Bachelor of Science in Electrical Engineering
2016-17

Freshman Year

Fall Semester Hours		Spring Semester Hours	
CHEM 1011 General Chemistry I Lab	1	ENG 1013 Composition II	3
CHEM 1013 General Chemistry I	3	ENGR 1412 Software Applications for Engineers	2
ENG 1003 Composition I	3	ENGR 2421 Electric Circuits I Lab	1
ENGR 1402 Concepts of Engineering	2	ENGR 2423 Electric Circuits I	3
MATH 2204 Calculus I	4	MATH 2214 Calculus II	4
SCOM 1203 Oral Communications	3	PHYS 2034 University Physics I	4
	16		17

Sophomore Year

Fall Semester Hours		Spring Semester Hours	
EE 2322 Electrical Workshop	2	CS 2114 Structured Programming	4
ENGR 2401 Applied Engineering Statistics	1	EE 3313 Electric Circuits II	3
ENGR 2403 Statics	3	EE 3331 Digital Electronics I Lab	1
MATH 3254 Calculus III	4	EE 3333 Digital Electronics I	3
PHYS 2044 University Physics II	4	ENGR 3443 Engineering Thermodynamics I	3
+ Humanities Elective	3	MATH 4403 Differential Equations	3
	17		17

Junior Year

Fall Semester Hours		Spring Semester Hours	
EE 3343 Engineering Fields & Waves	3	EE 3373 Probability and Random Signals	3
EE 3353 Signals and Systems	3	EE 3383 Principles and Practices in Electrical Engr.	3
EE 3363 Semiconductor Materials and Devices	3	EE 4333 Communications Theory	3
EE 3401 Electronics I Lab	1	EE 4373 Electronics II	3
EE 3403 Electronics I	3	EE 4773 Electronics II Lab	3
ENGR 4453 Num. Methods for Engineers	3		
	16		15

Senior Year

Fall Semester Hours		Spring Semester Hours	
EE 4313 Control Systems	3	++ EE Elective	3-4
EE 4353 Power Systems	3	++ EE Elective	3-4
ENGR 3433 Engineering Economics	3	ENGR 4482, Senior Design II	2
ENGR 4463 Senior Design I	3	+++Technical Elective	3
ENGR 4401 Senior Seminar	1	+Fine Arts Elective	3
+ Social Science Elective	3		
	16		14-16

TOTAL HOURS: 128-130

- Text in RED indicates change in the title with the old course number
- Text in GREEN indicates a new course with new course number in BLUE

General Education Curriculum for Engineering Baccalaureate Degrees

Semester Hours

Communication 9
ENG 1003, Freshman English I ENG 1013, Freshman English II SCOM 1203, Oral Communications

Mathematics 4
MATH 2204, Calculus I

Arts and Humanities 6
Fine Arts. Select one of the following:
MUS 2503, Fine Arts – Musical
THEA 2503, Fine Arts – Theater
ART 2503, Fine Arts – Visual
Humanities. Select one of the following:
ENG 2003, Intro. to the Lit. of the Western World I
ENG 2013, Intro. to the Lit. of the Western World II
PHIL 1103, Introduction to Philosophy

Social Sciences 11
Select one of the following:
HIST 2763, The United States to 1876
HIST 2773, The United States since 1876
POSC 2103, Introduction to United States Government
Substitution of Higher Math (8hrs required): MATH 2214, Calculus II AND MATH 3254, Calculus III

Science 8
CHEM 1013, General Chemistry I, and CHEM 1011, Laboratory for General Chemistry I
PHYS 2034, University Physics I

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Other rules: A course may be counted in satisfaction of only one area requirement. With the exception of English courses (ENG), no more than two selections may have the same prefix.

Additional required support courses:

MATH 4403, Differential Equations 3
PHYS 2044, University Physics II 4

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Engineering Core Courses:

ENGR 1402, Concepts of Engineering 2
ENGR 1412, Software Applications for Engineers 2
ENGR 2401, Applied Engineering Statistics 1
ENGR 2403, Statics 3
ENGR 2423 and ENGR 2421, Electric Circuits I and Laboratory for Electric Circuits 4
ENGR 3433, Engineering Economics 3
ENGR 3443, Engineering Thermodynamics 3
ENGR 4401 Senior Engineering Seminar 1
ENGR 4453, Numerical Methods for Engineers 3
ENGR 4463, Senior Design I 3
ENGR 4482, Senior Design II 2

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Electrical Engineering Foundation Courses:

CS 2114 Structured Programming 4
EE 2322, Electrical Workshop 2
EE 3313, Electric Circuits II 3
EE 3331, Digital Electronics I Lab 1
EE 3333, Digital Electronics I 3
EE 3343, Engineering Fields and Waves 3
EE 3353, Signals and Systems 3
EE 3363, Semiconductor Materials and Devices 3
EE 3373, Probability and Random Signals 3
EE 3383, Principles and Practices in Electrical Engineering 3
EE 3401, Laboratory for Electronics I 1
EE 3403, Electronics I 3
EE 4333, Communications Theory 3
*** Approved Technical Electives 3
*** Electrical Engineering Elective 6-8

44-46

Electrical Engineering Design and Analysis Courses:

EE 4313, Control Systems 3
EE 4353, Power Systems 3
EE 4373, Electronics II 3
EE 4773, Electronics II Laboratory 3

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***Electrical Engineering Electives (any two)**

EE 4303, Electromagnetic Waves 3
EE 4323, Electrical Machinery 3
EE 4343, Digital Signal Processing 3
EE 4344, Embedded Systems 4
EE 4354, Intelligent Control Systems 4
EE 4383, Digital Electronics II 3
EE 4393 Digital communications 3
Any upper level Computer Science course 3

Electrical Engineering (EE): Course Descriptions

EE 2322 Electrical Workshop Develop understanding and skills related to various workshop processes involved in electrical engineering. Workshop safety, electrical wiring and assembly, winding practice, domestic electrical appliances, soldering and de-soldering techniques, electronic project construction techniques, use of electronic bench equipment, preparation of reports. Prerequisite, C or better in PHYS 2034. Fall.

EE 3313 Electric Circuits II Transient analysis, average power, RMS values, mutual inductance, transformers, resonance, network theorems and principles, polyphase networks, complex power, and introduction to Fourier series and transforms. Prerequisite, C or better in MATH 2214 and ENGR 2423. Spring.

EE 3331 Digital Electronics I Laboratory Experimentation and design with digital electronic and computer components and circuits including logic gates, flip flops, counters, and registers. Practical applications in timing and control. Logic families such as TTL, ECL, and CMOS. Prerequisite, C or better in ENGR 2421. Corequisite, EE 3333. Spring, Fall.

EE 3333 Digital Electronics I Introduction to the analysis and design of digital and computer circuits, Boolean algebra, binary arithmetic, combinational logic, sequential logic, registers, counters, adders, comparators, and computer organization. Prerequisite, C or better in either CS 2114 or ENGR 2423. Fall.

EE 3343 Engineering Fields and Waves Study of time invariant electric and magnetic fields in free space and in materials, electrical current flow as a function of electric field, magnetic flux, interaction of magnetic fields with electrical current and voltage, electrical and magnetic potentials, time changing electric and magnetic fields, and introduction to Maxwell's Equations. Prerequisites, C or better in MATH 3254 and EE 3313. Fall.

EE 3353 Signals and Systems Methods of analysis of continuous and analog systems and associated synthesis, simulation and design, system response in the time and frequency domains, Laplace transforms Fourier series and transforms, Z-transforms, transfer functions, and convolution. Prerequisite, C or better in EE 3313. Corequisite, MATH 4403. Fall.

EE 3363 Semiconductor Materials and Devices Semiconductor materials and theory of solid state electronic devices. Semiconductor growth and processing techniques. Semiconductor parameters such as bandgap, mobility, carrier densities, diffusion length, carrier lifetime, and energy level distribution. P-n junctions and Schottky barriers. Various semiconductor devices, Constraints, limitations, and fabrication processes for various devices. Prerequisite, C or better in CHEM 1013, PHYS 2034, Co-requisite, EE 3403. Fall.

EE 3373 Probability and Random Signals Application of probabilistic models and analysis techniques to engineering signals and systems with inherent randomness. Topics include; probability theory, probability density functions, random variables, random vectors, estimation, detection, discrete and continuous processes, modeling, and power spectra. Prerequisite, C or better in EE 3353. Spring.

EE 3383 Principles and Practices in Electrical Engineering Principles of and good practices in electrical engineering, professional organizations, literature, intellectual property, licensure, ethics and regulations, vendors, products, specifications, procurement, communications and human relations, resource management, product certification and manufacturability, and modern tools and issues. Prerequisites, C or better in EE 3313 and EE 3403. Spring.

EE 3401 Electronics I Laboratory Basic laboratory experiments in electronic circuits and solid state electronic devices. Prerequisite, C or better in ENGR 2421, Corequisite, EE 3403. Fall.

EE 3403 Electronics I Theory, analysis, and introductory design of diode, bipolar junction transistor, operational amplifier, and field effect transistor devices and circuits. Prerequisite, C or better in ENGR 2423. Fall.

EE 4303 Electromagnetic Waves Study of electromagnetic waves in free space, dielectrics, and conductors, transmission lines, polarization, reflection, refraction, diffraction, waveguides, resonators, antennas, and radiation. Prerequisites, C or better in EE 3343 or PHYS 2044, and MATH 4403. Dual listed as EE 5303. Demand.

EE 4313 Control Systems Analysis and design of linear feedback systems. Transfer functions, transient and steady state characterization, stability determination. Closed loop analysis and design using root locus and frequency domain methods. Prerequisites, C or better in MATH 4403, EE 3353, EE 3403, EE 3401. Fall.

EE 4323 Electrical Machinery Introduction to the analysis and design of electromechanical energy conversion systems, magnetic circuit theory, general transformer and machinery theory, and DC and AC motors and generators. Prerequisite, C or better in EE 3313 or ENGR 3423. Spring.

EE 4333 Communication Theory Fundamentals of communication systems. Review of signals and systems (mainly Fourier analysis). Analog and digital signals. Error detection and correction techniques. Analog carrier modulation techniques like amplitude modulation, frequency modulation and phase modulation for transmitting and receiving information signals. Channel noise, and performance of the various modulation techniques in the presence of channel noise. Methods of digital transmission of analog signals (Binary and M-ary PCM). Prerequisites EE 3353, ENGR 3403. Spring.

EE 4343 Digital Signal Processing Introduction to the analysis and design of discrete linear systems and processing of digital signals. Topics include; time and frequency domain approaches to discrete signals and systems, discrete Fourier transform and its computation, and design of digital filters. Prerequisites, C or better in EE 3353, EE 3403, and EE 3333. Spring.

EE 4344 Embedded Systems Introduction to microcontroller systems and designs. Programming and interfacing with microcontroller. Introduction to PLC and ladder logic programming. Prerequisites, C or better in EE 3333 and EE 3331. Dual listed as 5344. Demand.

EE 4353 Power Systems Generation, transmission, and distribution of large scale electrical power, associated energy losses and practical design problems and complications. Transmission line analysis. Three phase power networks. Load monitoring and control. Prerequisite, C or better in EE 3313. Corequisite, MATH 4403. Fall.

EE 4354 Intelligent Control Systems Introduction of fuzzy logic, fuzzy logic in control engineering, neural networks, Bayesian or belief networks, neuro-fuzzy systems, neuro-fuzzy controllers, controller design, application problems. Prerequisite for EE: C or better in EE 4313; Prerequisite for ME: C or better in ME 3613. Dual listed as EE 5354. Demand.

EE 4373 Electronics II A continuation of EE 3403 with emphasis on the analysis, simulation, and design of feedback, operational amplifier systems, frequency response, integrated circuits, and power and wave shaping circuits. Prerequisite, C or better in EE 3313 and EE 3403. Spring.

EE 4773 Electronics II Laboratory Electronic circuit design - oriented experiments, measurement, interfacing, and other electrical engineering topics. Prequisites, C or better in EE 3313, EE 3331, and EE 3401. Corequisite, EE 4373. Spring.

EE 4383 Digital Electronics II Continuation of the study of digital circuit design with emphasis on the design of larger systems and use of LSI components. Register transfer logic, computer interfacing and design, and microcomputer-based system design. Prerequisite, C or better in EE 3333. Demand.

EE 479V Special Problems in Electrical Engineering Individually directed problems in electrical engineering primarily for juniors and seniors. A course outline and project summary listing the goals and expected outcomes must be approved by the student advisor and the program director. Prerequisites are dependent upon the nature of the special problem. Demand.

EE 4393 Digital Communications Continuation of the study of communications theory with emphasis on modulation and demodulation techniques, signal space representation of digitally modulated signals, coherent/non-coherent detection methods (and receiver structures) in AWGN channel, error performance, communication over band-limited channels with ISI and AWGN. Prerequisites, C or better in EE 3373 and EE 4333. Demand.

Summary:

Gen Ed: 38 credits

Communication (ENG 1003, ENG 1013, and SCOM 1203	9	
Mathematics (MATH 2204)	4	
Arts (MUS 2503, THEA 2503, or ART 2503)	3	
Humanities (ENG 2003, ENG 2013, or PHIL 1103)	3	
Social Science (HIST 2763, HIST 2773, or POSC 2103)	3	
Higher Math (MATH 2214, and MATH 3254)	8	
Science (CHEM 1013, CHEM 1011, and PHYS 2034)	8	
Total	38	38

Required Math and Science : 07 credits

MATH 4403 Differential Equations	3	
PHYS 2044 University Physics II	4	
Total	07	45

Engineering Core Courses

ENGR 1402 Concepts of Engineering	2	
ENGR 1412 Software Applications for Engineers	2	
ENGR 2401 Applied Engineering Statistics	1	
ENGR 2403 Statics	3	
ENGR 2423 Electric Circuits I	3	
ENGR 2421 Electric Circuits I Lab	1	
ENGR 3433 Engineering Economics	3	
ENGR 3443 Engineering Thermodynamics	3	
ENGR 4401 Senior Seminar	1	
ENGR 4453 Numerical Methods for Engineers	3	
ENGR 4464 Senior Design I	3	
ENGR 4482 Senior Design II	2	
	27	72

Electrical Engineering Foundation: 33 credits

CS 2114 Structured Programming	4	
EE 2322 Electrical Workshop	2	
EE 3313 Electric Circuits II	3	
EE 3331 Digital Electronics I Lab	1	
EE 3333 Digital Electronics I	3	
EE 3343 Engineering Fields and Waves	3	
EE 3353 Signals and Systems	3	
EE 3363 Semiconductor Materials and Devices	3	
EE 3373 Probability and Random Signals	3	
EE 3383 Principles and Practices in Electrical Engineering	3	
EE 3401 Electronics I Lab	1	
EE 3403 Electronics I	3	
EE 4333 Communication Theory	3	
Total	35	107

Electrical Engineering Design and Analysis: 12 credits

EE 4313 Control Systems	3	
EE 4353 Power Systems	3	
EE 4373 Electronics II	3	
EE 4773 Electronics II Lab	3	
	12	119

++ Electrical Engineering Electives (any two): 6-8 credits

1.	EE 4303 Electromagnetic Waves	3
2.	EE 4323 Electrical Machinery	3
3.	EE 4343 Digital Signal Processing	3
4.	EE 4344 Embedded Systems	4
5.	EE 4354 Intelligent Control Systems	4
6.	EE 4383 Digital Electronics II	3
7.	EE 4393 Digital Communications	3
8.	Any upper level Computer Science course	3

Electrical Engineering electives can be chosen from the above and must be approved by the advisor and the director.

Total	6-8	125-127

+++ Technical Elective (any one): 3 credits

1.	ENGR 2413 Mechanics of Materials	3
2.	ME 3613 Control Systems for Mechanical Engineers	3
3.	ENGR 3423 Dynamics	3
4.	PHYS 3303 Modern Physics	3
5.	Any upper level Math Course	3
6.	Any upper level Computer Science course	3
7.	Any upper level Engineering course	3

Technical elective can be chosen from the above and must be approved by the advisor and the director.

Total	3	128-130