ELECTRICAL AND COMPUTER ENGINEERING: PROFESSIONAL, MS

REQUIREMENTS

MINIMUM GRADUATE SCHOOL REQUIREMENTS

Review the Graduate School minimum academic progress and degree requirements (http://guide.wisc.edu/graduate/#policiesandrequirementstext), in addition to the program requirements listed below.

NAMED OPTION REQUIREMENTS

MODE OF INSTRUCTION

Face to Face	Evening/ Weekend	Online	Hybrid	Accelerated
Yes	No	No	No	Yes

Mode of Instruction Definitions

Accelerated: Accelerated programs are offered at a fast pace that condenses the time to completion. Students typically take enough credits aimed at completing the program in a year or two.

Evening/Weekend: Courses meet on the UW–Madison campus only in evenings and/or on weekends to accommodate typical business schedules. Students have the advantages of face-to-face courses with the flexibility to keep work and other life commitments.

Face-to-Face: Courses typically meet during weekdays on the UW-Madison Campus.

Hybrid: These programs combine face-to-face and online learning formats. Contact the program for more specific information.

Online: These programs are offered 100% online. Some programs may require an on-campus orientation or residency experience, but the courses will be facilitated in an online format.

CURRICULAR REQUIREMENTS

Requirement	Detail
Minimum Credit Requirement	30 credits
Minimum Residence Credit Requirement	23 credits
Minimum Graduate Coursework Requirement	15 credits must be graduate-level coursework. Refer to the Graduate School: Minimum Graduate Coursework (50%) Requirement policy: https://policy.wisc.edu/library/UW-1244 (https://policy.wisc.edu/library/UW-1244/).
Overall Graduate GPA Requirement	3.00 GPA required. Refer to the Graduate School: Grade Point Average (GPA) Requirement policy: https://policy.wisc.edu/library/UW-1203 (https://policy.wisc.edu/library/UW-1203/).
Other Grade Requirements	1. A grade of B or better in any course is acceptable. 2. A grade of BC in an E C E course is acceptable, provided the total cumulative GPA for E C E courses is greater than or equal to 3.00. 3. A grade of BC or C in a non-E C E course is acceptable only if approved by the Graduate Committee.
Assessments and Examinations	n/a
Language Requirements	Non-native speakers of English who enroll in the MS program must take the ESLAT test on arrival at the university and then take any recommended courses based on the exam results. In addition, if a student's advisor believes that his or her technical writing ability needs improvement, the student may be required to undertake remedial work.

REQUIRED COURSES

Code	Title	Credits
Mandatory Courses		
E C E 610	Seminar in Electrical and Computer Engineering	1
Elective Courses		
12 of the 30 credit hours must be taken within one curriculum path. Please see sample curriculum paths below. Students may take courses from combinations of different paths to create custom degrees that are well-aligned with their professional goals with advisor approval. [1]		
Other Course Requirements		
21 of the 30 credit hours must be taken in E C E. Approved graduate or undergraduate transfer credits in ECE courses may count toward the 21 E C E credits.		
No more than 9 credits can be taken outside of E C E.		
Special topics courses E C E 601 Special Topics in Electrical and Computer Engineering or E C E 901 Special Topics in Electrical and Computer Engineering may be used for up to 3 credits towards a curriculum path with advisor approval.		
No more than 3 independent study credits count toward the degree. This includes E C E 699 and E C E 999.		
No more than 3 credits of ESL courses count toward the degree.		
Thesis credits are not allowed (E C E 790 or E C E 890 or E C E 990).		

[1] Please keep written communications (emails are acceptable) of approvals from your faculty advisor.

Computer Engineering Sample Curriculum Path

Code	Title	Credits
Embedded Systems		
Select 12 credits from the following:		
E C E 551	Digital System Design and Synthesis	3

E C E/ COMP SCI 552	Introduction to Computer Architecture	3
E C E 555	Digital Circuits and Components	3
E C E/ COMP SCI 750	Real-time Computing Systems	3
E C E 751	Embedded Computing Systems	3
E C E 753	Fault-Tolerant Computing	3
COMP SCI 537	Introduction to Operating Systems	4

Code	Title	Credits
Networking and Security		
Select 12 credits from the following:		
E C E 537	Communication Networks	3
E C E/ COMP SCI 707	Mobile and Wireless Networking	3
E C E 751	Embedded Computing Systems	3
E C E 753	Fault-Tolerant Computing	3
COMP SCI 537	Introduction to Operating Systems	4
COMP SCI 642	Introduction to Information Security	3
COMP SCI 763	Security and Privacy for Data Science	3

Code	Title	Credits
CAD for Digital Electronic Systems		
Select 12 credits from the following:		
E C E 551	Digital System Design and Synthesis	3
E C E 553	Testing and Testable Design of Digital Systems	3
E C E 555	Digital Circuits and Components	3
E C E 556	Design Automation of Digital Systems	3
E C E 751	Embedded Computing Systems	3
E C E/ COMP SCI 755	VLSI Systems Design	3
E C E/ COMP SCI 756	Computer-Aided Design for VLSI	3

Code	Title	Credits
Computer Architecture		
Select 12 credits from the following:		
E C E 551	Digital System Design and Synthesis	3
E C E/ COMP SCI 552	Introduction to Computer Architecture	3
E C E 553	Testing and Testable Design of Digital Systems	3
E C E/ COMP SCI 752	Advanced Computer Architecture I	3
E C E/ COMP SCI 755	VLSI Systems Design	3
E C E/ COMP SCI 757	Advanced Computer Architecture II	3
E C E/COMP SCI/ E M A/E P/M E 759	High Performance Computing for Applications in Engineering	3
COMP SCI 537	Introduction to Operating Systems	4
COMP SCI 758	Advanced Topics in Computer Architecture	3

E&M Fields and Waves Sample Curriculum Path

Code	Title	Credits
Select 12 credits from the following:		
E C E 447	Applied Communications Systems	3
E C E 545	Advanced Microwave Measurements for Communications	3
E C E 547	Advanced Communications Circuit Design	3
E C E 740	Electromagnetic Theory	3
E C E 742	Computational Methods in Electromagnetics	3
E C E 744	Theory of Microwave Circuits and Devices	3
E C E/PHYSICS 748	Linear Waves	3
E C E/N E/ PHYSICS 749	Coherent Generation and Particle Beams	3
E C E 841	Antennas	3
E C E/PHYSICS 848	Nonlinear Waves	3

Energy and Power Systems Sample Curriculum Path [1]

Code	Title	Credits
Electric Machines and Drives		
Select 12 credits from the following:		
E C E 411	Introduction to Electric Drive Systems	3
E C E 412	Power Electronic Circuits	3
E C E 427	Electric Power Systems	3
E C E 504	Electric Machine & Drive System Laboratory	2-3
E C E 511	Theory and Control of Synchronous Machines	3
E C E 711	Dynamics and Control of AC Drives	3
E C E 713	Electromagnetic Design of AC Machines	3

Code	Title	Credits
Power Electronics		
Select 12 credits from the following:		
E C E 411	Introduction to Electric Drive Systems	3
E C E 412	Power Electronic Circuits	3
E C E 427	Electric Power Systems	3
E C E 512	Power Electronics Laboratory	3
E C E 711	Dynamics and Control of AC Drives	3
E C E 712	Solid State Power Conversion	3
E C E 714	Utility Application of Power Electronics	3

Code	Title	Credits
Power Systems		
Select 12 credits from the following:		
E C E 411	Introduction to Electric Drive Systems	3

E C E 412	Power Electronic Circuits	3
E C E 427	Electric Power Systems	3
E C E 511	Theory and Control of Synchronous Machines	3
E C E/COMP SCI/ I SY E 524	Introduction to Optimization	3
E C E 714	Utility Application of Power Electronics	3
E C E 723	On-Line Control of Power Systems	3
E C E 731	Advanced Power System Analysis	3

[1] The on-campus program, not the online MSEE Power Engineering program.

Solid State/Photonics Sample Curriculum Path

Code	Title	Credits
Semiconductor Device and Fabrication Technology		
Select 12 credits from the following:		
E C E 445	Semiconductor Physics and Devices	3
E C E/N E 528	Plasma Processing and Technology	3
E C E 542	Introduction to Microelectromechanical Systems	3
E C E 548	Integrated Circuit Design	3
E C E 549	Integrated Circuit Fabrication Laboratory	4
E C E 745	Solid State Electronics	3
E C E 845	Transport in Semiconductor Devices	3

Code	Title	Credits
Photonics Technology		
Select 12 credits from the following:		
E C E 434	Photonics	3
E C E 466	Electronics of Solids	3
E C E 536	Integrated Optics and Optoelectronics	3
E C E 740	Electromagnetic Theory	3
E C E 741	Semiconductor Diode Lasers and other Optoelectronic Devices	3
E C E 742	Computational Methods in Electromagnetics	3
E C E 747	Nanophotonics	3

PROFESSIONAL DEVELOPMENT ACTIVITIES

Students are strongly encouraged to participate in one of the professional development activities below:

- With assistance from Engineering Career Services, obtain a summer internship and enroll in E C E 702 Graduate Cooperative Education Program.
- Enroll in the summer course INTEREGR 601 Topics in Interdisciplinary Engineering.
- Enroll in up to 3 credits of E C E 699 Advanced Independent Study and be co-supervised by an advisor working in industry (choice of industry advisor is subject to program approval).
- Complete at least two of the online "Foundations of Professional Development" courses. Each course is eight weeks and 1 credit:

Code	Title	Credits
E P D 605	Fundamentals of Technical Project Management	1
E P D 701	Writing for Professionals	1
E P D 702	Professional Presentations	1
E P D 704	Organizational Communication and Problem Solving	1
E P D 706	Change Management	1
E P D 708	Creating Breakthrough Innovations	1
E P D 712	Ethics for Professionals	1
E P D/GEN BUS/ MARKETNG 782	Marketing for Non-Marketing Professionals	1
E P D/GEN BUS/ M H R 783	Leading Teams	1
or E P D 606	Leading and Managing Technical Teams	
E P D/GEN BUS/ M H R 785	Effective Negotiation Strategies	1

OTHER POLICY

Students in this program may not take courses outside the prescribed curriculum without faculty advisor and program director approval. Students in this program cannot enroll concurrently in other undergraduate or graduate degree programs.