

University of Wisconsin – Milwaukee
College of Engineering and Applied Science
ELECTRICAL ENGINEERING CURRICULUM

The typical number of credits required to complete the Bachelor of Science in Engineering with a major in Electrical Engineering is 126 credits. Students who need background preparation courses may need additional credits. See information below regarding placement examinations.

Engineering Core Courses (17 credits)		Credits	Prerequisite
CompSci 240	Introduction to Engineering Programming	3	Math 116 or 231(C)
CompSci 241	C Programming for Embedded Systems	3	CompSci 240*
EAS 200	Professional Seminar	1	None
ElecEng 101	Fundamentals of Electrical Engineering	3	Math 116(C)
ElecEng 301	Electrical Circuits I	3	Physics 210(C) or 220 (C)
MatlEng 201	Engineering Materials	4	Chem 102 or 105

^Electrical Engineering Major (36 credits)			
ElecEng 305	Electrical Circuits II	4	ElecEng 234*, 301
ElecEng 310	Signals & Systems	3	ElecEng 305(C)
ElecEng 330	Electronics I	4	ElecEng 305(C)
ElecEng 335	Electronics II	4	ElecEng 310(C), 330
ElecEng 354	Digital Logic	3	CompSci 240 or 250
ElecEng 361	Electromagnetic Fields	3	ElecEng 234, Math 233*, Physics 210* & 215* or 220*
ElecEng 362	Electromechanical Energy Conversion	4	ElecEng 305, 361
ElecEng 367	Introduction to Microprocessors	4	CompSci 240 or 250, ElecEng 354*
ElecEng 420	Random Signals & Systems	3	Jr St, ElecEng 310
ElecEng 595	Capstone Design Project	4	Sr St, ElecEng 335, 367

^^Mathematics (14-16 credits)			(16 credits typical: Math 231,232,233, ElecEng 234)
One of the following Calculus sequences must be completed:			
Math 231-232-233		12	Math placement score, or previous course with at least "C" grade
Or Math 221- 222 (Honors)		10	
And ElecEng 234	Analytical Methods in Engineering	4	Math 232*

^^Chemistry (5 credits)			
One of the following courses must be completed:			
Chem 102 or 105			Chem 100* or Chemistry Placement; Math 105* or 108*

Physics (10 credits)			
Physics 219 -220			Physics 219: Math 232 (C)
or			Physics 220: Math 233 (C), C or better in Physics 219
Physics 209 & 214 – 210 & 215			Physics 209: Math 232(C)
			Physics 210: Math 233(C), C- or better in Physics 209

General Education Requirements			
<i>Distribution Requirements (15 credits)</i>			
Art		3	
Humanities		3	
Social Science		6	
English 310	Writing, Speaking & Technoscience in the 21st Century	3	English Competency
Cultural Diversity - One of the arts, humanities, or social science courses selected must also meet the UWM cultural diversity requirement.			
Free Electives		3	
<i>Competency Requirements</i>			
^^English Composition (0-6 credits)			
The English Composition requirement is satisfied by:			
1.	Earning a satisfactory score on the English placement test or		
2.	Earning a grade of C or higher in English 102 or		
3.	Transferring with a grade of C or better in a course (3 credits or more) equivalent to English 102 or higher level expository writing course		
Foreign Language (0-8 credits) (for new freshman starting fall 1999)			
The foreign language requirement can be completed with one of these options:			
1.	Two years of a single foreign language in high school		
2.	Two semesters of a single foreign language in college		
3.	Demonstrate ability by examination		

***C or better in prerequisite** (C) **Concurrent Enrollment in Designated Course**

^Admission to Major: 1. Complete Math 231 (or 221) with C or better grade. 2. Complete the English composition requirement (OWCA). 3. Complete Chem 100 with C or better grade or satisfactory placement score. 4. Obtain a minimum GPA as set by the department. A 3.00 GPA guarantees admission to any CEAS major. Courses may be repeated only once. No more than two courses may be repeated.
The program may impose major status as a prerequisite for courses numbered 200 or above.

^^Placement Examinations: Students without previous college level credits in Math, Chemistry or English may be required to take placement exams. The results of these tests determine the appropriate course in which to register. Background prerequisite courses may be required in addition to the courses listed above.

Technical Electives – Electrical Engineering Major

The electrical engineering program requires a total of 24 credits of technical electives, chosen as follows.

Group A Technical Electives: Select at least 18 credits from the following list.

All non-required Electrical Engineering courses numbered 400-699 are Group A Technical Electives

		<u>Credits</u>	<u>Prerequisite</u>
EAS 001	Co-op Work Period	3 ¹	Prior Cons Co-Op Dir
EAS 497	Study Abroad	3 ²	Acceptance to Study Abroad Program
CompSci 459	Fundamentals of Computer Graphics	3	Jr St, CompSci 251, Math 232
CompSci 520	Computer Networks	3	Jr St, CompSci 315 or 458 or ElecEng 367
CompSci 530	Computer Networks Laboratory	3	Jr St, CompSci 520
ElecEng 410	Principles of Discrete Systems & Digital Signal Processing	3	Jr St, ElecEng 310
ElecEng 421	Communication Systems	3	Jr St, ElecEng 335(C)
ElecEng 436	Introduction of Medical Instrumentation	3	Jr St, ElecEng 305
ElecEng 437	Introduction to Biomedical Imaging	3	Sr St, ElecEng 310
ElecEng 451	Introduction to VLSI Design	3	Jr St, ElecEng 330, 354
ElecEng 457	Digital Logic Laboratory	3	Jr St, ElecEng 330, 354
ElecEng 458	Computer Architecture	3	Jr St., ElecEng 354, CompSci 315 or ElecEng 367
ElecEng 461	Microwave Engineering	3	Jr St, ElecEng 361
ElecEng 462	Antenna Theory	3	Jr St, ElecEng 361
ElecEng 464	Fundamentals of Photonics	3	Jr St, ElecEng 361
ElecEng 465	Broadband Optical Networks	3	Jr St, ElecEng 305, 361
ElecEng 471	Electric Power Systems	3	Jr St, ElecEng 362(C)
ElecEng 472	Introduction to Wind Energy	3	Jr St
ElecEng 474	Introduction to Control Systems	4	Jr St, CompSci 240, ElecEng 310
ElecEng 482	Introduction to Nanoelectronics	3	Jr St, ElecEng 330(C), 361(C)
ElecEng 490	Topics in Electrical Engineering	1-3	Jr St
ElecEng 541	Integrated Circuits & Systems	3	Jr St, ElecEng 330
ElecEng 545	FPGA Embedded CPUs & Firmware Development	3	Jr St, ElecEng 367, 457
ElecEng 562	Telecommunication Circuits	3	Sr St, ElecEng 330
ElecEng 565	Optical Communication	3	Sr St, ElecEng 330, 361 or 465
ElecEng 568	Applications of Digital Signal Processing	3	Jr St, ElecEng 310, 367
ElecEng 572	Power Electronics	3	Sr St, ElecEng 335(C)
ElecEng 574	Intermediate Control Systems	3	Sr St, ElecEng 474 or MechEng 474
ElecEng 575	Analysis of Electric Machines & Motor Drives	3	Jr St, ElecEng 330, 362
ElecEng 588	Fundamentals of Nanotechnology	3	Jr St, ElecEng 361
ElecEng 599	Senior Thesis	3	Sr St, Cons Instr
Ind Eng 360	Engineering Economic Analysis	3	Jr St
MatlEng 481	Electronic Materials	3	Jr St, MatlEng 201
MechEng 301	Basic Engineering Thermodynamics	3	Math 233, Physics 209
MechEng 321	Basic Heat Transfer	4	Jr St, MechEng 301
BusAdm 447	Entrepreneurship	3	Jr St, Bus Adm 350

¹Students who earn **3 or more** credits of Co-Op may use 3 of those credits as approved technical electives.

²Students who earn **3 or more** credits of Study Abroad may use 3 of those credits as approved technical electives.

Group B Technical Electives: Choose no more than 6 credits from the following list.

Any Mathematics course 400-level or above, or Math 313, Math 321, or Math 322

Any Chemistry course 200-level or above, or Chem 104³

Any Physics course 300-level or above

Any Biology course 150-level or above

Any Atmospheric Sciences course 100-level or above

Any Computer Science course 200-level or above

³Students who take Chem 102 and 104 (equaling a minimum of 8 credits) may use up to **3** credits of Chem 104 as Group B technical electives.

***C or better in prerequisite**

(C) Concurrent Enrollment in Designated Course

Degree Requirements: Students must maintain an average GPA of at least 2.0 on all work attempted at the University and in all courses offered by the College. Students majoring in Electrical Engineering must maintain an average GPA of at least 2.5 in all 300-level and above courses in the Electrical Engineering department. Transferable courses will be included as appropriate. Advancement to major status is required for graduation.

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