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/#requirementsforundergraduatetystudtext) section of the Guide.

General Education

- Breadth—Humanities/Literature/Arts: 6 credits
- Breadth—Natural Science: 4 to 6 credits, consisting of one 4- or 5-credit course with a laboratory component; or two courses providing a total of 6 credits
- Breadth—Social Studies: 3 credits
- Communication Part A & Part B *
- Ethnic Studies *
- Quantitative Reasoning Part A & Part B *

* The mortarboard symbol appears before the title of any course that fulfills one of the Communication Part A or Part B, Ethnic Studies, or Quantitative Reasoning Part A or Part B requirements.

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>
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<tbody>
<tr>
<td>Mathematics</td>
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<td>Science</td>
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<td>Electrical Engineering Core</td>
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<td>Electrical Engineering Advanced Electives</td>
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MATHEMATICS

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<tr>
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<tr>
<td>MATH 221</td>
<td>Calculus and Analytic Geometry 1</td>
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<tr>
<td>or MATH 217</td>
<td>Calculus with Algebra and Trigonometry II</td>
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<tr>
<td>or MATH 275</td>
<td>Topics in Calculus I</td>
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ELECTRICAL ENGINEERING CORE

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

1 MATH 375 and MATH 376 taken in sequence will fulfill the requirement for MATH 234.
**Electrical Engineering, B.S.**

**ECE 370 Advanced Laboratory**

**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 ECE 1 Cooperative Education Program toward advanced electives.
- Students can count up to 6 credits of ECE 399 Independent Study, ECE 489 Honors in Research or ECE 699 Advanced Independent Study towards advanced electives.
- Students can take ECE 379 Special Topics in Electrical and Computer Engineering and ECE 601 Special Topics in Electrical and Computer Engineering as advanced electives.

**Laboratory**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>ECE 303</td>
<td>Introduction to Real-Time Digital Signal Processing</td>
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<td>ECE 304</td>
<td>Electric Machines Laboratory</td>
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<tr>
<td>ECE 305</td>
<td>Semiconductor Properties Laboratory</td>
<td></td>
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<tr>
<td>ECE 306</td>
<td>Linear Active Circuits Laboratory</td>
<td></td>
</tr>
<tr>
<td>ECE 308</td>
<td>Nonlinear Electronic Circuits Laboratory</td>
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</tr>
<tr>
<td>ECE 313</td>
<td>Optoelectronics Lab</td>
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<tr>
<td>ECE 315</td>
<td>Introductory Microprocessor Laboratory</td>
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<td>ECE 317</td>
<td>Sensors Laboratory</td>
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<td>ECE 432</td>
<td>Digital Signal Processing Laboratory</td>
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<td>ECE 453</td>
<td>Embedded Microprocessor System Design</td>
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<tr>
<td>ECE/BME 462</td>
<td>Medical Instrumentation 1</td>
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</tr>
<tr>
<td>ECE 504</td>
<td>Electric Machine &amp; Drive System Laboratory</td>
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<tr>
<td>ECE 512</td>
<td>Power Electronics Laboratory</td>
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<tr>
<td>ECE 545</td>
<td>Advanced Microwave Measurements for Communications</td>
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<td>ECE 549</td>
<td>Integrated Circuit Fabrication Laboratory</td>
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<tr>
<td>ECE 554</td>
<td>Digital Engineering Laboratory</td>
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<td>ECE/M E 577</td>
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**Fields & Waves**

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<thead>
<tr>
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<tr>
<td>ECE 320</td>
<td>Electrodynamics II</td>
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<tr>
<td>ECE 420</td>
<td>Electromagnetic Wave Transmission</td>
<td>3</td>
</tr>
<tr>
<td>ECE 434</td>
<td>Photonics</td>
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**Communications & Signal Processing**

<table>
<thead>
<tr>
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<th>Title</th>
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<td>ECE 401</td>
<td>Electro-Acoustical Engineering</td>
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<tr>
<td>ECE 431</td>
<td>Digital Signal Processing 1</td>
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<td>ECE 432</td>
<td>Digital Signal Processing Laboratory 1</td>
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<td>ECE/COMP SCI/MATH 435</td>
<td>Introduction to Cryptography</td>
<td>3</td>
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<tr>
<td>ECE 436</td>
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<td>Communication Systems II</td>
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<td>ECE 447</td>
<td>Applied Communications Systems 1</td>
<td>3</td>
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<tr>
<td>ECE/COMP SCI/M E 532</td>
<td>Matrix Methods in Machine Learning 1</td>
<td>3</td>
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<td>ECE/COMP SCI 533</td>
<td>Image Processing 1</td>
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<td>ECE 537</td>
<td>Communication Networks 1</td>
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<td>ECE/COMP SCI/M E 539</td>
<td>Introduction to Artificial Neural Networks 1</td>
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<td>ECE/MATH 641</td>
<td>Introduction to Error-Correcting Codes</td>
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**Systems & Control**

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>ECE 332</td>
<td>Feedback Control Systems</td>
<td>3</td>
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<tr>
<td>ECE 334</td>
<td>State Space Systems Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ECE/M E 439</td>
<td>Introduction to Robotics 1</td>
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<td>ECE/M E 577</td>
<td>Automatic Controls Laboratory 1</td>
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**Power & Machines**

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<tr>
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<td>Electromechanical Energy Conversion</td>
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<tr>
<td>ECE 356</td>
<td>Electric Power Processing for Alternative Energy Systems</td>
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<tr>
<td>ECE 411</td>
<td>Introduction to Electric Drive Systems</td>
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<tr>
<td>ECE 412</td>
<td>Power Electronic Circuits 1</td>
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<td>ECE 427</td>
<td>Electric Power Systems</td>
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<td>ECE 504</td>
<td>Electric Machine &amp; Drive System Laboratory</td>
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<tr>
<td>ECE 511</td>
<td>Theory and Control of Synchronous Machines</td>
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<tr>
<td>ECE 512</td>
<td>Power Electronics Laboratory 1</td>
<td>3</td>
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**Electrical Engineering, B.S.**

**ECE 370 Advanced Laboratory**

**Total Credits** 33

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<td>ECE 545</td>
<td>Advanced Microwave Measurements for Communications</td>
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**Fields & Waves**

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**Communications & Signal Processing**

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<tr>
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<td>Electro-Acoustical Engineering</td>
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<td>ECE 432</td>
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<td>ECE/COMP SCI/M E 539</td>
<td>Introduction to Artificial Neural Networks 1</td>
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### Circuits & Devices

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<tbody>
<tr>
<td>ECE 335</td>
<td>Microelectronic Devices</td>
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<tr>
<td>ECE 342</td>
<td>Electronic Circuits II</td>
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<tr>
<td>ECE 445</td>
<td>Semiconductor Physics and Devices</td>
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<td>ECE/BME 462</td>
<td>Medical Instrumentation (^1)</td>
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<td>ECE 466</td>
<td>Electronics of Solids</td>
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<tr>
<td>ECE 541</td>
<td>Analog MOS Integrated Circuit Design (^1)</td>
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<td>ECE 542</td>
<td>Introduction to Microelectromechanical Systems (^1)</td>
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<td>ECE 545</td>
<td>Advanced Microwave Measurements for Communications (^1)</td>
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<td>ECE 548</td>
<td>Integrated Circuit Design (^1)</td>
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<td>ECE 549</td>
<td>Integrated Circuit Fabrication Laboratory (^1)</td>
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<td>ECE 555</td>
<td>Digital Circuits and Components (^1)</td>
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### Computers & Computing

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<tr>
<td>ECE 353</td>
<td>Introduction to Microprocessor Systems</td>
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<tr>
<td>ECE 453</td>
<td>Embedded Microprocessor System Design (^1)</td>
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<td>ECE 454</td>
<td>Mobile Computing Laboratory (^1)</td>
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<tr>
<td>ECE/BME 463</td>
<td>Computers in Medicine</td>
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<td>ECE 551</td>
<td>Digital System Design and Synthesis (^1)</td>
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<td>ECE/COMPSCI 552</td>
<td>Introduction to Computer Architecture</td>
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<td>ECE 553</td>
<td>Testing and Testable Design of Digital Systems (^1)</td>
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<td>ECE 554</td>
<td>Digital Engineering Laboratory (^1)</td>
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<tr>
<td>ECE 556</td>
<td>Design Automation of Digital Systems (^1)</td>
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</table>

\(^1\) Designated as a capstone course. Students can also take ECE 491 Senior Design Project for capstone credit.

### 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.

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<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>MATH/COMPSCI 240</td>
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<td>ECE 204</td>
<td>Data Science &amp; Engineering</td>
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<tr>
<td>ECE 320</td>
<td>Electrodynamics II</td>
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<tr>
<td>ECE 331</td>
<td>Introduction to Random Signal Analysis and Statistics</td>
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<tr>
<td>ECE 332</td>
<td>Feedback Control Systems</td>
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<tr>
<td>ECE 334</td>
<td>State Space Systems Analysis</td>
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<tr>
<td>ECE 335</td>
<td>Microelectronic Devices</td>
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</tbody>
</table>

ECE courses numbered 399 and higher

COMP SCI courses numbered 400 and higher

MATH 319 | Techniques in Ordinary Differential Equations |
MATH 320 | Linear Algebra and Differential Equations \(^1\) |
MATH 321 | Applied Mathematical Analysis |
MATH 322 | Applied Mathematical Analysis |
MATH 340 | Elementary Matrix and Linear Algebra \(^1\) |
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 ECE or cross-listed with ECE

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) |

\(^1\) 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>
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<tr>
<td>ENGL 100</td>
<td>Introduction to College Composition</td>
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<tr>
<td>or LSC 100</td>
<td>Science and Storytelling</td>
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<td>or COM ARTS 100</td>
<td>Introduction to Speech Composition</td>
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<td>or COM ARTS 181</td>
<td>Elements of Speech-Honors Course</td>
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<td>or ESL 118</td>
<td>Academic Writing II</td>
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<tr>
<td>INTEREGR 397</td>
<td>Engineering Communication (was EPD 397 before Fall 2020)</td>
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Total Credits 6
LIBERAL STUDIES ELECTIVES

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<tr>
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<td>College of Engineering Liberal Studies Requirements</td>
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</table>

College of Engineering Liberal Studies Requirements

Complete requirements (http://guide.wisc.edu/undergraduate/engineering/#requirementstext) 1 15

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 ECE advisor and/or the EE Curriculum Guide for additional information.

NAMED OPTION

View as list


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.