### GENERAL REQUIREMENTS

<table>
<thead>
<tr>
<th>Minimum Retention/Graduation Grade Point Averages:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall - Combined and OU</td>
</tr>
<tr>
<td>Major - Combined and OU</td>
</tr>
<tr>
<td>Curriculum - Combined and OU</td>
</tr>
</tbody>
</table>

- Overall - Combined and OU: 2.00
- Major - Combined and OU: 2.00
- Curriculum - Combined and OU: 2.00

A minimum grade of C is required for each course in the curriculum.

### REQUIREMENTS FOR THE BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING

#### Accredited by the Engineering Accreditation Commission of ABET, [http://www.abet.org](http://www.abet.org)

##### THE UNIVERSITY OF OKLAHOMA

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#### For Students Entering the Oklahoma State System for Higher Education

Summer 2011 through Spring 2012

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#### Electrical Engineering

Bachelor of Science in Electrical Engineering

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#### Table: Bachelor of Science in Electrical Engineering Requirements

**First Semester**

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 1113, Prin. of English Composition (Core I)</td>
<td>3</td>
<td>ENGL 1213, Prin. of English Composition (Core I), or</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 1315, General Chemistry (Core II)</td>
<td>5</td>
<td>EXPO 1213, Expository Writing (Core I)</td>
<td>3</td>
</tr>
<tr>
<td>HIST 1483, U.S., 1492-1865, or 1493, U.S., 1865-Present (Core IV)</td>
<td>3</td>
<td>MATH 2423, Calculus &amp; Analytic Geometry II (Core I)</td>
<td>3</td>
</tr>
<tr>
<td>MATH 1823, Calculus &amp; Analytic Geometry I (Core I)</td>
<td>3</td>
<td>PHYS 2514, General Physics for Engineering &amp; Science Majors (Core II)</td>
<td>4</td>
</tr>
<tr>
<td>ENGR 1411, Freshman Engineering Experience</td>
<td>1</td>
<td>*C S 1313, Programming for Non-Majors</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credit Hours**: 15

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#### Second Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 2433, Calculus &amp; Analytic Geometry III</td>
<td>3</td>
<td>MATH 2443, Calculus &amp; Analytic Geometry IV</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 2524, General Physics for Engineering &amp; Science Majors</td>
<td>4</td>
<td>MATH 3113, Introduction to Ordinary Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>ECE 2214, Intro. to Digital Design</td>
<td>4</td>
<td>ENGR 2002, Professional Development</td>
<td>2</td>
</tr>
<tr>
<td>ECE 2713, Digital Signals and Filtering</td>
<td>3</td>
<td>ECE 2723, Electrical Circuits I</td>
<td>3</td>
</tr>
<tr>
<td>ECE 2773, Electrical Circuits Laboratory</td>
<td>3</td>
<td>I E 3293, Applied Engineering Statistics</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credit Hours**: 16

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#### Freshman Year

**Year**: 1

**Total Credit Hours**: 15

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#### Sophomore Year

**Year**: 2

**Total Credit Hours**: 14

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#### Junior Year

**Year**: 3

**Total Credit Hours**: 18

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#### Senior Year

**Year**: 4

**Total Credit Hours**: 15

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**NOTE**: Engineering transfer students may take ENGR 3511 in place of ENGR 1411.

Courses designated as Core I, II, III, IV, or Capstone are part of the General Education curriculum. Students must complete a minimum of 40 hours of General Education courses, chosen from the approved list.

- To be chosen from the University-Wide General Education Approved Course List. Three of these 12 hours must be upper-division (3000-4000). See list in the Class Schedule.
- In the College of Engineering, in order to progress in your curriculum, and as a specific graduation requirement, a grade of C or better is required in each course in the curriculum. Any course for which a grade of C or better is not earned must be repeated the next semester enrolled in which it is offered, if a student plans to use the course in their curriculum. Please refer to the General Catalog for additional enrollment limitations.
- Students must successfully complete prerequisite courses (with a minimum C grade) before proceeding to the next course.
- Two college-level courses in a single foreign language are required; this may be satisfied by successful completion of 2 years in a single foreign language in high school.
- Students who must take foreign language at the University will have an additional 6-10 hours of coursework.
- Electives to be selected from list available in the ECE Office, DEH-T50. Technical electives must satisfy Depth Requirement.
- This course fulfills the Computer Literacy Requirement for graduation as required by the Oklahoma State Regents for Higher Education.

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**Bachelor of Science in Electrical Engineering Requirements**

- Credit Hours: 125
- Major Credit Hours: 38
- General Education Credit Hours: 15
- Technical Electives: Depth Requirement
- Curriculum: Combined and OU
- Graduation Grade Point Average: Overall - Combined and OU: 2.00; Major - Combined and OU: 2.00; Curriculum - Combined and OU: 2.00

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**Notes**:

- Two college-level courses in a single foreign language are required; this may be satisfied by successful completion of 2 years in a single foreign language in high school.
- Students who must take foreign language at the University will have an additional 6-10 hours of coursework.
- Electives to be selected from list available in the ECE Office, DEH-T50. Technical electives must satisfy Depth Requirement.
- This course fulfills the Computer Literacy Requirement for graduation as required by the Oklahoma State Regents for Higher Education.
COURSES IN CHEMISTRY AND BIOCHEMISTRY (CHEM)

1315 General Chemistry. Prerequisite: Mathematics 1503 or 1643, or math ACT equal to or greater than 23. First of a two-semester sequence in general chemistry. Topics covered: basic measurement, gas laws and changes in state, stoichiometry, atomic theory, electron configuration, periodicity, bonding, molecular structure and thermochmistry. Laboratory (F, Sp, Su) [B-LAB]

COURSES IN COMPUTER SCIENCE (CS)

1313 Programming for Nonmajors. Prerequisite: 1523 or concurrent enrollment. Introduction to the design and implementation of computer programs. Emphasis on problem solving. (F, Sp)

2713 Digital Signals and Filtering. Prerequisites: ENGR 1411 or ENGR 3511 or concurrent enrollment; CS 1313 or CS 1323 or concurrent enrollment; and MATH 2423. Digital signals and filters, discrete Fourier and Z transforms, sampling. (F, Sp)

2723 Electrical Circuits I. Prerequisite: ECE 2713 or concurrent enrollment in ECE 2713, Mathematics 2423, Physics 2524. Introduction to circuit elements and the laws of electrical science: Loop and nodal analysis solution methods. Thevenin and Norton equivalent circuits. Superposition and source transformation methods. Guest lectures introducing advanced topics. (F, Sp)

†G113 Energy Conversion I. Prerequisite: 3613, and ECE 2723 or Engineering 2613. Survey of methods of energy conversion: field-energy force relationships, equations of motion, incremental motion transducers, transformer theory; introduction to rotating machines. (Sp)

3223 Microprocessor System Design. Prerequisite: 2214. Review of clocked sequential circuits; MSI/LSI devices and applications, including registers, busing, combinational functions; use of microprocessors and logic design using microprocessors. Emphasizes assembly of full functional units into workable systems. (F, Sp)

†G3323 Introduction to Solid State Electronic Devices. Prerequisite: 3613. Introduction to quantum mechanics, crystal properties and growth of semiconductors, energy bands in solids, charge carriers in semiconductors, excess carriers in semiconductors, and introduction to diodes and transistors. (F)

3613 Electromagnetic Fields I. Prerequisite: Mathematics 3113. Electrostatic and magnetostatic fields and sources, boundary conditions; introduction to Laplace’s and Poisson’s equations; quasi-stationary and time-varying fields; Maxwell’s equations and circuit concepts. (F)

†G3723 Electrical Circuits II. Prerequisites: ECE 2713, ECE 2723; and, Mathematics 3113 or concurrent enrollment in MATH 3113. Analysis of electrical circuits in both the time and the frequency domains. Continuation of AC circuit theory, use of two port network theorems, impulse response, convolution, and differential equations. Laplace and Fourier transform analysis of electrical circuits. (F, Sp)

3773 Electrical and Computer Engineering Circuits Laboratory. Prerequisite: 2214 and either 3723 or enrollment in 3723. Electrical laboratory procedures, circuit construction, debug and experimental confirmation of the principles of circuit theory. Introduction to use of laboratory instrumentation, including skills in the use of the oscilloscope in the evaluation of DC and AC circuits. Use and application of diodes, operational amplifiers and programmable logic devices. (F, Sp)

†G3793 Signals and Systems. Prerequisites: ECE 2713, ECE 2723, MATH 3113; and MATH 3333 or concurrent enrollment in MATH 3333. Linear systems; time domain analysis; frequency domain analysis; Fourier, Laplace and Z-transforms; introduction to communications and control. (F, Sp)

†G3813 Introductory Electronics. Prerequisites: ECE 2713, and ECE 2723; CHEM 1315; and MATH 2443 or concurrent enrollment in MATH 2443. Small and large signal characteristics and models of electronic devices; analysis and design of elementary electronic circuits. (F, Sp)

3873 Electrical and Computer Engineering Electronics Laboratory. Prerequisite: 3773, 3813, and Engineering 2002 or 2003. Electronic analog circuit design, simulation, construction, debugging and measurement of circuit performance quantities using advanced instrumentation techniques; circuit reliability theory; independent design skills development and technical writing. (F, Sp)

†G4273 Digital Design Laboratory. Prerequisites: ECE 3223 and ECE 3873. Design of digital systems with integrated circuits and MSI/LSI and microprocessor interfacing. Laboratory (F, Sp)

†G4773 Laboratory (Special Projects). Prerequisite: 4273 or enrollment in 4273. Individually supervised special engineering problems of experimental nature. Laboratory (F, Sp, VI)

COURSES IN ENGINEERING (ENGR)

1411 Freshman Engineering Experience. Prerequisite: declared major in Engineering or permission of instructor. Required of all entering freshmen with a declared Engineering major. Lecture hours cover a variety of topics including: majors and minors; career planning; advising; and extra-curricular activities. Students also work on multi-disciplinary engineering projects in smaller groups during the lab hour. (F)

2002 Professional Development. Prerequisite: sophomore standing. Develop an understanding of engineering ethics, teamwork, leadership, and professional responsibility through the concepts of contemporary, social, and global issues. (F, Sp)

COURSES IN INDUSTRIAL ENGINEERING (IE)

†G2933 Applied Engineering Statistics. Prerequisite: Mathematics 2433. Introduction to probability, one and higher dimensional random variables, function of random variables, expectation, discrete and continuous distributions, sampling and descriptive statistics, parameter estimation, use of statistical packages. Not available for graduate credit for students in engineering disciplines. (F, Sp, Su)

COURSES IN MATHEMATICS (MATH)

1823 Calculus and Analytic Geometry I. Prerequisite: 1523 at OU, or satisfactory score on the placement test, or, for incoming freshmen direct from high school, satisfactory score on the ACT/SAT. Topics covered include equations of straight lines; conic sections; functions, limits and continuity; differentiation; maximum-minimum theory and curve sketching. A student may not receive credit for this course and 2123. (F, Sp, Su) [I-M]

2423 Calculus and Analytic Geometry II. Prerequisite: 1823. Integration and its applications; the calculus of transcendental functions; techniques of integration; and the introduction to differential equations. A student may not receive credit for this course and 2123. (F, Sp, Su) [I-M]

2433 Calculus and Analytic Geometry III. Prerequisite: 2423. Polar coordinates, parametric equations, sequences, infinite series, vector analysis. (F, Sp, Su)

2443 Calculus and Analytic Geometry IV. Prerequisite: 2433. Vector calculus; functions of several variables; partial derivatives; gradients, extreme values and differentials of multivariate functions; multiple integrals; line and surface integrals. (F, Sp, Su)

†G3113 Introduction to Ordinary Differential Equations. Prerequisite: MATH 2423 or MATH 2924. Duplicates two hours of 3413. First order ordinary differential equations, linear differential equations with constant coefficients, two-by-two linear systems, Laplace transformations, phase planes and stability. (F, Sp, Su)

†G3333 Linear Algebra I. Prerequisite: MATH 2433 or MATH 2934 or permission of instructor. Systems of linear equations, determinants, finite dimensional vector spaces, linear transformations and matrices; characteristic values and vectors. (F, Sp, Su)

COURSES IN PHYSICS (PHYS)

2514 General Physics for Engineering and Science Majors. Prerequisite: Mathematics 1823 or Mathematics 1914 with grade of C or better. Not open to students with credit in 1205. Vectors, kinematics and dynamics of particles, work and energy systems of particles, rotational kinematics and dynamics, oscillations, gravitation, fluid mechanics, waves. (F, Sp, Su) [I-II-NL]

2524 General Physics for Engineering and Science Majors. Prerequisite: 2514 and Mathematics 2423. Not open to students with credit in 1215. Temperature, heat, thermodynamics, electricity, magnetism, optics. (F, Sp, Su)

†G2233 Modern Physics for Engineers. Prerequisite: Mathematics 3113 or equivalent. Relativity, atomic structure, nuclear theory, wave mechanics, statistical physics, solid state physics. (F)