# Requirements for the Bachelor of Science in Computer Engineering/Master of Science

**B.S. Portion of the Program Accredited by the Engineering Accreditation Commission of ABET, [http://www.abet.org](http://www.abet.org)**

## College of Engineering

**The University of Oklahoma**

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### General Requirements

- **Total Credit Hours**: 144-147*
- **Minimum Retention/Graduation Grade Point Averages**:
  - Overall - Combined and OU: 3.00
  - Major - Combined and OU: 3.00
  - Curriculum - Combined and OU: 3.00

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

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### Computer Engineering/Electrical & Computer Engineering —

**A226**

Bachelor of Science in Computer Engineering/Master of Science (Elec. & Comp. Engr.) **F226**

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### OU encourages students to complete at least 29-30 hours of applicable coursework each year to have the opportunity to graduate in five years.

<table>
<thead>
<tr>
<th>Year</th>
<th>FIRST SEMESTER</th>
<th>Hours</th>
<th>SECOND SEMESTER</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRESHMAN</td>
<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></td>
<td>CHEM 1315, General Chemistry</td>
<td>5</td>
<td>EXPO 1213, Expository Writing (Core I)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MATH 1823, Calculus &amp; Analytic Geometry I (Core I)</td>
<td>3</td>
<td>MATH 2423, Calculus &amp; Analytic Geometry II</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>HIST 1483, U.S., 1492-1865, or</td>
<td>3</td>
<td>PHYS 2514, General Physics for Engineering &amp; Science</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>ENGR 1411, Freshman Engineering Experience</td>
<td>1</td>
<td>Majors (Core II)</td>
<td>3</td>
</tr>
</tbody>
</table>

### TOTAL CREDIT HOURS

15

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### SOPHOMORE

<table>
<thead>
<tr>
<th>Year</th>
<th>MATH 2433, Calculus &amp; Analytic Geometry III</th>
<th>3</th>
<th>MATH 3113, Introductory to Ordinary Differential Equations</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PHYS 2524, General Physics for Engineering &amp; Science</td>
<td>4</td>
<td>C S 2413, Data Structures</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>C S 2334, Programming Structures &amp; Abstractions</td>
<td>4</td>
<td>C S 2813, Discrete Structures</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ECE 2214, Intro. to Digital Design</td>
<td>4</td>
<td>ECE 2723, Electrical Circuits I</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ECE 2713, Digital Signals and Filtering</td>
<td>3</td>
<td>ENGR 2002, Professional Development</td>
<td>2</td>
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</tbody>
</table>

### TOTAL CREDIT HOURS

18

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### JUNIOR

<table>
<thead>
<tr>
<th>Year</th>
<th>MATH 2443, Calculus &amp; Analytic Geometry IV</th>
<th>3</th>
<th>MATH 3333, Linear Algebra I</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ECE 3772, Electrical Circuits II</td>
<td>3</td>
<td>ECE 3223, Microprocessor System Design</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ECE 3773, ECE Circuits Laboratory</td>
<td>3</td>
<td>ECE 3793, Signals and Systems</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ECE 3813, Introductory Electronics</td>
<td>3</td>
<td>ECE 3873, ECE Electronics Laboratory</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>$\text{^t}[^{\dagger}]$ Professional Elective</td>
<td>3</td>
<td>$\text{^t}[^{\dagger}]$ Approved Elective, Core IV: Artistic Forms</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>$\text{^t}[^{\dagger}]$ Approved Elective, Core III: Social Science</td>
<td>3</td>
<td>$\text{^t}[^{\dagger}]$ Approved Elective, Core IV: Non-Western Culture</td>
<td>3</td>
</tr>
</tbody>
</table>

### TOTAL CREDIT HOURS

18

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### SENIOR

<table>
<thead>
<tr>
<th>Year</th>
<th>$\text{^t}[^{\dagger}]$ ECE G4000 or higher Elective</th>
<th>3</th>
<th>$\text{^t}[^{\dagger}]$ ECE G4000 or higher Elective</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\text{^t}[^{\dagger}]$ Approved Elective, Core IV: Western Civ. &amp; Culture</td>
<td>3</td>
<td>$\text{^t}[^{\dagger}]$ ECE/C S G4000-level Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>$\text{^t}[^{\dagger}]$ Approved Elective, Core IV: Non-Western Culture</td>
<td>3</td>
<td>$\text{^t}[^{\dagger}]$ Approved Elective, Core IV: Non-Western Culture</td>
<td>3</td>
</tr>
</tbody>
</table>

### TOTAL CREDIT HOURS

15

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**Students are eligible for graduate status upon graduation with the Bachelor of Science in Computer Engineering.**

<table>
<thead>
<tr>
<th>FIFTH YEAR</th>
<th>$\text{^t}[^{\dagger}]$ G4000/5000 Electives</th>
<th>6</th>
<th>$\text{^t}[^{\dagger}]$ 5000 or higher Electives, or</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ECE 5980, Research for Master’s Thesis, or</td>
<td>3</td>
<td>$\text{^t}[^{\dagger}]$ ECE 5000 or higher Electives</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>5000 or higher Elective</td>
<td>3</td>
<td>$\text{^t}[^{\dagger}]$ ECE 5000 or higher Electives</td>
<td>6</td>
</tr>
</tbody>
</table>

### TOTAL CREDIT HOURS

9

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*Note: Students may enter the accelerated program based on the undergraduate degree pattern offered in the year they first enrolled in the Oklahoma State System of Higher Education or later.

**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, 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-150. Technical electives must satisfy Depth Requirement.

* Fourth and fifth year electives (G4000 or higher, including technical electives for MS) must satisfy MSECE Approved Requirements.

* Thesis option requires nine hours; non-thesis requires 12 hours.

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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) [I-LAB]

COURSES IN COMPUTER SCIENCE (CS)
1322 Introduction to Computer Programming. Prerequisite: Mathematics 1523 or placement into 1743 or above, or MATH 1823 as a corequisite. Introduction to the design and implementation of software with an emphasis on abstraction and program organization. (F, Sp)
2334 Programming Structures and Abstractions. Prerequisite: 1323 and Mathematics 1523 or higher. Application of software engineering principles with examples from central areas of computer science. Use of abstract data types such as stacks, queues, lists, trees, file processing, introduction to ethics in computer science, including philosophical ethics theories. Discussion of intellectual property rights and privacy. A program design tool will be used. (F, Sp)
2413 Data Structures. Prerequisite: 2334 and MATH 1823 and 2013 or Mathematics 2513, or concurrent enrollment in 2813 or Mathematics 2513. Representation, analysis and implementation of widely used data structures and associated algorithms. Discussion of algorithms employing data structures with analysis. Written communications required in some projects. Discussion of ethical issues including computer crime, abuse, and hacker ethics. Tools and techniques used in writing secure applications will also be discussed. Windows operating system will be used. A debugging tool will be used. (F, Sp)
2813 Discrete Structures. Prerequisite: 2003 or Electrical and Computer Engineering 2213 or 2214. Introduction to the theory of discrete structures useful in computer science. Topics include combinatorics, relations, functions, computational complexity, recurrences, and graph theory. (F, Sp)

COURSES IN ELECTRICAL AND COMPUTER ENGINEERING (ECE)
2214 Digital Design. Prerequisite: Mathematics 2423. Number systems, Boolean algebra, minimization procedures, combinational logic functions, introduction to sequential logic design, finite state machines and clocked (synchronous) sequential circuits. Analysis, synthesis and implementation are appropriately emphasized. (F, Sp)
2713 Digital Signals and Filtering. Prerequisites: ENGR 1411 or ENGR 3511 or concurrent enrollment; CS 1313 or CS 3132 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)
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)
1G3721 Electrical Circuits II. Prerequisites: ECE 2713, ECE 2722; 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 of application of diodes, operational amplifiers and programmable logic devices. (F, Sp)
1G3793 Signals and Systems. Prerequisites: ECE 2713, ECE 2723, MATH 3113; and MATH 3133 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)
1G3813 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)
1G4273 Digital Design Laboratory. Prerequisites: ECE 3223 and ECE 3873. Design of digital systems with integrated circuits and MSI/LSI and microprocessor interlacing. Laboratory (F, Sp)
G4613 Computer Architecture (Crosslisted with Computer Science 4613). Prerequisite: 2223 or Computer Science 2613. Covers basic concepts of computer system design and communication between components, along with current and historical examples of computer architecture. (F, Sp)
1G4773 Laboratory (Special Projects). Prerequisite: 4273 or enrollment in 4273. Individually supervised special engineering problems of experimental nature. Laboratory (F, Sp)