COMPUTER ENGINEERING, BS

REQUIREMENTS

UNIVERSITY REQUIREMENTS

All undergraduate students must complete both the following Core General Education (Core GenEd) and University Degree and Quality of Work requirements. The requirements below apply to students whose first term at UW-Madison or whose earliest post-high school college attendance at any institution is Summer 2026 or later.

Students whose first term at UW-Madison or whose earliest post-high school college attendance at any institution occurred before Summer 2026 should refer to the archived Guide (https://guide.wisc.edu/archive/) for the requirements that apply to them.

CORE GENERAL EDUCATION (CORE GENED) REQUIREMENTS

Civics & Perspectives	3 credits of Civics & Perspectives coursework.
Communicatio & Literacy	6 credits of Communication & Literacy coursework. This requirement may be partially satisfied by a qualifying placement test score. More information: https://go.wisc.edu/qualifyingenglishplacement (https://go.wisc.edu/qualifyingenglishplacement/)
Humanities & Arts	6 credits of Humanities & Arts coursework.
Mathematics & Quantitative Reasoning	6 credits of Mathematics & Quantitative Reasoning coursework. This requirement may be partially satisfied by a qualifying placement test score. More information: https://go.wisc.edu/qualifyingmathplacement (https://go.wisc.edu/qualifyingmathplacement/)
Natural Science & Wellness	Complete both: • 6 credits of Natural Science & Wellness or Natural Science & Wellness + Laboratory coursework. • one course must be in Natural Science & Wellness + Laboratory coursework.
Social & Behavioral Science	3 credits of Social & Behavioral Science coursework.
Total Credits	30 credits.

For more information see the policy (https://policy.wisc.edu/library/UW-1095/).

UNIVERSITY DEGREE AND QUALITY OF WORK REQUIREMENTS

All undergraduate degree recipients must complete the following minimum requirements. Requirements for some programs will exceed these requirements; see program requirements for additional information.

Total Degree	120 degree credits.
Residency	Complete 30 credits in residence. A course is considered "in residence" if it is taken when in undergraduate degree-seeking status and: • is offered by UW-Madison and completed on the UW-Madison campus or at an approved off-site location, or • is offered by UW-Madison in an online or distance format, or is completed during participation in a UW-Madison study abroad/study away program.
Quality of Work	Achieve at least the minimum grade point average specified by the school, college, and/or academic program.
Math	Demonstrate minimal mathematics competence by: • placing above MATH 96, or, • successfully completing MATH 96, or • successfully completing a more advanced mathematics course such as MATH 112, MATH 113, MATH 114, MATH 141, MATH 211, or MATH 221.
English Language	If required to take the UW-Madison English as a Second Language Assessment Test (MSN-ESLAT), demonstrate minimal English language competence by: • earning credit for ESL 118, or • achieving a qualifying MSN-ESLAT placement test score.
Language	Complete one: • 2 high school units of a single language other than English, or • one course with the second semester Language designation.
Major Declaration	Declare and complete the requirements for at least one major.

COLLEGE OF ENGINEERING DEGREE GRANTING PROGRAMS' COMMON REQUIREMENTS

The College of Engineering departments collaborated and adopted a common set of guidelines in their degree granting program (major) requirements. Engineering departments incorporate specific coursework within their curricula to meet these guidelines. Students should refer to specific coursework detailed below the Summary of Requirements.

COLLEGE OF ENGINEERING DEGREE GRANTING PROGRAMS' COMMON REQUIREMENTS

Communication	All College of Engineering majors require two levels of communication coursework: • Engineering Communication 1: one course with the Communication A designation or satisfaction of Communication A based on eligible UW Placement Score. • Engineering Communication 2: each major specifies one course (e.g. INTEREGR 397) which also carries the Communication B designation.

Quantitative Reasoning	All College of Engineering majors require a math sequence that incorporates two levels of quantitative reasoning.
Humanities or Literature	All College of Engineering majors require a minimum of 6 credits with the Humanities or Literature breadth designations. See major Liberal Studies Electives Requirement below.
Social Sciences	All College of Engineering majors require a minimum of 3 credits with the Social Sciences breadth designation. See major Liberal Studies Electives Requirement below.
Natural Sciences	All College of Engineering majors require specific coursework that incorporates a minimum of 6 credits with the Biological, Natural, or Physical Science breadth designations.
Ethnic Studies	All College of Engineering majors require at least one course of at least 3 credits with the Ethnic Studies designation. This course may also be used to satisfy the Social Sciences or Humanities or Literature requirement.

COMPUTER ENGINEERING, BS CURRICULUM

This curriculum applies to students admitted to the degree program this Guide academic year. Curricular requirements for students admitted in previous semesters are available in the Archive (https://guide.wisc.edu/archive/) section of Guide.

SUMMARY OF REQUIREMENTS

Code	Title	Credits
Mathematics		19
Science		20-21
Computer Engineering Core		33
Computer Engineering Advanced Electives		16
Professional Electives		9
Communication Skills		6
Liberal Studies Electives		15
Free Elective		2
Total Credits		**120**

MATHEMATICS

Code	Title	Credits
MATH 221	Calculus and Analytic Geometry 1	5
MATH 222	Calculus and Analytic Geometry 2	4
MATH 234	Calculus--Functions of Several Variables [1]	4
MATH/ COMP SCI 240	Introduction to Discrete Mathematics	3
or MATH/ COMP SCI/ STAT 475	Introduction to Combinatorics	
Probability/Statistics Elective (select one)		3
STAT 311	Introduction to Theory and Methods of Mathematical Statistics I	
MATH/STAT 431	Introduction to the Theory of Probability	
E C E 331	Introduction to Random Signal Analysis and Statistics	
Total Credits		**19**

[1] MATH 375 and MATH 376 taken in sequence will fulfill the requirement for MATH 234.

SCIENCE

Code	Title	Credits
COMP SCI 300	Programming II	3
COMP SCI 400	Programming III	3
PHYSICS 201	General Physics [1]	5
or PHYSICS 207	General Physics	
or PHYSICS 247	A Modern Introduction to Physics	
PHYSICS 202	General Physics	5
or PHYSICS 208	General Physics	
or PHYSICS 248	A Modern Introduction to Physics	
Select one of the following:		4-5
CHEM 109	Advanced General Chemistry	
CHEM 103	General Chemistry I	
CHEM 104	General Chemistry II	
Total Credits		**20-21**

[1] Students may also fulfill this requirement by taking E M A 201 Statics and E M A 202 Dynamics.

COMPUTER ENGINEERING CORE

Code	Title	Credits
E C E 203	Signals, Information, and Computation	3
E C E 210	Introductory Experience in Electrical Engineering	2
E C E 222	Electrodynamics I	4
E C E 230	Circuit Analysis	4
E C E/ COMP SCI 252	Introduction to Computer Engineering	3
E C E 270	Circuits Laboratory I	1
E C E 315	Introductory Microprocessor Laboratory	1
E C E 340	Electronic Circuits I	3
E C E/ COMP SCI 352	Digital System Fundamentals	3
E C E 353	Introduction to Microprocessor Systems	3
E C E/ COMP SCI 354	Machine Organization and Programming	3
E C E 551	Digital System Design and Synthesis	3
Total Credits		**33**

COMPUTER ENGINEERING ADVANCED ELECTIVES

Code	Title	Credits
Electronic Circuits Elective		
Select one of the following:		3

E C E 342	Electronic Circuits II
E C E 447	Applied Communications Systems
E C E 541	Analog MOS Integrated Circuit Design
E C E 542	Introduction to Microelectromechanical Systems
E C E 548	Integrated Circuit Design
E C E 555	Digital Circuits and Components

Systems Software Elective [1]

Select one of the following:		3
E C E/ COMP SCI 506	Software Engineering	
COMP SCI 536	Introduction to Programming Languages and Compilers	
COMP SCI 537	Introduction to Operating Systems	
COMP SCI 564	Database Management Systems: Design and Implementation	

Capstone Design

Select one of the following:		4
E C E 453	Embedded Microprocessor System Design	
E C E 454	Mobile Computing Laboratory [2]	
E C E 455	Capstone Design in Electrical and Computer Engineering	
E C E 554	Digital Engineering Laboratory	

CMPE Elective I

Select one of the following:		3
E C E 537	Communication Networks	
E C E/ COMP SCI 552	Introduction to Computer Architecture	
E C E 553	Testing and Testable Design of Digital Systems	
E C E 556	Design Automation of Digital Systems	

CMPE Elective II

Select one of the following:		3
Select from E C E 399 - E C E 699		
Select from COMP SCI 400 - COMP SCI 699 [2]		

Total Credits	**16**

[1] If a 4-credit course is taken, one credit may be used toward satisfying the professional elective and free elective requirement.

[2] E C E 454 Mobile Computing Laboratory and COMP SCI 407 Foundations of Mobile Systems and Applications cannot both be taken for degree credit.

PROFESSIONAL ELECTIVES

Code	Title	Credits
Courses 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.		9
E C E 1	Cooperative Education Program (One co-op credit can count towards professional electives.)	
E C E 204	Data Science & Engineering	
E C E/ PHYSICS 235	Introduction to Solid State Electronics	
E C E 320	Electrodynamics II	
E C E 330	Signals and Systems	
E C E 331	Introduction to Random Signal Analysis and Statistics	
E C E 332	Feedback Control Systems	
E C E 334	State Space Systems Analysis	
E C E 335	Microelectronic Devices	
E C E 342	Electronic Circuits II (may be used if not already used as an Electronic Circuits Advanced Elective)	
E C E 355	Electromechanical Energy Conversion	
E C E 356	Electric Power Processing for Alternative Energy Systems	
E C E courses numbered 370 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 1: Vector and Complex Calculus	
MATH 322	Applied Mathematical Analysis 2: Partial Differential Equations	
MATH 340	Elementary Matrix and Linear Algebra [1]	
MATH 341	Linear Algebra	
MATH 345	Linear Algebra and Optimization	
MATH courses numbered 400 and higher		
STAT courses numbered 400 and higher		
Any biological sciences course that is designated as intermediate or advanced level		
Any physical science course that is designated as intermediate or advanced level		
Any natural science course that is designated as advanced level, 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.		
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

Code	Title	Credits
Engr Comm 1		
INTEREGR 156	Introduction to Writing, Speaking, and Ethics for Engineers	3
or ENGL 100	Introduction to College Composition	
or LSC 100	Science and Storytelling	
or COM ARTS 100	Introduction to Speech Composition	
or COM ARTS 181	Elements of Speech-Honors Course	
or ESL 118	Academic Writing II	
Engr Comm 2		
INTEREGR 397	Engineering Communication	3
Total Credits		**6**

LIBERAL STUDIES ELECTIVES

Code	Title	Credits
College of Engineering Liberal Studies Electives Requirements		
Complete requirements (https://guide.wisc.edu/undergraduate/engineering/#requirementstext)		15
Total Credits		**15**

HONORS IN RESEARCH PROGRAM

Qualified undergraduates may earn an Honors in Research designation in their transcript. The Honors in Research program gives an undergraduate the opportunity to participate in a research project under the direction of a faculty member. It is expected that the student will be actively involved in research that could lead to new knowledge. The project can be independent or a component of a larger team effort.

Admission Requirements include:

1. Complete at least one semester on the UW-Madison campus,
2. Have a cumulative GPA of at least 3.5,
3. Major in Computer Engineering (CMPE) or Electrical Engineering (EE),
4. Identify an ECE faculty advisor who is willing to supervise the research project.

Students admitted to the program should register for one to three credits of E C E 489 Honors in Research. A thesis worth three credits of E C E 489 Honors in Research is required. The thesis is a written document that details the objectives of the project, the methods used to carry out the research, and the results of the research activity. The thesis must be approved by the faculty advisor and the student is encouraged to present a seminar.

The "Honors in Research" designation will be awarded to graduates who:

1. Complete either the CMPE or EE degree requirements.
2. Have a cumulative GPA of at least 3.3 at graduation.
3. Complete a total of at least six credits of E C E 489 Honors in Research.
4. Receive a final grade of at least B in E C E 489 Honors in Research.

NAMED OPTION

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- **COMPUTER ENGINEERING: MACHINE LEARNING AND DATA SCIENCE, BS (HTTPS://GUIDE.WISC.EDU/UNDERGRADUATE/ENGINEERING/ELECTRICAL-COMPUTER-ENGINEERING/COMPUTER-ENGINEERING-BS/COMPUTER-ENGINEERING-MACHINE-LEARNING-DATA-SCIENCE-BS/)**
- **COMPUTER ENGINEERING: SEMICONDUCTOR ENGINEERING, BS (HTTPS://GUIDE.WISC.EDU/UNDERGRADUATE/ENGINEERING/ELECTRICAL-COMPUTER-ENGINEERING/COMPUTER-ENGINEERING-BS/COMPUTER-ENGINEERING-SEMICONDUCTOR-ENGINEERING-BS/)**