Code # EN23 (2014)

**Bulletin Change Transmittal Form**

**Undergraduate Curriculum Council** - Print 1 copy for signatures and save 1 electronic copy.

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|  |
| --- |
| **Bulletin Change** Please attach a copy of all catalogue pages requiring editorial changes. |

|  |  |
| --- | --- |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date… **Department Curriculum Committee Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **COPE Chair (if applicable)** |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date… **Department Chair:** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **General Education Committee Chair (If applicable)** |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date… **College Curriculum Committee Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Undergraduate Curriculum Council Chair** |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date… **College Dean** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Graduate Curriculum Committee Chair** |
|  | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Vice Chancellor for Academic Affairs** |

**1.Contact Person** (Name, Email Address, Phone Number)

Dr. Shubhalaxmi Kher, Dr. Paul Mixon

[skher@astate.edu](mailto:skher@astate.edu), pmixon@astate.edu

972-2088

**2.Proposed Change**

B.S.E.E. Degree Plan overhaul for 2015-16

**3.Effective Date**

Fall 2015

**4.Justification**

Degree plan is being changed to reflect advisory council recommendations (faculty, industry, student, and constituency feedback).

**From the most current electronic version of the bulletin, copy all bulletin pages that this proposal affects and paste it to the end of this proposal.**

**To copy from the bulletin:**

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2. Go to <http://registrar.astate.edu/bulletin.htm> and choose either undergraduate or graduate.
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4. Find the page(s) you wish to copy, click on the “select” button and highlight the pages you want to copy.
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7. Minimize the bulletin and maximize this page.
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Current Bulletin Page 193 (New bulletin page shown on page 7 of this document)

**Area of Concentration: Electrical Engineering**

**Electrical Engineering: Sem. Hrs.**

Electives denoted with an asterisk (\*) may be selected from any courses within the designated elective group; subject to a program advisor’s approval. They must make a rational contribution to the student’s personal and professional education goals.

CHEM 1023, General Chemistry II 3

CS 2114, Structured Programming 4

EE 3401, Electronics I Laboratory 1

EE 3403, Electronics I 3

EE 3313, Electric Circuits II 3

EE 3333, Digital Electronics I 3

EE 3343, Engineering Fields and Waves ~~I~~ 3

EE 3353, ~~Continuous and Analog Systems~~ Signals and Systems 3

EE 3383, Principles and Practices in Electrical Engineering 3

EE 3393 Probability and Random Signals 3

EE 4323, Electrical Machinery **OR**

EE 4353, Power Systems 3

EE 4373, Electronics II **OR**

EE 3363, Semiconductor Matl and Devices ~~I~~ 3

EE 4773, ~~Intermediate EE Lab~~Electronics II Laboratory **OR**

~~EE 3303, Semiconductor and Optoelectronic Materials and Devices I Laboratory~~ 3

EE 4383, Digital Electronics II **OR**

EE 4313, Control Systems 3

ENGR 4413, Engineering Problem Solving 3

\*Engineering Electives 2

\*Approved Electives 3

**Total Required Hours: 46**

Current Bulletin page 199 (New bulletin page shown on page 8 of this document)

Major in Electrical Engineering

Bachelor of Science in Electrical Engineering

A complete 8-semester degree plan is available at http://registrar.astate.edu/.

**University Requirements:**

See University General Requirements for Baccalaureate degrees (p. 41)

**First Year Making Connections Course:** Sem. Hrs.

ENGR 1402, Concepts of Engineering (See College of Engineering Core Courses) -

**General Education Requirements:** Sem. Hrs.

See General Education Curriculum for College of Engineering 38

**Additional Support Courses:** Sem. Hrs.

Refer to Additional Support Courses for College of Engineering 7

**College of Engineering Core Courses:** Sem. Hrs.

Refer to College of Engineering Core Courses 34

**Major Requirements:**

Electives denoted with an asterisk (\*) may be selected from any courses within the designated elective group; subject to a program advisor’s approval. They must make a rational contribution to the student’s personal and professional education goals.

In addition to the University requirements for all Baccalaureate Degrees, a Bachelor of Science in Electrical Engineering requires that one of the two following conditions be met:

1. “C” or better in each course in the 49-hour major courses; **OR**

2. 2.5 (or greater) grade point average in the 49-hour major courses listed below

.

Sem. Hrs.

CHEM 1023, General Chemistry II 3

CS 2114, Structured Programming 4

EE 3401, Electronics I Laboratory 1

EE 3403, Electronics I 3

EE 3313, Electric Circuits II 3

EE 3333, Digital Electronics I 3

EE 3343, Engineering Fields and Waves ~~I~~ 3

EE 3353, ~~Continuous and Analog Systems~~ Signals and Systems 3

EE 3383, Principles and Practices in Electrical Engineering 3

EE 3393 Probability and Random Signals 3

EE 4323, Electrical Machinery **OR**

EE 4353, Power Systems 3

EE 4333, Communications Theory 3

EE 4373, Electronics II **OR**

EE 3363, Semiconductor Materials and Devices ~~I~~ 3

EE 4773, ~~Intermediate EE Lab~~Electronics II Laboratory **OR**

~~EE 3303, Semiconductor and Optoelectronics Matl and Devices I Lab~~ 3

EE 4383, Digital Electronics II **OR**

EE 4313, Control Systems 3

ENGR 4413, Engineering Problem Solving 3

\*Engineering Electives 2

\*Approved Electives 3

**Sub-total 49**

**Total Required Hours: 128**

Bulletin pages 443-445

**ELECTRICAL ENGINEERING PROGRAM**

**Electrical Engineering (EE)**

**EE 2322 Electrical Workshop** Workshop processes involved in electrical engineering including 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, and preparation of reports. Prerequisite, PHYS 2034. Fall.

**~~EE 3303. Semiconductor and Optoelectronic Materials and Devices I Laboratory~~** ~~Experimentation and demonstrations in semiconductor growth and deposition, material analysis and characterization, doping, and processing. Fabrication of simple devices. Metallization, etching, and other manufacturing processes. Lecture one to two hours, laboratory four to five hours per week. Prerequisite, C or better in CHEM 1011, PHYS 2034, and EE 3401. Corequisite, EE 3363. Spring, even.~~

**EE 3313. Electric Circuits II** Transient analysis, average power, RMS values, mutual inductance, resonance, network theorems and principles, polyphase networks, complex power. 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. Demand.

**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 ~~I~~** 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. ~~Continuous and Analog Systems~~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 ~~I~~** 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. Pn junctions and Schottky barriers. Constraints and limitations on practical devices. Prerequisite, C or better in CHEM 1013, PHYS 2034, and C or better in EE 3403 and ENGR 3443. Spring, even.

**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 and tools and issues. Prerequisite, C or better in EE 3313. Spring.

**EE 3393. 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, and power spectra. Prerequisite, C or better in EE 3353. Spring.

**EE 3401. Electronics I Laboratory** Basic laboratory experiments in electronic circuits and solid state electronic devices. Corequisite, EE 3403. Prerequisite, C or better in ENGR 2421. 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. ~~Engineering Field and Waves II~~ 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 MATH 4403 and EE 3343. Dual listed as EE 5303. Demand.~~Study of time harmonic electromagnetic wave interaction with materials including energy and momentum, polarization, reflection, refraction, waveguides, radiation, and scattering. Prerequisites, C or better in (EE 3343 or PHYS 2044) and MATH 4403. Dual listed as EE 5303. Spring, odd.

**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 EE 3403. Corequisite, EE 3353. Dual listed as EE 5313. Demand.

**EE 4333. Communications Theory** Frequency spectra of time signals. Review of Fourier series and transforms. Signal mixing, modulation, and demodulation. AM and FM broadcasting techniques and bands. Pulsed and digital communication modes. Prerequisite, C or better in EE 3353 and EE 3403. Dual listed as EE 5333. Demand.

**~~EE 4321. Electrical Machinery Laboratory~~** ~~Experiments dealing with motor, generators, transformers, and associated measurements and controls. Prerequisite, C or better in ENGR 2421. Corequisite, EE 4323. Demand.~~

**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 3473, and ENGR 3423. Dual listed as EE 5323. Demand.

**EE 4343. Digital Signal Processing** 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. ~~Microprocessor and PLC Applications~~Embedded Systems** A microcomputer and programmable logic controller course for junior and senior level engineers. A survey of small computers and their engineering functions including control, sensing, and computation. The concept of using control programming languages is introduced. Prerequisites, C or better in EE 3333 and EE 3401, or consent of instructor. Dual listed as EE 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 and ENGR 3423. Corequisite, MATH 4403. Dual listed as EE 5353. Demand.

**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, and application problems. Prerequisite for EE majors: C or better in EE 4313; Prerequisite for ME majors: C or better in ME 3613. Dual listed as EE 5354. Spring, even.

**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 waveshaping circuits. Prerequisite, C or better in EE 3313, ENGR 3443, and EE 3403. Dual listed as EE 5373. Spring, odd.

**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. Dual listed as EE 5383.

**EE 4743. Digital Communications** Continuation 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 3393 and EE 4333. Spring, odd.

**EE 4773. ~~Intermediate Electrical Engineering Laboratory~~Electronics II Laboratory** Advanced design-oriented experiments in electronics, measurement, interfacing, and other electrical engineering topics. Corequisite, EE 4373. Prerequisites, C or better in EE 3333, and EE 3401. Spring.

**EE 479V. Special Problems in Electrical Engineering** Individually directed problems in electrical engineering 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 on the nature of the special problem. Demand.

New bulletin page 193

**Area of Concentration: Electrical Engineering**

|  |  |
| --- | --- |
| **Electrical Engineering**  Electives denoted with an asterisk(\*) may be selected from any courses within the designated elective group, subject to a program advisor’s approval. They must make a rational contribution to the student’s personal and education goals. |  |
| 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 3383, Principles and Practices in Electrical Engineering | 3 |
| EE 3393, Probability and Random Signals | 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 |
| EE 4313, Control Systems | 3 |
| EE 4353, Power Systems | 3 |
| EE 4373, Electronics II | 3 |
| EE 4773, Electronics II Laboratory | 3 |
| **Total required Hours:** | **56-58** |
|  |  |

New Bulletin page 199

**Major in Electrical Engineering**

**Bachelor of Science in Electrical Engineering**

A complete 8 semester degree plan is available at <http://registrar.astate.edu>

|  |  |
| --- | --- |
| **University requirements:** |  |
| See University General Requirements for Baccalaureate degrees (p.41) |  |
| **First Year making Connections Course:** | **Sem. Hrs.** |
| ENGR 1402, Concepts of Engineering (see college of Engineering core courses) | - |
| **General Education Requirements:** | **Sem. Hrs.** |
| See General Education Curriculum for College of Engineering | 38 |
| **Additional Support courses:** | **Sem. Hrs.** |
| Refer to additional support courses for College of Engineering | 7 |
| **College of Engineering Core Courses:** | **Sem. Hrs.** |
| Refer to College of Engineering Core courses | 27 |
| **Major Requirements:**  Electives denoted with an asterisk(\*) may be selected from any courses within the designated elective group, subject to a program advisor’s approval. They must make a rational contribution to the student’s personal and education goals.  In addition to the University requirements for all the Baccalaureate Degrees, a bachelor of Science in Electrical Engineering requires that one of the two following conditions be met.   1. “C” or better in the --- hour major courses; or 2. 2.5 ( greater) grade point average in the – hour major courses listed below |  |
| 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 3383, Principles and Practices in Electrical Engineering | 3 |
| EE 3393, Probability and Random Signals | 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 |
| EE 4313, Control Systems | 3 |
| EE 4353, Power Systems | 3 |
| EE 4373, Electronics II | 3 |
| EE 4773, Electronics II Laboratory | 3 |
| **Sub total** | **57-59** |
| **Total Required Hours:** | **128-130** |
|  |  |

**Bachelor of Science in Electrical Engineering**

**2015-16**

**Freshman Year**

**Fall Semester Hours Spring Semester Hours**

CHEM 1011 General Chemistry I Lab 1 ENG 1013 Composition 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 3393 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

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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: Humanities. Select one of the following:

MUS 2503, Fine Arts – Musical ENG 2003, Intro. to the Lit. of the Western World I

THEA 2503, Fine Arts – Theater ENG 2013, Intro. to the Lit. of the Western World II

ART 2503, Fine Arts – Visual 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 \_\_\_\_\_

38

**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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7

**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 3383, Principles and Practices in Electrical Engineering……………………………………………………………..…...……3

EE 3393, Probability and Random Signals ………………………………………………..………………… 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

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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 4743 Digital communications…………………………………………………………………………………………………..........3

Any upper level Computer Science course…………………………………………………………………………………………….3

**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 3383 Principles and Practices in Electrical Engineering 3

EE 3393 Probability and Random Signals 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 Laboratory 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 4743 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