the design are presented in a formal, final, oral presentation, as well a final report. Professionalism education will reinforce the importance of professional ethics, corporate culture, life-long learning and globalization. Prerequisite: ELEG 4473. Course equivalence: CHEG, CVEG or MCEG 4483.

ELEG 4991-4992-4993. Independent Study. (1-0, 2-0, 3-0) Credit 1, 2, or 3 semester hours. Readings, research, and/or field work on selected topics. Prerequisite: consent of advisor.

ELET 1111. Direct Current Circuits Laboratory. (0-3) Credit 1 semester hour. The application of Ohm's Law, Kirchhoff's Law, and related theories to the principles of electricity and magnetism in conductors and insulators. Prerequisite: credit for or concurrent enrollment in ELET 1113.

ELET 1113. Direct Current Circuits. (3-0) Credit 3 semester hours. Basic principles of electricity, magnetism, conductors insulators, electric theory, Ohm's Law, Kirchhoffs Laws, characteristics of series and parallel DC circuits, and basic instruments used in electronics. Prerequisite: credit for or concurrent enrollment in ELET 1111.

ELET 1141. Alternating Current Circuits Laboratory. (0-3) Credit 1 semester hour. The application of Kirchhoff's Law and related theories to the principles of AC circuits, impedance and phasor experiments. Prerequisite: Credit for or concurrent enrollment in ELET 1143.

ELET 1143. Alternating Current Circuits. (3-0) Credit 3 semester hours. A study of alternating current circuits, AC generation, transmission, transformers, frequency, and impedance and phasor calculations. Prerequisites: ELET 1113, and credit for or concurrent enrollment in ELET 1141.

ELET 2006. Cooperative Education I. (0-6) Credit 6 semester hours. A cooperative arrangement between the university and a company or government agency that provides experiences for students majoring in Electrical Engineering Technology. The work assignment must be commensurate with the student's major. A subsequent written report is required. Prerequisite: Department Head's approval is required.

ELET 2221. Basic Electronics I Laboratory. (0-3) Credit 1 semester hour. The implementation of semiconductors in electronic circuits and the analysis of basic amplifiers. Prerequisite: credit for or concurrent enrollment in ELET 2223.

ELET 2223. Basic Electronics I. (3-0) Credit 3 semester hours. Principles of elementary electronics circuit design and analysis. Solid state diodes, bipolar and MOSFET transistors, biasing techniques DC and AC load lines. Analysis of basic amplifiers. Prerequisites: MATH 1113, and credit for or concurrent enrollment in ELET 2221.

ELET 2251. Basic Electronics II Laboratory. (0-3) Credit 1 semester hour. The implementation of semiconductors in A-F and R-F amplifiers, oscillators, and filters circuits. Prerequisite: credit for or concurrent enrollment in ELET 2253.

ELET 2253. Basic Electronics II. (3-0) Credit 3 semester hours, Analysis and design using single and multi-stage semiconductor technology in amplifiers. Typical industrial applications of rectifiers, operational amplifiers, A-F and R-F amplifiers, filter circuits, and oscillators. Prerequisite: ELET 2223 and credit for or concurrent enrollment in ELET 2251.

ELET 2903. Modern Electronic Test Instruments. (3-0) Credit 3 semester hours. The analysis of a variety of sophisticated electronic instruments used in the computer, electronic and electrical fields that includes Broadband Spectrum Analyzers, Signature Analyzers, Programmable Function Generators, and test instruments on the market. The theory of operation of each instrument will be covered along with typical circuit measurements. Corequisite: ELET 2223 or instructors permission.

ELET 3003. Antennas and Transmission Systems. (3-0) Credit 3 semester hours. Topics that will be covered are VSWR, application of Smith charts, characteristic of antennas, characteristic of transmission lines, fiber optics used in data transmission, characteristic impedance of transmission lines, antenna gain calculations, antenna patterns, antenna grounding, microwave antenna considerations, and field strength measurement. Prerequisites: MATH 2024 and ELET 2253.

ELET 3023. Computer Applications to Electrical Problems. (3-0) Credit 3 semester hours. The development of orderly methods of solving current voltage relations problems, circuit law problems, and electronics problems with the use of the computer. Prerequisite: CPET 1013.

ELET 3241. Network Analysis Laboratory. (0-3) Credit I semester hour. Laboratory experiments in the areas of basic circuits laws, network theorems, circuit analysis techniques, use of controlled sources, transient, and sinusoidal circuit analysis. Prerequisite: credit for or concurrent enrollment in ELET 3243.

ELET 3243. Network Analysis. (3-0) Credit 3 semester hours. Review of basic circuit laws and network theorems. Study of circuit analysis techniques, use of controlled sources, transient, and sinusoidal circuit analysis. Computer usage is emphasized in determining steady-state and transient solutions. Prerequisite: ELET 1143 and credit for or concurrent enrollment in ELET 3241.

ELET 3451. Robotics I Laboratory. (0-3) Credit 1 semester hour. Experiments with and testing of robotic devices, including sensors, motion systems, electronics components, and control. Prerequisite: Credit for or concurrent enrollment in ELET 3453.

ELET 3453. Robotics I. (3-0) Credit 3 semester hours. Applications of robotic devices, including sensors, motions systems, electronic components, and control systems. Basic programming of robots. Prerequisite: Credit for or concurrent enrollment in ELET 3451.

ELET 3521. Instruments and I/O Transducers Laboratory. (0-3) Credit 1 semester hour. Laboratory experiments in the theory and application of electrical and electronic measuring instruments and input/output transducers. Prerequisite: Credit or concurrent enrollment and ELET 3523.

ELET 3523. Instruments and I/O Transducers. (3-0) Credit 3 semester hours. The theory and applications of electrical and electronic measuring instruments and input/output transducers. Topics include analog and digital instruments and transducers. Prerequisites: ELET 2223 and credit for or concurrent enrollment in ELET 3251.

ELET 3603. Digital Integrated Circuits Devices and Applications. (3-0) Credit 3 semester hours. A treatise of LSI and VLSI devices to include memories, interfacing, data transfer, and arithmetic logic units. The application and programming of Motorola's 68000 and Intel's 80286 microprocessors will be covered. Prerequisites: Credit for ELET 3601.

ELET 3701. Communication Circuits I Laboratory. (0-3) Credit 1 semester hour. Laboratory experiments in the areas of RF circuits including impedance matching, RF power amplifiers, wideband amplifiers, RF oscillators, and phase shift oscillators. Prerequisite: credit for or concurrent enrollment in ELET 3703.

ELET 3703. Communication Circuits I. (3-0) Credit 3 semester hours. RF circuits including impedance matching, RF power amplifiers, wideband amplifiers RF oscillators, phase shift oscillators, AM, FM, and PM circuits. Prerequisites: ELET 2223, and credit for or concurrent enrollment in ELET 3701.

ELET 4082. Senior Project I. (1-3) Credit 2 semester hours. A two-semester sequence for individual projects supervised by a faculty member of the department. The portions of the first semester course (4082) are devoted to group discussion of professional aspects of engineering ethics, research protocols, patent considerations. A written proposal describing the project is required. Oral presentation throughout the semester on the research project using a conference style format. Prerequisite: Senior standing in the department and permission of the instructor required.

ELET 4092. Senior Project II. (1-3) Credit 2 semester hour. A two-semester sequence for individual and/or team projects supervised by a faculty member of the department. The portions of the second semester course (4092) are devoted to group discussion of professional aspects of engineering technology: research writing, engineering ethics, research protocols, patent considerations. Oral presentations throughout the semester culminating in a final written report. Prerequisite: Senior standing in the department, permission of the course instructor required, and ELET 4082.

ELET 4241. Operational Amplifier Theory and Applications Laboratory. (0-3) Credit 1 semester hour. The application of designing and evaluating differential and operational amplifier circuitry, feedback configurations, linear and nonlinear circuitry. Prerequisite: credit for or concurrent enrollment in ELET 4243.

ELET 4243. Operational Amplifier Theory and Applications. (3-0) Credit 3 semester hours. The design and evaluation of differential and operational amplifier circuitry, feedback configurations, operational amplifiers, errors compensation, linear and nonlinear circuitry. Prerequisites: ELET 2253, MATH 2014, and credit for or concurrent enrollment in ELET 4241.

ELET 4471. Control Systems Laboratory. (0-3) Credit 1 semester hour. The laboratory testing of automated controlled circuitry designed and developed with electrical engineering techniques. Automated controlled circuits designed with digital filter circuits will be tested. Prerequisite: credit for or concurrent enrollment in ELET 4473.

ELET 4473. Control Systems. (3-0) Credit 3 semester hours. The application of control and automated systems to computers. The analysis and design of transducers and signal converters for process control.

The development of electrical circuitry to be used in computer programming. Prerequisites: ELET 2253 and credit for or concurrent enrollment in ELET 4471.

ELET 4513. Advanced Integrated Circuits. (3-0) Credit 3 semester hours. Fabrication of LSI and VLSI devices. Design considerations of PROM, EPROM, EEPROM devices and LIFO, FIFO memories. Students will be required to write computer programs that will perform typical dynamic testing of integrated circuits.

ELET 4801. Communications Circuits II Laboratory. (0-3) Credit 1 semester hour. Laboratory experiments in the areas of analog and digital data communication techniques. Prerequisite: credit for or concurrent enrollment in ELET 4803.

ELET 4803. Communication Circuits II. (3-0) Credit 3 semester hours. Analog and Digital Data communications techniques including PPM, PWM, FSK, DM, PAM, and PCM. Data Modem, digital coding/decoding, Interfacing and Codec circuits. Prerequisites: ELET 3703 and credit for or concurrent enrollment in ELET 4801.

ELET 4901. Communication Circuits III Laboratory. Credit 3 semester hours. Students will perform laboratory experiments that support the topics covered in ELET 4903. Students will perform experiments that involve the transmission and reception of voice, video and data. Prerequisite: Concurrent enrollment in 4903.

ELET 4903. Communication Circuits III. (3-0) Credit 3 semester hours. The study of the licensing procedures employed by the United States Federal Communications Commission. Topics include the study of the hardware and documentation required for radio and television stations and CATV systems in the U.S. Prerequisite: ELET 4803.

GNEG 1011-1021. Engineering Professional Concepts. (1-1) Credit 1 semester hour. Professional orientation and synthesis. Introduction to engineering practices and methods of analysis. Written and oral presentations and discussions by students, faculty, and visiting professionals on topics of timely interest relative to the engineering professional and professional development.

GNEG 1013. Modern Engineering. (3-0) Credit 3 semester hours. An introduction to various engineering fields of study. The scope includes the impact of engineering on civilization, role of engineers in economic development, ethics and professional practice, and modern developments in engineering.

GNEG 2013. Logical Reasoning and Decision Analysis. (3-0) Credit 3 semester hours. An introduction to logical and decision analysis in a variety of fields. The scope includes an introduction to Boolean logic and logic flow diagrams; deductive reasoning; and use of criteria and logic trees to analyze and improve decisions. Prerequisite: MATH 1113.

GNEG 2151. Engineering Research I. (0-0) Credit 1 semester hour. Research methodology course, the content of which includes an introduction to scientific method, formulation of research question, development and implementation of research plan, analysis and evaluation of results, and reporting of findings. Prerequisite: consent of instructor and research advisor.

GNEG 2156 and 3156. Engineering Cooperative Education I and II. (0-0) Credit 6 semester hours. A cooperative program of engineering with an approved engineering-based industry, engineering consulting firm, or governmental regulatory agency engaged in planning and administration of engineering functions. The student receives related engineering assignments in a real work situation. The assignment is commensurate with the theoretical engineering experience of the student.

GNEG 3113. Introduction to Engineering Project Management. (3-0) Credit 3 semester hours. An introduction to engineering project management. The scope includes principles of project management and elements of engineering economics: defining project scope; identification of tasks; work breakdown

structure; scheduling and resource allocation; budget management; and estimation of project costs including time value of money. Prerequisites: GNEG 1013 and MATH 1113.

GNEG 3151. Engineering Research II. (0-0) Credit 1 semester hour. This is a course of research activities consisting of library, laboratory, or other research activities on selected problems. Results of the research are presented in formal, oral, and written presentations. Prerequisites: GNEG 2151 and consent of instructor and research advisor.

GNEG 4151. Engineering Research III. (0-0) Credit 1 semester hour. A continuation of GNEG 3151; in-depth research on selected problems. Results of the research are presented in formal, oral, and written presentations. Prerequisites: GNEG 3151 and consent of instructor and research advisor.

MCEG 1213. Creative Engineering I. (2-2) Credit 3 semester hours. A study of the engineering profession, practice, and ethics. Introduction to design methodology, CAD tools for engineering design and presentations. Engineering applications of spreadsheet. Corequisite or prerequisite : MATH 1123 or MATH 1115.

MCEG 1223. Creative Engineering II. (2-2) Credit 3 semester hours. An application of the engineering design process to team projects; the production of physical models or prototypes, oral presentations, and written design project reports are required. Prerequisite: MCEG 1213; Corequisite or prerequisite : PHYS 2013.

MCEG 2013. Thermodynamics I. (3-0) Credit 3 semester hours. First Law, transformation of energy, theoretical limitations, Second Law, absolute temperature, entropy, and available energy, properties of gases, liquids, and vapors, and irreversibility. Prerequisites: MATH 2024, PHYS 2013.

MCEG 2023 Materials Science and Engineering. (3-0) Credit 3 semester hours. This course is focused on relationship between mechanical properties and microstructure, mechanical behavior and property control of engineering materials, such as metals, alloys, and composites. Concepts of dislocations, phase diagrams, various bonding, crystal structures, and solidification are also included. Industrial applications of the engineering materials are discussed. Prerequisite: CHEM1033 or equivalent.

MCEG 2123. Energy Systems. (3-0) Credit 3 semester hours. Surveys sources of energy including crude oil, natural gas, coal, solar, wind, nuclear, and hybrid sources. Various energy conversion processes will be discussed including thermal, hydro-electric, nuclear, and alternative methods. Applications to be discussed include power generation, transportation, and data communication. Prerequisite: MATH 1113 or equivalent.

MCEG 3011. Measurement and Instrumentation Laboratory. (0-3) Credit 1 semester hour. The scope of this course includes fundamentals in measurement theory, statistical analysis of experimental data, uncertainty, accuracy assessments, and calibration techniques. The course includes the use and applications of Instruments for measuring area, pressure, time, speed, temperature, strain, hardness, and deflection. Prerequisites: PHYS 2023, PHYS 2521.

MCEG 3013. Heat Transfer. (3-0) Credit 3 semester hours. Study of the fundamental modes of heat transfer; conduction, convection, and thermal radiation, separately and in combination. Theoretical, numerical, and design methods of analysis of steady, transient, single, and multidimensional problems will be emphasized. Prerequisites: MCEG 3063; Corequisite or prerequisite: MATH 4173.

MCEG 3021. Thermal Science Laboratory. (0-3) Credit 1 semester hour. This course includes experimental investigation of the performance of various thermal systems, such as engines, combustion unit, heat exchangers, nozzles, boilers and turbomachinery. Prerequisites: MCEG 3011, 3023; Corequisite or prerequisite: MCEG 3013.

MCEG 3023. Thermodynamics II. (3-0) Credit 3 semester hours. Continuation of Thermodynamics I, including various power cycles, refrigeration cycles, fluid flow, combustion process, and advanced concepts of gas dynamic such as shock waves. Prerequisite: MCEG 2013.

MCEG 3031. Manufacturing Processes Laboratory. (0-3) Credit 1 semester credit hour, This lab includes experiments for metal identification, machinability of materials, effects of factors on surface roughness measurement, material removal rates, and cutting tool force analysis. It also includes illustrations of casting, forging, rolling, and powder metallurgy. Student will be required to design a structure part and perform manufacturing operations. Prerequisite or corequisite: MCEG 3033.

MCEG 3033. Manufacturing Processes. (3-0) Credit 3 semester hours. This course provides the concepts that deals in the conversion of materials into products. It includes measurement and quality assurance, and processes of casting, forming, material removal, and joining. In addition, it involves the study of computer numerical control machines, manufacturing systems, and automation. Prerequisites: MCEG 2023; corequisite or prerequisite: CVEG 2063.

MCEG 3041. Fluid Mechanics Laboratory. (0-3) Credit 1 semester credit hour, This lab focuses on flow visualization; velocity, viscosity, minor loss, and volume flow rate measurement; pipe friction measurement for incompressible and compressible flows; flow through nozzles and diffusers; pumps and fan characteristics; performance of pumps connected in series and parallel; lift and drag force measurement; and open channel flow measurement. Corequisite or Prerequisite: MCEG 3063.

MCEG 3043. Machine Design I. (2-2) Credit 3 semester hours. Fundamentals of mechanical design methodology, design of machine elements for static and fatigue failure, individual projects and classroom discussions of various design solutions. Prerequisites: CVEG 2063 and MCEG 1223.

MCEG 3051. Professional Engineering I. (0-3) Credit 1 semester hour. Fundamentals of engineering and related science subjects including chemistry, computers, dynamics, electric circuits, engineering economics, ethics, fluid mechanics, materials science, mathematics, mechanics of materials, statistics, and thermodynamics. Passing a mock exam for “fundamentals of engineering” is a requirement of passing this course. Prerequisite: junior standing in engineering major. Course equivalence: CHEG 3051, CVEG 3051 or ELEG 3051.

MCEG 3053. Kinematic Design and Analysis. (2-2) Credit 3 semester hours. This course includes the theory and application for the kinematic design of mechanisms. The students will be required to use computers to model, analyze, and synthesize mechanical systems. Prerequisites: MCEG 1223 and CVEG 2053.

MCEG 3063. Fluid Mechanics. (3-0) Credit 3 semester hours. The fundamental conservation laws in fluid statics and dynamics are derived and solved analytically and numerically. Other topics include analysis of viscous and inviscid flow; laminar and turbulent flows in pipes and on external surfaces; open channel flow; hydraulic machinery; and introduction to compressible flow. Direct applications to problems encountered in practice and in engineering design will be covered. Problem solving and design application will be emphasized. Prerequisites: MCEG 2013; Corequisite or prerequisite: MATH 2043.

MCEG 3073. Automatic Controls. (3-0) Credit 3 semester hours. Analysis and synthesis of continuous time control systems, transfer function, block diagrams, stability, root locus, state space representation, design considerations for feedback control system. Prerequisites: MATH 4173, and ELEG 2053 or 2023.

MCEG 3156. Mechanical Engineering Internship I. (0-0) Credit 6 semester hours, An internship program of work experience with an approved engineering firm. Prerequisites: Junior standing.

MCEG 3193. Introduction to Robotics. (3-0) Credit 3 semester hours. Fundamental topics in Robotics covering configuration (forward and reverse) kinematics, motion kinematics, force/torque relations and trajectory planning. Rudiments of dynamics and position control are also introduced. Prerequisites: MATH 4173 and Junior standing.

MCEG 4011. Mechanical Systems Laboratory. (0-3) Credit 1 semester hour. This course includes laboratory experiments in kinematics, vibrations, and feedback controls for mechanical systems. Prerequisites: MCEG 3053; corequisite or prerequisite: MCEG 4063.

MCEG 4043. Machine Design II. (2-2) Credit 3 semester hours. This is a design course featuring a design project using strength of materials, kinematics of machines, machine element design (e.g., gears and shafts), and CAD. Prerequisite: MCEG 3043 and 3053.

MCEG 4063. Dynamic Systems and Controls. (3-0) Credit 3 semester hours. The scope of this course includes mathematical modeling, analysis, and feedback control of dynamic systems. Topics include free and forced vibrations of single and multiple degrees of freedom systems. Transient, steady-state, and stability of linear feedback control systems will be studied in the course. Prerequisites: MCEG 3053 and MATH 4173.

MCEG 4093. Finite Element Analysis and Design. (3-0) Credit 3 semester hours. An introduction to finite element analysis as a modern computational tool to solve boundary value problems. Applications will be in structural mechanics, fluid flow, and heat transfer. Design and computer projects included. Prerequisite: CVEG 2063; corequisite or prerequisite: MCEG 3013.

MCEG 4123. Energy System Design. (3-0) Credit 3 semester hours. A design course emphasizing heat exchangers, heat pipes, heat reclamation devices, piping systems, and solar heating and cooling systems. Prerequisite: MCEG 3013 and 3023.

MCEG 4143. Engineering Information Technology. (3-0) Credit 3 semester hours. This course focuses on the use of modern information technology tools as well as linking some available tools used in several engineering applications including thermal analysis, fluid flow analysis, electrical power and current distribution and management through the use of commercial softwares such as STAR-CD, FLOWTHERM, TRNSYS, PSPICE, MULTI SIM, VHDL, etc. Prerequisite: MATH 4173.

MCEG 4156. Mechanical Engineering Internship II. (0-0) Credit 6 semester hours. Continuation of MCEG 3156. Prerequisites: Senior standing.

MCEG 4163. Special Topics. (3-0) Credit 3 semester hours. Selected current and emerging topics in mechanical engineering depending on need determined by the department. Prerequisite: Consent of advisor.

MCEG 4183. Gas Dynamics. (3-0) Credit 3 semester hours. Fundamentals in compressible fluid flow, one dimensional and two dimensional flow, subsonic and supersonic flow. Topics include isentropic flow, normal and oblique shock, Prandtl-Meyer Flow, flow with friction and heat transfer, and various engineering applications. Prerequisites: MCEG 3023, 3063.

MCEG 4473. Senior Design and Professionalism I. (1-4) Credit 3 semester hours. This is a capstone engineering design of an industrial or advanced team project. Elements of ethics and professionalism in engineering practice will be integrated into the project experience. The design achievement will be demonstrated by written report, oral presentation, and professional standards and ethics examinations. Prerequisites: MCEG 3043; corequisite or prerequisite: MCEG 3013.

MCEG 4483. Senior Design and Professionalism II. (1-4) Credit 3 semester hours. A continuation of MCEG 4473 with required design modifications of the team projects necessary to produce a working prototype of the designs initiated in Senior Design and Professionalism I. Results of the design are presented in a formal, final oral presentation, as well a final report. Professionalism education will reinforce the importance of professional ethics, corporate culture, life-long learning, and globalization. Prerequisites: MCEG 4473.

MCEG 4991-4993. Independent Study. (1-0, 3-0) Credit 1 or 3 semester hours. Readings, research, and/or field work on selected topics. Prerequisite: Consent of advisor.

MCET 3103. Mathematical Applications for Technology. (3-0) Credit 3 semester hours. A survey of appropriate concepts and techniques from methods with applications to the solution of problems in technology. Prerequisite: MATH 2024.

TECH 1002. Engineering and Technology Seminar. (2-0) Credit 2 semester hours. Introduction to the engineering, technology, architecture and computer science fields of study. The history and development of technology and how it effects multi/interdisciplinary studies. Scope and future of the fields of study and examination of the role of professionals in a highly technological society. Content designed especially for assisting students in learning to cope successfully in various interdisciplinary fields of study.

TECH 1033. Engineering Graphics. (2-4) Credit 3 semester hours. Introduction to graphics with emphasis on drafting techniques: use of instruments, lettering, geometric construction, multiview projections, auxiliary and sectional views, dimensioning, and pictorial drawings. **(ENGR 1304)

TECH 1103. Computer-Aided Drafting I. (2-2) Credit 3 semester hours. This course is an introduction to computer-aided drafting and design. Use of microcomputers and of multiview and sectional drawings. File maintenance and an introduction to plotting applications.

TECH 1113. Communication Technology. (3-0) Credit 3 semester hours. A study of the technologies employed in the communication process. Topics include: the various technical communication systems, introduction to graphics communication, electronic and telecommunication systems and satellite systems. Prerequisite: None

TECH 1123. Introduction to Technology. (3-0) Credit 3 semester hours. Provides students an opportunity to explore and experience a large variety of tools, materials, and processes associated with technology. Designed to assist individuals in identifying their areas of interests. Topics such as communications technology, energy technology, production technology, computer applications, research and development are included.

TECH 1243. Production Technology. (2-4) Credit 3 semester hours. A study in the production and planning; design and installation of integrated systems of materials, equipment and personnel; and measurement, testing and management of quality control in the manufacturing and construction industries. Prerequisite: TECH 1123

TECH 2003. Basic Computer Automated Manufacturing. (2-2) Credit 2 semester hours. An introductory study of Computer Integrated Manufacturing with emphasis on how subsystems apply to manufacturing applications. The integration of robotics, computers and other machines will be emphasized. Prerequisite: Department Head approval.

TECH 2103. Computer-Aided Drafting II. (2-) Credit 3 semester hours. This course is a continuation of TECH 1103. Use of microcomputers to generate complex engineering drawings and designs. Advanced techniques for data input and drawing generation. Dimensioning, data base management, preparation of isometric drawings and introduction to 3D drawings, and plotting techniques. Prerequisites: Departmental approval.

TECH 2163. Architectural Drafting. (2-4) Credit 3 semester hours. Application of basic drafting of architectural working drawings to plans and sections and elevations. Building details are studied using standard components obtained from such references as Sweet's Catalog and Architectural Graphic Standards. Prerequisite: Departmental approval.

TECH 2303. Photography I. (2-2) Credit 2 or 3 semester hours. A study of the equipment, procedures, and processes that make photographs and of the ability to communicate through this medium. Instruction encourages competency development. Covers advanced scientific principles of optics, theory of light,

camera handling, composition, film processing, print finishing, and photographic evaluation. Prerequisite: Departmental approval.

TECH 2313. Quality Assurance. (3-0) Credit 3 semester hours. An introduction to the concepts of applied quality control systems. This course deals with the problems and solution of how to achieve better quality in the production and manufacturing of products or systems. Topics covered include quality responsibility, control chart methods, sampling techniques, and reliability applications as they relate to engineering and technical products or systems. Prerequisite: Departmental approval.

TECH 3004. Principles of the Computer Integrated Manufacturing System(2-2) Credit 3 semester hours. A study of techniques of computer integrated manufacturing. Topics will include principles of automation in manufacturing, programmable automation based machines and the integration of robotics and CNC machines into the CIM system. Prerequisites: TECH 2003

TECH 3013. Industrial Design. (2-4) Credit 3 semester hours. Introduction to industrial design. Includes the creative process, objectives of design, standard parts and materials commonly used, and basic manufacturing practices to create useful products. Prerequisite: Departmental approval.

TECH 3103. Manufacturing Processes. (2-4) Credit 3 semester hours. An analysis of activities related to the production and distribution of goods and services. Instruction includes materials processing, management, and the free enterprise system. Prerequisite: Departmental approval.

TECH 3113. Energy and Power Technology. (3-0) Credit 3 semester hours. Considers techniques employed for using and controlling energy to perform work. A study of the generation, conversion transmission, control and use of power. Instruction includes exploration in mechanical, pneumatics, and fluid power. Prerequisite: Departmental approval.

TECH 3123. Technology of Materials. (2-4) Credit 3 semester hours. A study of tools, materials and processes common to wood, metals, plastics, and composites industries. Practical applications in the use and shaping of these materials into useful products. Including application and use of CNC machines. Prerequisite: Departmental approval.

TECH 3203 Engineering and Technical Communications. (3-0) Credit 3 semester hours. Oral and written presentations and documentations that focus on scientific and technical communications. Intended for professionals preparing for basic and applied sciences, engineering and technology fields of study. Emphasizes principles and use rather than use - it offers functional explanations rather than formal rules. Prerequisite: ENGL 1133.

TECH 3223. Electromechanical Drafting. (2-4) Credit 3 semester hours. Electrical and electronic graphic symbols and terminology. Study of the basic types of electronic drawing block, single line, and schematic lines. Layout and development of mechanical chassis and housings are included. Prerequisites: Departmental approval.

TECH 3233. Industrial Management and Supervision. (3-0) Credit 3 semester hours. Principles of industrial management and supervision. Study of industrial organization, production and quality control, plant layout and planning, manufacturing cost analysis, and time and motion. Prerequisite: junior standing.

TECH 3383. Pipe Drafting. (2-4) Credit 3 semester hours. Vocabulary and definition of pipe drafting. Fundamental pipe symbols and single line drawings, including standard equipment and fittings. Dimensioning and isometric pipe drafting. Study of flow sheets as related to piping systems and structural systems for pipe supports. Prerequisite: Departmental approval.

TECH 4072. Senior Project I. (1-3) Credit 2 semester hours. This is the first part of a two part senior project course for technology majors. Students will be involved with a special project selected by the student or advisor. Consideration is given to taking a project from the planning stage to implementation. Prerequisite: Senior Standing.

TECH 4082. Senior Project II. (1-3) Credit 2 semester hours. Continuation of TECH 4072. Students will complete the project. An oral presentation and written report are required. Prerequisite: TECH 4072.

TECH 4103. Advanced Computer Aided Design. (2-2) Credit 3 semester hours. A special problems course in which students may use various CAD software to design and to develop standard engineering documentation to meet specific applications. Students will develop skill in the management of the total CAD system with emphasis on team work in the work environment. Prerequisite: Departmental approval.

TECH 4113. CAD Programming and Customization. (1-3) Credit 3 semester hours. An advanced class designed to provide instruction in techniques of designing and customizing CAD programs to specific needs. Topics will include a study of languages and software, techniques of enhancing CAD software, and programming and customization techniques. Prerequisite: Senior classification and Department Advisor approval.

TECH 4123. Manufacturing Technology Problems. (2-4) Credit 3 semester hours. A class for advanced students wanting to study problems in manufacturing technology. Courses may be repeated for additional 3 hour credit with in-depth extension of previous problem class. Prerequisite: Senior classification and Department Advisor approval.

TECH 4273. Industrial Safety Management. (3-0) Credit 3 semester hours. A comprehensive, in-depth study of accident prevention and safety administration, emphasizing management aspects of safety. This course uses the most recently developed techniques for implementation of successful accident prevention techniques. Prerequisite: Advisor approval.

TECH 4303. Construction Processes. (1-4) Credit 3 semester hours. A study of the construction industry. Instruction includes a managed production system study in which roads, tunnels, bridges, dams, and buildings are produced and serviced on the site. Experiences are provided in planning, site preparation, scheduling work, contracting, construction of a structure, support systems, and assembling models. Prerequisite: Departmental approval.

TECH 4313. Transportation Systems. (3-0) Credit 3 semester hours. A study of transportation systems. An analysis of transportation in terms of land, sea, air, and aerospace vehicles. An analysis of the factors which affect design, safety, materials, control and ecological effects of transportation systems. Prerequisite: Junior Standing.

TECH 4403. Machine Drafting. (2-4) Credit 3 semester hours. A study of working drawings as applied to the machine shop with emphasis on relationship of views and dimensioning, correct interpretation of scale measurement and tolerance, and the application and interpretation of symbols and notes. Prerequisite: TECH 1033.

TECH 4993. Independent Study. (3-0) Credit 3 semester hours. Reading, research, and/or field work on selected topics. Prerequisite: Consent of department head.