

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 (23 credits)		Credits	Prerequisite
EAS 100/ElecEng 150	CEAS Freshman Orientation/Electronic Technology in the World Around Us (recommended only)	1/3	none
EAS 200	Professional Seminar	1	none
CompSci 201 ¹	Introductory Computer Programming	3	Math 105 (P), CS 132 (R) or equivalent
Civ Eng 201	Statics	3	Math 232 (P)
Civ Eng 202	Dynamics	3	Civ Eng 201 (P), Math 233 (C)
MatlEng 201	Engineering Materials	4	Chem 105 (P) or 102 (P) or 117(P)
ElecEng 301	Electrical Circuits I	3	Physic 210 (C), ElecEng 234 (C)
MechEng 301	Basic Engineering Thermodynamics	3	Math 233 (P), Physics 209 (P)
Ind Eng 360	Engineering Economic Analysis	3	Jr St

*Electrical Engineering Major (36 credits)			
ElecEng 305	Electrical Circuits II	4	ElecEng 301 (P), ElecEng 234 (P)
ElecEng 310	Signals and Systems	3	ElecEng 305 (P)
ElecEng 330	Electronics I	4	ElecEng 305 (P)
ElecEng 335	Electronics II	4	ElecEng 330 (P), ElecEng 310 (P)
ElecEng 354	Digital Logic	3	CompSci 151 (P) or 152 (P) or 153 (P) or 201 (P) or 215 (P)
ElecEng 361	Electromagnetic Fields	3	Physics 210 (P), ElecEng 234 (P)
ElecEng 362	Electromechanical Energy Conversion	4	ElecEng 305 (P), ElecEng 361(P)
ElecEng 367	Introduction to Microprocessors	4	ElecEng 354 (P), CompSci 151 (P) or 152 (P) or 153 (P) or 201 (P)
ElecEng 420	Random Signals and Systems	3	Jr St, ElecEng 310 (P)
ElecEng 595	Capstone Design Project	4	Sr St, ElecEng 335 (P), ElecEng 367 (P)

**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 (P)	

**Chemistry (5-10 credits)		
One of the following sequences must be completed:		
Chem 105 (5 cr., Suggested) or Chem 102 -104 (10 cr.)		Chem 100 with "C" grade or Chemistry placement test

Physics (8 credits)		
Physics 209 – 210		Physics 209: Math 232 (C) Physics 210: Math 233 (C)

General Education Requirements		
<i>Distribution Requirements (15 credits)</i>		
Art	3	none
Humanities	6	none
Social Science	6	none
One of the arts, humanities, or social science courses selected must also meet the UWM cultural diversity requirement. <i>(Commun 103 Public Speaking or Commun 105 Business and Professional Communication are recommended as part of the distribution requirements.)</i>		
Free Electives	2	
<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		

*** Advancement to Major:** 1. Complete a minimum of 24 credits required for major. (Excludes: general education, prerequisite and orientation courses). 2. Complete Math 232 (or 222) with "C" or better grade. 3. Complete EAS 200 Professional Seminar. 4. Complete the English composition requirement. 5. Obtain a 2.3 GPA in all courses in item 1. **The program may impose major status as a prerequisite for courses numbered 300 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.
¹CompSci 151 or 153 can be substituted for CompSci 201.

Technical Electives--Electrical Engineering Major.

The electrical engineering program requires a total of 21 credits of technical electives, chosen as follows.

Group A Technical Electives: Select at least 15 credits from the following list.

		<u>Credits</u>	<u>Prerequisite</u>
EAS 001	Co-op Work Period	3 ¹	none
ElecEng 410	Principles of Discrete Systems & Digital Signal Processing	3	Jr St, ElecEng 310(P)
ElecEng 421	Communication Systems	3	ElecEng 335(C)
ElecEng 429	Wireless Communication Systems	3	Jr St, ElecEng 234(P)
ElecEng 436	Introduction of Medical Instrumentation	3	Jr St, ElecEng 330(P)
ElecEng 437	Introduction to Biomedical Imaging	3	Sr St, ElecEng 310(P)
ElecEng 438	Bioanalytics and Biomedical Diagnostics	3	Sr St, ElecEng 310 (P), 330 (P), or cons instr
ElecEng 451	Introduction to VLSI Design	3	Jr St, ElecEng 330(P), 354(P)
ElecEng 457	Digital Logic Laboratory	3	Jr St, ElecEng 330(P), 354(P)
ElecEng 458	Computer Architecture	3	CompSci 315(215)(P) or ElecEng 354(P)
CompSci 459	Fundamentals of Computer Graphics	3	Jr St, CompSci 217(P), CompSci 252(P)
ElecEng 461	Microwave Engineering	3	Jr St, ElecEng 361(P)
ElecEng 462	Antenna Theory	3	Jr St, ElecEng 361(P)
ElecEng 465	Broadband optical networks	3	Jr St, ElecEng 305(P), 361(P)
ElecEng 471	Electric Power Systems	3	Jr St, ElecEng 362(P)
ElecEng 474	Introduction to Control Systems	4	Jr St, ElecEng 310(P) or CivEng 202 or cons instr
ElecEng 482	Introduction to Nanoelectronics	3	Jr St, ElecEng 330 (C), 361 (C)
ElecEng 490	Special Topics	1-3	Jr St
CompSci 536	Introduction to Software Engineering	3	Jr St, CompSci 252
ElecEng 537	Fundamentals of Neuroimaging Technology	3	Sr St, ElecEng 437 (P), or cons instr
ElecEng 541	Integrated Circuits and Systems	3	Jr St, ElecEng 330(P)
ElecEng 561	Microwave Solid State Circuit Design	3	Sr St, ElecEng 330(P)
ElecEng 562	Telecommunication Circuits	3	Sr St, ElecEng 330(P)
ElecEng 565	Optical Communication	3	Sr St, ElecEng 361(P), 330(P) or 465(P)
ElecEng 572	Power Electronics	3	Sr St, ElecEng 335(C)
ElecEng 574	Intermediate Control Systems	3	Sr St, ElecEng 474(402)(P) or MechEng 474(P)
ElecEng 575	Analysis of Electric Machines and Motor Drives	3	Jr. St, ElecEng 330 (P), 362 (P)
ElecEng 588	Fundamental of Nanotechnology	3	Jr St, ElecEng 361 (P)
Matl 481	Electronic Materials	3	Jr St, MatlEng 201(P)
MechEng 321	Basic Heat Transfer	4	Jr St, MechEng 301

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 104²

Any Physics course 300-level or above, or Phy 214, or Phy 215

Any Biology course 150-level or above

Any Atmospheric Sciences course 100-level or above

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

²Students who take Chem 102 and 104 (equaling a min. of 8 credits) may use up to **3** credits of Chem 104 as Group B technical electives.

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