ELECTRICAL ENGINEERING, B.S.

Electrical engineers design, develop, analyze, research, and manufacture systems such as those for power generation distribution, communication, control, and instrumentation. Electrical engineers are also concerned with the devices that make up these systems, such as transistors, integrated circuits, rotating machines, antennas, and fusion plasma confinement devices. Low-power, reliable integrated circuits allow dramatic improvements that have driven the revolution in communications and computation. High-power transistors in combination with electronic controls are serving as the foundation for new ways of efficiently utilizing electrical power.

ELECTRICAL ENGINEERING AND COMPUTER ENGINEERING PROGRAM EDUCATIONAL OBJECTIVES

Our graduates should be engaged in activities such as:

1. Employment in industry, government, academia, or nonprofit using their degree knowledge or skills for professional functions such as teaching, research and development, quality control, technical marketing, intellectual property management, or sales. Graduates may eventually reach a leadership position supervising others.
2. Continuing education through self-study or short courses and workshops through their employer, local or online educational institutions, or attendance at professional events such as conferences.
3. Taking a principal role in starting a new business or product line.
4. Pursuing a postgraduate degree.

HOW TO GET IN

ADMISSION TO THE COLLEGE AS A FRESHMAN

Students applying to UW–Madison (https://www.admissions.wisc.edu/apply/) need to indicate an engineering major (https://engineering.wisc.edu/degrees-programs/undergraduate/) as their first choice in order to be considered for direct admission to the College of Engineering. Direct admission to a major means students will start in the program of their choice in the College of Engineering and will need to meet progression requirements (https://engineering.wisc.edu/admissions/undergraduate/freshman/) at the end of the first year to guarantee advancement in that program.

CROSS-CAMPUS TRANSFER TO ENGINEERING

UW–Madison students in other schools and colleges on campus must meet minimum admission requirements (https://engineering.wisc.edu/admissions/undergraduate/cross-campus-students/) for admission consideration to engineering degree granting classifications. Cross-campus admission is competitive and selective, and the grade point average expectations may increase as demand trends change. The student’s overall academic record at UW–Madison is also considered. Students apply to their intended engineering program by submitting the online application by stated deadlines for spring and fall. The College of Engineering offers an online information tutorial and drop-in advising (https://engineering.wisc.edu/admissions/undergraduate/cross-campus-students/) for students to learn about the cross-campus transfer process.

OFF-CAMPUS TRANSFER TO ENGINEERING

With careful planning, students at other accredited institutions can transfer coursework that will apply toward engineering degree requirements at UW–Madison. Off-campus transfer applicants are considered for direct admission to the College of Engineering by applying to the Office of Admissions with an engineering major listed as their first choice. Those who are admitted to their intended engineering program must meet progression requirements (https://engineering.wisc.edu/admissions/undergraduate/transfer-from-off-campus/) at the point of transfer or within their first two semesters at UW–Madison to guarantee advancement in that program. A minimum of 30 credits in residence in the College of Engineering is required after transferring, and all students must meet all requirements for their major in the college. Transfer admission to the College of Engineering is competitive and selective, and students who have exceeded the 80 credit limit at the time of application are not eligible to apply.

The College of Engineering has dual degree programs with select four-year UW System campuses. Eligible dual degree applicants are not subject to the 80 credit limit.

Off-campus transfer students are encouraged to discuss their interests, academic background, and admission options with the Transfer Coordinator in the College of Engineering: ugtransfer@engr.wisc.edu or 608-262-2473.

SECOND BACHELOR’S DEGREE

The College of Engineering does not accept second undergraduate degree applications. Second degree students (https://engineering.wisc.edu/student-services/undergraduate-student-advising/) might explore the Biological Systems Engineering program at UW–Madison, an undergraduate engineering degree elsewhere, or a graduate program in the College of Engineering.

REQUIREMENTS

UNIVERSITY GENERAL EDUCATION REQUIREMENTS

All undergraduate students at the University of Wisconsin–Madison are required to fulfill a minimum set of common university general education requirements to ensure that every graduate acquires the essential core of an undergraduate education. This core establishes a foundation for living a productive life, being a citizen of the world, appreciating aesthetic values, and engaging in lifelong learning in a continually changing world. Various schools and colleges will have requirements in addition to the requirements listed below. Consult your advisor for assistance, as needed. For additional information, see the university Undergraduate General Education Requirements (http://guide.wisc.edu/undergraduate/#requirementsforundergraduatestudenttext) section of the Guide.
SUMMARY OF REQUIREMENTS

The following curriculum applies to students who were admitted to the electrical engineering degree program (classification changed to EE) in Fall 2017 or later.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math</td>
<td>Mathematics</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Science</td>
<td>17-18</td>
</tr>
<tr>
<td></td>
<td>Electrical Engineering Core</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>Electrical Engineering Advanced Electives</td>
<td>24</td>
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<td></td>
<td>Professional Electives</td>
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<td></td>
<td>Communication Skills</td>
<td>6</td>
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<td></td>
<td>Liberal Studies</td>
<td>15</td>
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<td>Total Credits</td>
<td>120-121</td>
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MATHEMATICS

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MATH 221</td>
<td>Calculus and Analytic Geometry 1</td>
<td>5</td>
</tr>
<tr>
<td>or MATH 217</td>
<td>Calculus with Algebra and Trigonometry II</td>
<td></td>
</tr>
<tr>
<td>or MATH 275</td>
<td>Topics in Calculus I</td>
<td></td>
</tr>
<tr>
<td>MATH 222</td>
<td>Calculus and Analytic Geometry 2</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 276</td>
<td>Topics in Calculus II</td>
<td></td>
</tr>
<tr>
<td>MATH 234</td>
<td>Calculus—Functions of Several Variables 2</td>
<td>4</td>
</tr>
<tr>
<td>Probability and Statistics Elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>STAT 311</td>
<td>Introduction to Theory and Methods of Mathematical Statistics</td>
<td>1</td>
</tr>
<tr>
<td>STAT/M E 424</td>
<td>Statistical Experimental Design</td>
<td></td>
</tr>
<tr>
<td>MATH/STAT 431</td>
<td>Introduction to the Theory of Probability</td>
<td></td>
</tr>
<tr>
<td>E C E 331</td>
<td>Introduction to Random Signal Analysis and Statistics</td>
<td>3</td>
</tr>
<tr>
<td>Total Credits</td>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>

In addition to the courses listed in the Mathematics Requirement at least one additional course must be completed for the advanced mathematics auxiliary condition. Choose: MATH 319 Techniques in Ordinary Differential Equations, MATH 320 Linear Algebra and Differential Equations, MATH 340 Elementary Matrix and Linear Algebra, MATH 341 Linear Algebra, E C E 334 State Space Systems Analysis, or E C E/COMP SCI/M E 532 Matrix Methods in Machine Learning to satisfy the advanced math auxiliary condition. These credits count toward either professional electives or advanced elective credit depending on the course.

In addition to the courses listed in the Mathematics Requirement at least one additional course must be completed for the advanced mathematics auxiliary condition. Choose: MATH 319 Techniques in Ordinary Differential Equations, MATH 320 Linear Algebra and Differential Equations, MATH 340 Elementary Matrix and Linear Algebra, MATH 341 Linear Algebra, E C E 334 State Space Systems Analysis, or E C E/COMP SCI/M E 532 Matrix Methods in Machine Learning to satisfy the advanced math auxiliary condition. These credits count toward either professional electives or advanced elective credit depending on the course.

Students may also fulfill this requirement by taking E M A 201 Statics and E M A 202 Dynamics or E M A 201 Statics and M E 240 Dynamics.

ELECTRICAL ENGINEERING CORE

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>E C E 203</td>
<td>Signals, Information, and Computation</td>
<td>3</td>
</tr>
<tr>
<td>E C E 210</td>
<td>Introductory Experience in Electrical Engineering</td>
<td>2</td>
</tr>
<tr>
<td>E C E 219</td>
<td>Analytical Methods for Electromagnetics Engineering</td>
<td>2</td>
</tr>
<tr>
<td>E C E 220</td>
<td>Electrodynamics I</td>
<td>3</td>
</tr>
<tr>
<td>E C E 230</td>
<td>Circuit Analysis</td>
<td>4</td>
</tr>
<tr>
<td>E C E/PHYSICS 235</td>
<td>Introduction to Solid State Electronics</td>
<td>3</td>
</tr>
<tr>
<td>E C E/COMP SCI 252</td>
<td>Introduction to Computer Engineering</td>
<td>3</td>
</tr>
<tr>
<td>E C E 270</td>
<td>Circuits Laboratory I</td>
<td>1</td>
</tr>
<tr>
<td>E C E 271</td>
<td>Circuits Laboratory II</td>
<td>1</td>
</tr>
<tr>
<td>E C E 330</td>
<td>Signals and Systems</td>
<td>3</td>
</tr>
<tr>
<td>E C E 340</td>
<td>Electronic Circuits I</td>
<td>3</td>
</tr>
<tr>
<td>E C E/COMP SCI 352</td>
<td>Digital System Fundamentals</td>
<td>3</td>
</tr>
</tbody>
</table>
E C E 370  Advanced Laboratory  2

Total Credits  33

**ELECTRICAL ENGINEERING ADVANCED ELECTIVES**

Students must take 22 credits in at least three of six areas and at least 2 credits in two laboratory courses.

- At least 9 credits must be in courses numbered 400 and above.
- At least one course must be a capstone design course.
- Students can count 1 credit of E C E 1 Cooperative Education Program toward advanced electives.
- Students can count up to 6 credits of E C E 399 Independent Study, E C E 489 Honors in Research or E C E 699 Advanced Independent Study towards advanced electives.
- Students can take E C E 379 Special Topics in Electrical and Computer Engineering and E C E 601 Special Topics in Electrical and Computer Engineering as advanced electives.

**Laboratory**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>E C E 301</td>
<td>DNA Microarray Techniques in Optical Microscopy</td>
<td>3</td>
</tr>
<tr>
<td>E C E 302</td>
<td>DNA Microarray Techniques in Optical Microscopy</td>
<td>3</td>
</tr>
<tr>
<td>E C E 303</td>
<td>Introduction to Real-Time Digital Signal Processing</td>
<td>3</td>
</tr>
<tr>
<td>E C E 304</td>
<td>Electric Machines Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>E C E 305</td>
<td>Semiconductor Properties Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>E C E 306</td>
<td>Linear Active Circuits Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>E C E 308</td>
<td>Nonlinear Electronic Circuits Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>E C E 313</td>
<td>Optoelectronics Lab</td>
<td>3</td>
</tr>
<tr>
<td>E C E 315</td>
<td>Introductory Microprocessor Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>E C E 317</td>
<td>Sensors Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>E C E 320</td>
<td>Feedback Control Systems</td>
<td>3</td>
</tr>
<tr>
<td>E C E 321</td>
<td>State Space Systems Analysis</td>
<td>3</td>
</tr>
<tr>
<td>E C E 322</td>
<td>Introduction to Robotics</td>
<td>3</td>
</tr>
<tr>
<td>E C E 323</td>
<td>Automatic Controls Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>E C E 324</td>
<td>Lasers</td>
<td>3</td>
</tr>
<tr>
<td>E C E 325</td>
<td>Advanced Communications Circuit Design</td>
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**Fields & Waves**

<table>
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<tr>
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<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>E C E 310</td>
<td>Electrodynamics II</td>
<td>3</td>
</tr>
<tr>
<td>E C E 311</td>
<td>Electromagnetic Wave Transmission</td>
<td>3</td>
</tr>
<tr>
<td>E C E 312</td>
<td>Photonicics</td>
<td>3</td>
</tr>
<tr>
<td>E C E 313</td>
<td>Plasma Confinement and Heating</td>
<td>3</td>
</tr>
<tr>
<td>E C E 314</td>
<td>Plasma Processing and Technology</td>
<td>3</td>
</tr>
<tr>
<td>E C E 315</td>
<td>Integrated Optics and Optoelectronics</td>
<td>3</td>
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</table>

**Systems & Control**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>E C E 316</td>
<td>Feedback Control Systems</td>
<td>3</td>
</tr>
<tr>
<td>E C E 317</td>
<td>State Space Systems Analysis</td>
<td>3</td>
</tr>
<tr>
<td>E C E 318</td>
<td>Introduction to Robotics</td>
<td>3</td>
</tr>
<tr>
<td>E C E 319</td>
<td>Automatic Controls Laboratory</td>
<td>3</td>
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</table>

**Power & Machines**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>E C E 320</td>
<td>Electromechanical Energy Conversion</td>
<td>3</td>
</tr>
<tr>
<td>E C E 321</td>
<td>Electric Power Processing for Alternative Energy Systems</td>
<td>3</td>
</tr>
<tr>
<td>E C E 322</td>
<td>Introduction to Electric Drive Systems</td>
<td>3</td>
</tr>
<tr>
<td>E C E 323</td>
<td>Power Electronic Circuits</td>
<td>3</td>
</tr>
<tr>
<td>E C E 324</td>
<td>Electric Power Systems</td>
<td>3</td>
</tr>
<tr>
<td>E C E 325</td>
<td>Electric Machine &amp; Drive System Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>E C E 326</td>
<td>Theory and Control of Synchronous Machines</td>
<td>3</td>
</tr>
<tr>
<td>E C E 327</td>
<td>Power Electronics Laboratory</td>
<td>3</td>
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</table>

Designated as a capstone course. Students can also take E C E 491 Senior Design Project for capstone credit.
Communications & Signal Processing

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ECE 331</td>
<td>Introduction to Random Signal Analysis and Statistics</td>
<td>3</td>
</tr>
<tr>
<td>ECE 401</td>
<td>Electro-Acoustical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>ECE 431</td>
<td>Digital Signal Processing ¹</td>
<td>3</td>
</tr>
<tr>
<td>ECE 432</td>
<td>Digital Signal Processing Laboratory ¹</td>
<td>3</td>
</tr>
<tr>
<td>ECE/COMP SCI/</td>
<td>Introduction to Cryptography</td>
<td>3</td>
</tr>
<tr>
<td>MATH 435</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECE 436</td>
<td>Communication Systems I ¹</td>
<td>3</td>
</tr>
<tr>
<td>ECE 437</td>
<td>Communication Systems II ¹</td>
<td>3</td>
</tr>
<tr>
<td>ECE 447</td>
<td>Applied Communications Systems ¹</td>
<td>3</td>
</tr>
<tr>
<td>ECE/COMP SCI/</td>
<td>Matrix Methods in Machine Learning</td>
<td>3</td>
</tr>
<tr>
<td>ME 532</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECE/COMP SCI/</td>
<td>Image Processing ¹</td>
<td>3</td>
</tr>
<tr>
<td>533</td>
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<tr>
<td>ECE/COMP SCI/</td>
<td>Communication Networks ¹</td>
<td>3</td>
</tr>
<tr>
<td>ME 537</td>
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<tr>
<td>ECE/COMP SCI/</td>
<td>Introduction to Artificial Neural Networks ¹</td>
<td>3</td>
</tr>
<tr>
<td>ME 539</td>
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<tr>
<td>ECE/MATH 641</td>
<td>Introduction to Error-Correcting Codes</td>
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Circuits & Devices

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<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>ECE 335</td>
<td>Microelectronic Devices</td>
<td>3</td>
</tr>
<tr>
<td>ECE 342</td>
<td>Electronic Circuits II</td>
<td>3</td>
</tr>
<tr>
<td>ECE 445</td>
<td>Semiconductor Physics and Devices</td>
<td>3</td>
</tr>
<tr>
<td>ECE/B ME 462</td>
<td>Medical Instrumentation ¹</td>
<td>3</td>
</tr>
<tr>
<td>ECE 466</td>
<td>Electronics of Solids</td>
<td>3</td>
</tr>
<tr>
<td>ECE 541</td>
<td>Analog MOS Integrated Circuit Design ¹</td>
<td>3</td>
</tr>
<tr>
<td>ECE 542</td>
<td>Introduction to Microelectromechanical Systems ¹</td>
<td>3</td>
</tr>
<tr>
<td>ECE 545</td>
<td>Advanced Microwave Measurements for Communications ¹</td>
<td>3</td>
</tr>
<tr>
<td>ECE 548</td>
<td>Integrated Circuit Design ¹</td>
<td>3</td>
</tr>
<tr>
<td>ECE 549</td>
<td>Integrated Circuit Fabrication Laboratory ¹</td>
<td>3</td>
</tr>
<tr>
<td>ECE 555</td>
<td>Digital Circuits and Components ¹</td>
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</tbody>
</table>

Computers & Computing

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ECE 353</td>
<td>Introduction to Microprocessor Systems</td>
<td>3</td>
</tr>
<tr>
<td>ECE 453</td>
<td>Embedded Microprocessor System Design ¹</td>
<td>4</td>
</tr>
<tr>
<td>ECE 454</td>
<td>Mobile Computing Laboratory ¹</td>
<td>4</td>
</tr>
<tr>
<td>ECE/B ME 463</td>
<td>Computers in Medicine</td>
<td>3</td>
</tr>
<tr>
<td>ECE 551</td>
<td>Digital System Design and Synthesis ¹</td>
<td>3</td>
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<tr>
<td>ECE/COMP SCI/</td>
<td>Introduction to Computer Architecture</td>
<td>3</td>
</tr>
<tr>
<td>552</td>
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<td></td>
</tr>
<tr>
<td>ECE 553</td>
<td>Testing and Testable Design of Digital Systems ¹</td>
<td>3</td>
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<tr>
<td>ECE 554</td>
<td>Digital Engineering Laboratory ¹</td>
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</tr>
<tr>
<td>ECE 556</td>
<td>Design Automation of Digital Systems ¹</td>
<td>3</td>
</tr>
</tbody>
</table>

Professional Electives

Classes to be taken in an area of professional interest. The following courses are acceptable as professional electives if the courses are not used to meet any other degree requirements.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MATH/COMP SCI 240</td>
<td>Introduction to Discrete Mathematics</td>
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</tr>
<tr>
<td>ECE 204</td>
<td>Data Science &amp; Engineering</td>
<td></td>
</tr>
<tr>
<td>ECE 320</td>
<td>Electrodyamics II</td>
<td></td>
</tr>
<tr>
<td>ECE 331</td>
<td>Introduction to Random Signal Analysis and Statistics</td>
<td></td>
</tr>
<tr>
<td>ECE 332</td>
<td>Feedback Control Systems</td>
<td></td>
</tr>
<tr>
<td>ECE 334</td>
<td>State Space Systems Analysis</td>
<td></td>
</tr>
<tr>
<td>ECE 335</td>
<td>Microelectronic Devices</td>
<td></td>
</tr>
<tr>
<td>ECE 342</td>
<td>Electronic Circuits II</td>
<td></td>
</tr>
<tr>
<td>ECE 353</td>
<td>Introduction to Microprocessor Systems</td>
<td></td>
</tr>
<tr>
<td>ECE/COMP SCI 354</td>
<td>Machine Organization and Programming</td>
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</tr>
<tr>
<td>ECE 355</td>
<td>Electromechanical Energy Conversion</td>
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</tr>
<tr>
<td>ECE 356</td>
<td>Electric Power Processing for Alternative Energy Systems</td>
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</tr>
<tr>
<td>ECE courses numbered 399 and higher</td>
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</tr>
<tr>
<td>COMP SCI courses numbered 400 and higher</td>
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</tr>
<tr>
<td>MATH 319</td>
<td>Techniques in Ordinary Differential Equations</td>
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<tr>
<td>MATH 320</td>
<td>Linear Algebra and Differential Equations ¹</td>
<td></td>
</tr>
<tr>
<td>MATH 321</td>
<td>Applied Mathematical Analysis</td>
<td></td>
</tr>
<tr>
<td>MATH 322</td>
<td>Applied Mathematical Analysis</td>
<td></td>
</tr>
<tr>
<td>MATH 340</td>
<td>Elementary Matrix and Linear Algebra ¹</td>
<td></td>
</tr>
</tbody>
</table>
MATH 341 Linear Algebra

MATH courses numbered 400 and higher

STATS courses numbered 400 and higher

Any biological science course that is designated as intermediate or advanced

Any physical science course that is designated as intermediate or advanced (except PHYSICS 241)

Any natural science course that is designated as advanced except that Math, Computer Sciences, and Statistics courses must follow the above criteria

Engineering courses numbered 300 and higher that are not E C E or cross-listed with E C E

Up to six credits of Professional Electives can be taken from School of Business classes numbered 300 and higher.

DS 501 Special Topics (Wearable Technologies)

DANCE 560 Current Topics in Dance: Workshop (Making Digital Lighting Controls)

Students may only earn degree credit for MATH 320 Linear Algebra and Differential Equations or MATH 340 Elementary Matrix and Linear Algebra, not both.

**COMMUNICATION SKILLS**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 100</td>
<td>Introduction to College Composition</td>
<td>3</td>
</tr>
<tr>
<td>or LSC 100</td>
<td>Science and Storytelling</td>
<td></td>
</tr>
<tr>
<td>or COM ARTS 100</td>
<td>Introduction to Speech Composition</td>
<td></td>
</tr>
<tr>
<td>or COM ARTS 181</td>
<td>Elements of Speech-Honors Course</td>
<td></td>
</tr>
<tr>
<td>or ESL 118</td>
<td>Academic Writing II</td>
<td></td>
</tr>
<tr>
<td>INTEREGR 397</td>
<td>Engineering Communication (was EPD 397 before Fall 2020)</td>
<td>3</td>
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</tbody>
</table>

Total Credits 6

**LIBERAL STUDIES ELECTIVES**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>College of Engineering Liberal Studies Requirements</td>
<td>Complete requirements (<a href="http://guide.wisc.edu/undergraduate/engineering/#requirementstext">http://guide.wisc.edu/undergraduate/engineering/#requirementstext</a>)</td>
<td>15</td>
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</tbody>
</table>

Total Credits 15

1 All liberal studies credits must be identified with the letter H, S, L, or Z. Language courses are acceptable without the letter and are considered humanities. **Note:** See an E C E advisor and/or the EE Curriculum Guide for additional information.

**HONORS IN UNDERGRADUATE RESEARCH PROGRAM**

Qualified undergraduates may earn an Honors in Research designation on their transcript and diploma by completing 8 credits of undergraduate honors research, including a senior thesis. Further information is available in the department office.

**NAMED OPTION**

View as listView as grid


**TOTAL DEGREE CREDITS: 120**

**UNIVERSITY DEGREE REQUIREMENTS**

- **Total Degree** To receive a bachelor’s degree from UW–Madison, students must earn a minimum of 120 degree credits. The requirements for some programs may exceed 120 degree credits. Students should consult with their college or department advisor for information on specific credit requirements.

- **Residency** Degree candidates are required to earn a minimum of 30 credits in residence at UW–Madison. "In residence" means on the UW–Madison campus with an undergraduate degree classification. "In residence" credit also includes UW–Madison courses offered in distance or online formats and credits earned in UW–Madison Study Abroad/Study Away programs.

- **Quality of Work** Undergraduate students must maintain the minimum grade point average specified by the school, college, or academic program to remain in good academic standing. Students whose academic performance drops below these minimum thresholds will be placed on academic probation.

**LEARNING OUTCOMES**

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.
### FOUR-YEAR PLAN

#### SAMPLE FOUR-YEAR PLAN

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 221</td>
<td>5</td>
<td>E C E/COMP SCI 252</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 103, 104, or 109</td>
<td>4-5</td>
<td>PHYSICS 201</td>
<td>5</td>
</tr>
<tr>
<td>E C E 210</td>
<td>2</td>
<td>MATH 222</td>
<td>4</td>
</tr>
<tr>
<td>or Communication A</td>
<td>Communication A or Communication A or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liberal Studies Elective</td>
<td>3</td>
<td>E C E 210</td>
<td></td>
</tr>
<tr>
<td></td>
<td>14-15</td>
<td></td>
<td>15</td>
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</table>

**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYSICS 202</td>
<td>5</td>
<td>E C E 219</td>
<td>2</td>
</tr>
<tr>
<td>MATH 234</td>
<td>4</td>
<td>COMP SCI 300</td>
<td>3</td>
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<tr>
<td>E C E 203</td>
<td>3</td>
<td>E C E 230</td>
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</tr>
<tr>
<td>Liberal Studies Elective</td>
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<td>E C E 270</td>
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<tr>
<td></td>
<td></td>
<td>E C E 330</td>
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</tr>
<tr>
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</table>

**Third Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>E C E/PHYSICS 235</td>
<td>3</td>
<td>ECE Advanced Elective</td>
<td>3</td>
</tr>
<tr>
<td>Statistics/Probability Elective</td>
<td>3</td>
<td>ECE Advanced Elective</td>
<td>3</td>
</tr>
<tr>
<td>E C E 340</td>
<td>3</td>
<td>INTEREGR 397 (was EPD 397)</td>
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</tr>
<tr>
<td>E C E 271</td>
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<td>EE Advanced Lab (3XX)</td>
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</tr>
<tr>
<td>E C E/COMP SCI 352</td>
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<td>Liberal Studies Elective</td>
<td>3</td>
</tr>
<tr>
<td>E C E 220</td>
<td>3</td>
<td>Professional Elective (Adv Math)</td>
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</tr>
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</tbody>
</table>

**Fourth Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Liberal Studies Elective</td>
<td>3</td>
<td>Professional Elective</td>
<td>3</td>
</tr>
<tr>
<td>ECE Advanced Elective</td>
<td>3</td>
<td>ECE Advanced Elective (4XX)</td>
<td>3</td>
</tr>
<tr>
<td>ECE Advanced Elective</td>
<td>4</td>
<td>ECE Advanced Elective (4XX)</td>
<td>3</td>
</tr>
<tr>
<td>EE Advanced Lab (3XX)</td>
<td>1</td>
<td>ECE Capstone Design</td>
<td>3</td>
</tr>
<tr>
<td>E C E 370</td>
<td>2</td>
<td>Liberal Studies Elective</td>
<td>3</td>
</tr>
<tr>
<td>Professional Elective</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>16</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

**Total Credits 120-121**

### ADVISING AND CAREERS

#### ADVISING

Each College of Engineering program has academic advisors dedicated to serving its students. Program advisors can help current College of Engineering students with questions about accessing courses, navigating degree requirements, resolving academic issues and more. Students can find their assigned advisor on the homepage of their student center.

### ENGINEERING CAREER SERVICES

Engineering Career Services (ECS) assists students in identifying pre-professional work-based learning experiences such as co-ops and summer internships, considering and applying to graduate or professional school, and finding full-time professional employment during their graduation year.

ECS offers two major career fairs per year, assists with resume writing and interviewing skills, hosts workshops on the job search, and meets one-on-one with students to discuss offer negotiations.

Students are encouraged to utilize the ECS office early in their academic careers. For comprehensive information on ECS programs and workshops, see the ECS website or call 608-262-3471.

### PEOPLE

#### PROFESSORS

Susan Hagness (Chair)

David T. Anderson

Nader Behdad

John Booske

Dan Botez

Azadeh Davoodi

John A. Gubner (Associate Chair for Operations)

Yu Hen Hu

Hongrui Jiang (Associate Chair for Graduate Studies)

Irena Knezevic

Bernard Lesieutre (Associate Chair for Undergraduate Studies)

Mikko Lipasti

Zhenqiang Ma

Luke J. Mawst

Robert Nowak

Parameswaran Ramanathan

Bulent Sarlioglu

William A. Sethares

Daniel van der Weide

Barry Van Veen

Giri Venkataramanan

Amy E. Wendt

#### ASSOCIATE PROFESSORS

Steven Fredette

Mikhail Kats

Daniel Ludois

Paul H. Milenkovic

Umit Ogras

Dimitris Papailiopoulos

Andreas Velten

Zongfu Yu

#### ASSISTANT PROFESSORS

Joseph Andrews

Kassem Fawaz

Dominic Gross

Chirag Gupta

Robert Jacobberger

Younghyun Kim
Bhuvana Krishnaswamy
Kangwook Lee
Chu Ma
Pedro Morgado
Shubhra Pasayat
Line Roald
Joshua San Miguel
Eric Severson
Eric Tervo
Ramya Korlakai Vinayak
Ying Wang

TEACHING FACULTY
Mark C. Allie
Eduardo Arvelo
Setareh Behroozi
Eric Hoffman
Joe Krachey
Srđjan Milicic

See also Electrical and Computer Engineering Faculty Directory (https://directory.engr.wisc.edu/ece/faculty/).

ACCREDITATION

Accreditation.


Note: Undergraduate Program Educational Objectives and Student Outcomes are made publicly available at the Departmental website. (In this Guide, the program’s Student Outcomes are designated by our campus as “Learning Outcomes.”)