ELECTRICAL ENGINEERING, MS

Banner Code: EC-MS-ELEN

Academic Advising

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Electrical Engineering is the discipline that drives our increasingly-connected society. Electrical engineers design systems, devices, and algorithms that contribute innovative solutions across a broad spectrum of applications. The Electrical Engineering program offers the following concentrations: bioengineering, communications and networking, control and robotics, machine learning in electrical engineering, power systems and smart grid, signal processing, semiconductor engineering, and space-based systems.

The graduates of our program develop reliable, secure, and high-speed communication networks and systems; apply modern signal processing algorithms to extract information from images, audio, video, sonar, and radio signals; apply machine-learning, control theory, and robotics foundations to applications such as autonomous vehicles, humanoid robots, and multi-agent systems; develop state-of-the-art power systems based on the ideas of sustainability, adaptability, security, and resilience; design nanoscale devices for the highly integrated circuits that drive the Internet of Things, health-monitoring devices, smartphones, tablets, and modern-day computer systems; develop prosthetic devices, brain-machine interfaces, and systems to ameliorate neurological disorders. Students in this program will develop theoretical foundations, analytical capabilities, and practical hands-on skills in their chosen field of specialization. They will also develop the oral and written communication skills necessary to articulate their ideas and succeed as entrepreneurs, practicing engineers, or technical managers in high-tech companies.

Admissions & Policies

Admissions

Requirements

Applicants should have a baccalaureate degree preferably in electrical engineering, electronics and communication engineering, computer engineering, computer science engineering, or a closely-related discipline.

Students with BS or MS degrees in other science, technology, engineering, and mathematics (STEM) disciplines are encouraged to apply for admission as well. Such students may be advised to take some courses from the undergraduate electrical engineering curriculum or a professional certificate offered by Mason, according to their intended concentration and specific backgrounds. Domestic students may be admitted provisionally and required to satisfy provisional requirements before taking advanced coursework.

Candidates must meet the general university graduate admission eligibility requirements, as defined in the catalog section Graduate Admission Policies (http://catalog.gmu.edu/admissions/graduate-policies/), under General Admission Requirements, including a minimum 3.00 GPA on a 4.00 scale.

All students are required to submit a resume. They are also encouraged to provide up to three choices for their preferred academic advisor (selected from the list available on the ECE Department website (https://ece.gmu.edu/people/faculty/)), and declare their preliminary concentration choice. The concentration can be changed during the entire time in the program.

For internationally educated applicants, a satisfactory score on any of the English proficiency examinations accepted by Mason is required. Satisfactory scores are specific to the College of Engineering and Computing. They are listed on the English Proficiency Requirements page (https://www.gmu.edu/admissions-aid/apply-now/how-apply/international/english-proficiency-requirements/) of the Mason website.

Policies

Please see AP.6. Graduate Policies (http://catalog.gmu.edu/policies/academic/graduate-policies/).

Student Advising

Students can select a concentration from those available in the MS degree program at the time of application to the program or later during their studies. In the former case, students are assigned an academic advisor from the selected concentration at the time of the admission, in the latter case, students can petition for a change of an academic advisor to match their concentration choice.

Plan of Study

Before completing 6 credit hours of coursework, each student must submit to the department a plan of study that has been approved by the academic advisor. This plan should be kept up to date by regular consultation with the academic advisor. A final, signed version of the plan must be turned in when the student submits a graduation application.

Requirements

Degree Requirements

Total credits: 30

Students must complete a minimum of 30 graduate credits beyond the bachelor's degree. The plan of study for the degree must fulfill the following requirements:

Core Course Requirement

Code	Title	Credits
Required Courses		
Select 15 credits from the following:		15
ECE 511	Computer Architecture	
ECE 518	Power System Protection and Control	
ECE 519	Power Electronics for Modern Power Systems	
ECE 521	Linear Systems and Control	
ECE 527	Learning From Data	

ECE 528	Introduction to Random Processes in Electrical and Computer Engineering	
ECE 535	Digital Signal Processing	
ECE 539	Neural Engineering	
ECE 542	Computer Network Architectures and Protocols	
ECE 552	Big Data Technologies	
ECE 580	Small Spacecraft Engineering	
ECE 584	Semiconductor Device Fundamentals	
ECE 586	Digital Integrated Circuits	
ECE 587	Design of Analog Integrated Circuits	
ECE 605	Microgrid Design and Control	
ECE 621	Systems Identification	
ECE 630	Principles of Digital Communications	
ECE 799	Master's Thesis [1]	
Total Credits		15

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See Thesis/Scholarly Paper option.

Concentration Requirement

Accomplished by choosing one of the concentrations and then meeting the course requirements for this concentration. Courses required for the selected concentration must be passed with a grade of B or better. For each concentration, related ECE 590 Selected Topics in Engineering courses can be used in addition to all explicitly listed 500-level courses, and related ECE 699 Advanced Topics in Electrical and Computer Engineering courses in addition to all explicitly listed 600 level or above courses, subject to approval by the student's academic advisor. With assistance from their advisors, students may petition the graduate program coordinator to approve a specialization area of their own design, not fulfilling the requirements of any concentration.

Available Concentrations

- Concentration in Bioengineering (BIOE)
- Concentration in Communications and Networking (CONE)
- Concentration in Control and Robotics (CORO)
- Concentration in Machine Learning in Electrical Engineering (MLEE)
- Concentration in Power Systems and Smart Grid (PSSG)
- Concentration in Semiconductor Engineering (SCEN)
- Concentration in Signal Processing (SIGP)
- Concentration in Space-Based Systems (SBSY)

Concentration in Bioengineering (BIOE)

Code	Title	Credits
Required Courses		
ECE 538	Medical Imaging	3
ECE 539	Neural Engineering	3
Total Credits		6

Code	Title	Credits
Electives		
Select at least three courses from the following, including two courses at the 600 level or above:		9
BENG 501	Bioengineering Research Methods	
BENG 738	Advanced Medical Image Processing	
ECE 521	Linear Systems and Control	
ECE 528	Introduction to Random Processes in Electrical and Computer Engineering	
ECE 530	Sensor Engineering	
ECE 535	Digital Signal Processing	
ECE 537	Image Processing and Computer Vision	
ECE 542	Computer Network Architectures and Protocols	
ECE 620	Optimal Control Theory	
ECE 621	Systems Identification	
ECE 622	Kalman Filtering with Applications	
ECE 634	Detection and Estimation Theory	
ECE 636	Advanced Digital Signal Processing	
ECE 637	Array Processing	
Total Credits		9

Concentration in Communications and Networking (CONE)

Code	Title	Credits
Required Courses		
ECE 528	Introduction to Random Processes in Electrical and Computer Engineering	3
ECE 542	Computer Network Architectures and Protocols	3
Total Credits		6

Code	Title	Credits
Electives		
Select at least three courses from the following, including two courses at the 600 level or above:		9
ECE 508	Internet of Things	
ECE 527	Learning From Data	
ECE 531	Introduction to Wireless Communications and Networks	
ECE 532	Secure Wireless Communications and Networks	
ECE 567	Optical Fiber Communications	
ECE 628	Random Processes in Electrical and Computer Engineering	
ECE 629	Wireless Networks	
ECE 630	Principles of Digital Communications	
ECE 631	Software-Defined Radio	
ECE 632	Digital Communications	
ECE 633	Error Control Coding	
ECE 634	Detection and Estimation Theory	
ECE 639	Satellite Communications	
ECE 642	Design and Analysis of Computer Networks	
ECE 643	Network Switching and Routing	
ECE 646	Applied Cryptography	
ECE 651	Advanced Learning From Data	
ECE 657	Probabilistic Machine Learning	
ECE 664	Information Theory	
ECE 732	Mobile Communication Systems	
Total Credits		9

Concentration in Control and Robotics (CORO)

Code	Title	Credits
Required Courses		
ECE 521	Linear Systems and Control	3
ECE 528	Introduction to Random Processes in Electrical and Computer Engineering	3
Total Credits		6

Code	Title	Credits
Electives		
Select at least three courses from the following list:		9
ECE 527	Learning From Data	
ECE 612	Real-Time Embedded Systems	
ECE 619	Nonlinear Systems and Control	
ECE 620	Optimal Control Theory	
ECE 621	Systems Identification	
ECE 622	Kalman Filtering with Applications	
ECE 623	Distributed Control and Optimization	
ECE 625	Autonomous Control for Robotic Systems	
ECE 627	Adaptive Control	
ECE 634	Detection and Estimation Theory	
ECE 635	Adaptive Signal Processing	
ECE 651	Advanced Learning From Data	
ECE 657	Probabilistic Machine Learning	
Total Credits		9

Concentration in Machine Learning in Electrical Engineering (MLEE)

Code	Title	Credits
Required Courses		
ECE 527	Learning From Data	3
ECE 528	Introduction to Random Processes in Electrical and Computer Engineering	3
or ECE 552	Big Data Technologies	
Total Credits		6

Code	Title	Credits
Electives:		
Select at least three courses from the following list, including at least two courses at the 600 level or above:		9
ECE 528	Introduction to Random Processes in Electrical and Computer Engineering	
ECE 552	Big Data Technologies	
ECE 556	Neuromorphic Computing	
ECE 617	Distributed and Federated Learning	
ECE 651	Advanced Learning From Data	
ECE 653	Machine Learning Security and Privacy	
ECE 657	Probabilistic Machine Learning	
Total Credits		9

Concentration in Power Systems and Smart Grid (PSSG)

Code	Title	Credits
Required Courses		
ECE 518	Power System Protection and Control	3
ECE 519	Power Electronics for Modern Power Systems	3
ECE 605	Microgrid Design and Control	3
Total Credits		9

Code	Title	Credits
Electives [1]		**6**
Select 1-2 courses (3-6 credits) from the following:		
ECE 514	Grid Digitization and Automation	
ECE 517	Cyber Infrastructure of the Smart Grid	
ECE 606	Advanced Data Analytics in Smart Grid	
Select 0-1 courses (0-3 credits) from the following:		
ECE 505	Hardware Security	
ECE 508	Internet of Things	
ECE 513	Applied Electromagnetic Theory	
ECE 527	Learning From Data	
ECE 531	Introduction to Wireless Communications and Networks	
ECE 542	Computer Network Architectures and Protocols	
ECE 552	Big Data Technologies	
ECE 629	Wireless Networks	
ECE 631	Software-Defined Radio	
ECE 643	Network Switching and Routing	
ECE 651	Advanced Learning From Data	
Total Credits		6

[1] At least one elective should be at the 600 level or above

Concentration in Semiconductor Engineering(SCEN)

Code	Title	Credits
Required Courses		
ECE 584	Semiconductor Device Fundamentals	3
ECE 586	Digital Integrated Circuits	3
Total Credits		6

Code	Title	Credits
Electives		
Select at least three courses from the following, including two courses at the 600 level or above:		9
ECE 587	Design of Analog Integrated Circuits	
ECE 588	Nanoelectronics Fundamentals	
ECE 681	VLSI Design for ASICs	
ECE 684	MOS Device Electronics	
ECE 685	Nanoelectronics	
ECE 686	Sensor Device Technology	
ECE 687	Radio Frequency Electronics	
ME 754	Introduction to Nano-Materials	
Total Credits		9

Concentration in Signal Processing (SIGP)

Code	Title	Credits
Required Courses		
ECE 528	Introduction to Random Processes in Electrical and Computer Engineering	3
ECE 535	Digital Signal Processing	3
Total Credits		6

Code	Title	Credits
Electives		
Select at least three courses from the following, including two courses at the 600 level or above:		9
ECE 521	Linear Systems and Control	
ECE 527	Learning From Data	
ECE 530	Sensor Engineering	
ECE 537	Image Processing and Computer Vision	
ECE 538	Medical Imaging	
ECE 545	Digital System Design with VHDL	
ECE 621	Systems Identification	
ECE 622	Kalman Filtering with Applications	
ECE 628	Random Processes in Electrical and Computer Engineering	
ECE 630	Principles of Digital Communications	
ECE 631	Software-Defined Radio	
ECE 632	Digital Communications	
ECE 633	Error Control Coding	
ECE 634	Detection and Estimation Theory	
ECE 635	Adaptive Signal Processing	
ECE 636	Advanced Digital Signal Processing	
ECE 637	Array Processing	
ECE 648	Digital Signal Processing Hardware Architectures	
ECE 651	Advanced Learning From Data	
ECE 657	Probabilistic Machine Learning	
ECE 664	Information Theory	
ECE 732	Mobile Communication Systems	
Total Credits		9

Concentration in Space-Based Systems (SBSY)

Code	Title	Credits
Required Courses		
ECE 580	Small Spacecraft Engineering	3
ECE 660	Space Systems Engineering	3
Total Credits		6

Code	Title	Credits
Electives		
Select at least three courses from the following, including at least one course at the 600 level or above:		9
ECE 511	Computer Architecture	
ECE 513	Applied Electromagnetic Theory	
ECE 521	Linear Systems and Control	
ECE 528	Introduction to Random Processes in Electrical and Computer Engineering	
ECE 530	Sensor Engineering	
ECE 535	Digital Signal Processing	
ECE 545	Digital System Design with VHDL	
ECE 550	System Engineering Design	
ECE 612	Real-Time Embedded Systems	
ECE 615	Software/Hardware Codesign	
ECE 620	Optimal Control Theory	
ECE 622	Kalman Filtering with Applications	
ECE 627	Adaptive Control	
ECE 630	Principles of Digital Communications	
ECE 631	Software-Defined Radio	
ECE 635	Adaptive Signal Processing	
ECE 637	Array Processing	
ECE 639	Satellite Communications	
ECE 640	Small Satellite Development	
Total Credits		9

Upper-Level Course Requirement

A minimum of 9 credit hours of ECE courses at the 600 level or above, other than ECE 698, ECE 798, and ECE 799 (including, but not limited to, the selected concentration elective).

ECE Course Requirement

A maximum of 6 credits of non-ECE courses may be used to fulfill degree requirements, subject to prior approval by the student's academic advisor, in the form of a plan of study signed by the advisor and submitted to the ECE Office.

Electives

Electives can be chosen from among all ECE (http://catalog.gmu.edu/courses/ece/) graduate courses, as well as related graduate courses with other designations. The students are encouraged to discuss their choice of electives with their academic advisor prior to the registration.

GPA Requirements

A maximum of 6 credits of courses with a grade of C may be applied toward the degree. The student must present a GPA of at least 3.00 for all courses submitted for the degree.

Seminar Requirement

Graduate students are expected to participate actively in the exchange of knowledge and ideas in their discipline. Towards this objective, all degree candidates must attend a minimum of 6 graduate seminars approved for the degree program. Approved seminars are publicized on the departmental website.

To demonstrate completion of the seminar requirement, students must register for ECE 795 Engineering Seminar in their final semester. The department office will verify that the seminar requirement has been met and submit a grade of S (satisfactory) upon completion of the requirement. Students who have not met the seminar requirement in their final semester must continue to register for ECE 795 in subsequent semesters until the requirement is met.

Thesis/Scholarly Paper Option

To complete the program, students may select one of the following options:

Thesis Option

Students who select this option must complete:

Code	Title	Credits
ECE 799	Master's Thesis	6
Coursework		24
Total Credits		30

The thesis is particularly recommended for those students who wish to develop and document their research skills or contemplate subsequent enrollment in a PhD program. The thesis involves a research effort, which is conducted under the guidance of a faculty advisor. Choosing the thesis option requires approval of a full-time faculty member willing to serve as a thesis advisor. The topic and scope of the thesis must be approved by the thesis advisor. In some cases, permission may be granted to complete a portion of the work at the student's place of employment. The final written thesis and oral defense are approved by the student's advisory committee.

This committee consists of at least three full-time faculty members, including two from the student's concentration, and one from outside the concentration. Thesis students may not register for ECE 798 Research Project. Students must register for at least 3 credits of ECE 799 Master's Thesis for their first thesis semester. Following their first thesis semester, they must register for at least 1 credit of ECE 799 Master's Thesis each fall and spring semester until graduation.

Scholarly Paper Option

Students who select to complete their degree program with a scholarly paper must:

Code	Title	Credits
Complete 30 credits of coursework		30
ECE 797	Scholarly Paper	0
Enroll in a 600-level or above course requiring a research project		
Write a Scholarly Paper project report and present findings as part of the course requirements		
Total Credits		30

An acceptable scholarly paper must be technically sound, adhere to accepted formatting standards for technical reports, and contain a significant literature review evidenced by a comprehensive list of cited references.

A list of courses requiring projects that can be used to satisfy the scholarly paper requirement will be published on the department website. Scholarly papers must be individual written project reports – not group projects. To qualify as a scholarly paper an oral presentation of the project is required. A passing grade for the project, reflecting both the written report and the oral presentation, satisfies the scholarly paper requirement.

A successful scholarly paper will be recorded by awarding a satisfactory (S) grade for ECE 797 Scholarly Paper. Students are eligible to attempt the scholarly paper and register for ECE 797 Scholarly Paper after completion of 18 hours of coursework. Students choosing the scholarly paper option are not eligible for graduation until they have received a final, passing grade for ECE 797 Scholarly Paper.

Accelerated Master's

Computer Engineering, BS/Electrical Engineering, Accelerated MS

Overview

Highly-qualified undergraduates may be admitted to the bachelor's/accelerated master's program and obtain a BS in Computer Engineering (http://catalog.gmu.edu/colleges-schools/engineering-computing/engineering/electrical-computer/computer-engineering-bs/) and an MS in Electrical Engineering in an accelerated time-frame after satisfactory completion of a minimum of 144 credits.

See AP.6.7 Bachelor's/Accelerated Master's Degrees (http://catalog.gmu.edu/policies/academic/graduate-policies/#ap-6-7) for policies related to this program.

Students in an accelerated degree program must fulfill all university requirements for the master's degree. For policies governing all graduate degrees, see AP.6 Graduate Policies (http://catalog.gmu.edu/policies/academic/graduate-policies/).

BAM Pathway Admission Requirements

Applicants to all graduate programs at George Mason University must meet the admission standards and application requirements for graduate study as specified in Graduate Admissions Policies and Bachelor's/Accelerated Master's Degree policies.

Students will be considered for admission into the BAM Pathway after completion of a minimum of 60 credits with an overall GPA of 3.0.

Students who are accepted into the BAM Pathway will be allowed to register for graduate level courses after successful completion of a minimum of 75 undergraduate credits and course-specific pre-requisites.

Accelerated Master's Admission Requirements

Students already admitted in the BAM Pathway will be admitted to the MS program, if they have met the following criteria, as verified on the Bachelor's/Accelerated Master's Transition form: 3.0 overall GPA, successfully meeting Mason's requirements for undergraduate degree conferral (graduation), and completing the application for graduation.

Accelerated Pathway Requirements

To maintain the integrity and quality of both the undergraduate and graduate degree programs, undergraduate students interested in taking graduate courses must choose from the following:

Advanced standing courses: Students may take up to 12 credits of graduate-level courses that will count as advanced standing (i.e., overlap between the BS/MS program) from the list below. Note that ECE 542 can be used to meet the ECE 465 requirement for the BS in Electrical Engineering program. An additional 9 credits of graduate-level courses from the list below may be selected to substitute in place of the 9 credits of technical electives required for the undergraduate degree.

Code	Title	Credits
ECE 505	Hardware Security	3
ECE 508	Internet of Things	3
ECE 511	Computer Architecture	3
ECE 512	Computer Architecture Security	3

ECE 513	Applied Electromagnetic Theory	3
ECE 514	Grid Digitization and Automation	3
ECE 516	Mobile Systems and Applications	3
ECE 517	Cyber Infrastructure of the Smart Grid	3
ECE 518	Power System Protection and Control	3
ECE 519	Power Electronics for Modern Power Systems	3
ECE 521	Linear Systems and Control	3
ECE 527	Learning From Data	3
ECE 528	Introduction to Random Processes in Electrical and Computer Engineering	3
ECE 530	Sensor Engineering	3
ECE 531	Introduction to Wireless Communications and Networks	3
ECE 532	Secure Wireless Communications and Networks	3
ECE 535	Digital Signal Processing	3
ECE 538	Medical Imaging	3
ECE 539	Neural Engineering	3
ECE 542	Computer Network Architectures and Protocols	3
ECE 550	System Engineering Design	3
ECE 552	Big Data Technologies	3
ECE 554	Machine Learning for Embedded Systems	3
ECE 555	GPU Architecture and Programming	3
ECE 556	Neuromorphic Computing	3
ECE 565	Introduction to Optical Electronics	3
ECE 567	Optical Fiber Communications	3
ECE 580	Small Spacecraft Engineering	3
ECE 584	Semiconductor Device Fundamentals	3
ECE 586	Digital Integrated Circuits	3
ECE 587	Design of Analog Integrated Circuits	3
ECE 590	Selected Topics in Engineering	3

Selected 600 level courses may be taken as well with permission of an advisor granted before registering for a given course.

Reserve credit courses: Additional courses (up to 6 credits) may be selected from the above list as credits to be put on reserve to be later applied to the graduate program. Students can take these courses while undergraduates but these reserve courses will only count for the graduate degree program.

For more detailed information on coursework and timeline requirements, see AP.6.7 Bachelor's/Accelerated Master's Degrees (http://catalog.gmu.edu/policies/academic/graduate-policies/#ap-6-7).

Degree Conferral

Students must apply the semester before they expect to complete the BS requirements to have the BS degree conferred. In addition, at the beginning of the student's final undergraduate semester, students must complete a Bachelor's/Accelerated Master's Transition form. At the completion of MS requirements, a master's degree is conferred.

Electrical Engineering, BS/Electrical Engineering, Accelerated MS

Overview

Highly-qualified undergraduates may be admitted to the bachelor's/accelerated master's program and obtain a BS in Electrical Engineering (http://catalog.gmu.edu/colleges-schools/engineering-computing/engineering/electrical-computer/electrical-engineering-bs/) and an MS in Electrical Engineering in an accelerated time-frame after satisfactory completion of a minimum of 139 credits.

See AP.6.7 Bachelor's/Accelerated Master's Degrees (http://catalog.gmu.edu/policies/academic/graduate-policies/#ap-6-7) for policies related to this program.

Students in an accelerated degree program must fulfill all university requirements for the master's degree. For policies governing all graduate degrees, see AP.6 Graduate Policies (http://catalog.gmu.edu/policies/academic/graduate-policies/).

BAM Pathway Admission Requirements

Applicants to all graduate programs at George Mason University must meet the admission standards and application requirements for graduate study as specified in Graduate Admissions Policies and Bachelor's/Accelerated Master's Degree policies.

Students will be considered for admission into the BAM Pathway after completion of a minimum of 60 credits with an overall GPA of 3.0.

Students who are accepted into the BAM Pathway will be allowed to register for graduate level courses after successful completion of a minimum of 75 undergraduate credits and course-specific prerequisites.

Accelerated Master's Admission Requirements

Students already admitted in the BAM Pathway will be admitted to the MS program, if they have met the following criteria, as verified on the Bachelor's/Accelerated Master's Transition form: 3.0 overall GPA, successfully meeting Mason's requirements for undergraduate degree conferral (graduation), and completing the application for graduation.

Accelerated Pathway Requirements

To maintain the integrity and quality of both the undergraduate and graduate degree programs, undergraduate students interested in taking graduate courses must choose from the following:

Advanced standing courses: Students may take up to 12 credits of graduate-level courses that will count as advanced standing (i.e., overlap between the BS/MS program) from the list below: Note that that either ECE 584 Semiconductor Device Fundamentals or ECE 586 Digital Integrated Circuits or ECE 587 Design of Analog Integrated Circuits can be used to meet the ECE 433 Linear Electronics II requirement for the BS in Electrical Engineering program. An additional 9 credits of graduate-level courses from the list below may be selected to substitute in place of the 9 credits of technical electives required for the undergraduate degree:

Code	Title	Credits
ECE 505	Hardware Security	3
ECE 508	Internet of Things	3
ECE 511	Computer Architecture	3
ECE 512	Computer Architecture Security	3
ECE 513	Applied Electromagnetic Theory	3

ECE 514	Grid Digitization and Automation	3
ECE 516	Mobile Systems and Applications	3
ECE 517	Cyber Infrastructure of the Smart Grid	3
ECE 518	Power System Protection and Control	3
ECE 519	Power Electronics for Modern Power Systems	3
ECE 521	Linear Systems and Control	3
ECE 527	Learning From Data	3
ECE 528	Introduction to Random Processes in Electrical and Computer Engineering	3
ECE 530	Sensor Engineering	3
ECE 531	Introduction to Wireless Communications and Networks	3
ECE 532	Secure Wireless Communications and Networks	3
ECE 535	Digital Signal Processing	3
ECE 538	Medical Imaging	3
ECE 539	Neural Engineering	3
ECE 542	Computer Network Architectures and Protocols	3
ECE 550	System Engineering Design	3
ECE 552	Big Data Technologies	3
ECE 554	Machine Learning for Embedded Systems	3
ECE 555	GPU Architecture and Programming	3
ECE 556	Neuromorphic Computing	3
ECE 565	Introduction to Optical Electronics	3
ECE 567	Optical Fiber Communications	3
ECE 580	Small Spacecraft Engineering	3
ECE 584	Semiconductor Device Fundamentals	3
ECE 586	Digital Integrated Circuits	3
ECE 587	Design of Analog Integrated Circuits	3
ECE 590	Selected Topics in Engineering	3

Selected 600 level courses may be taken as well with permission of an advisor granted before registering for a given course.

Reserve credit courses: Additional courses (up to 6 credits) may be selected from the above list as credits to be put on reserve to be later applied to the graduate program. Students can take these courses while undergraduates but these reserve courses will only count for the graduate degree program.

For more detailed information on coursework and timeline requirements, see AP.6.7 Bachelor's/Accelerated Master's Degrees (http://catalog.gmu.edu/policies/academic/graduate-policies/#ap-6-7)

Degree Conferral

Students must apply the semester before they expect to complete the BS requirements to have the BS degree conferred. In addition, at the beginning of the student's final undergraduate semester, students must complete a Bachelor's/Accelerated Master's Transition form. At the completion of MS requirements, a master's degree is conferred.

Mechanical Engineering, BS/Electrical Engineering, Accelerated MS

Overview

The university offers highly-qualified students in the Mechanical Engineering, BS (http://catalog.gmu.edu/colleges-schools/engineering-computing/engineering/mechanical/mechanical-engineering-bs/) the option of obtaining an accelerated Electrical Engineering, MS.

For more detailed information, see AP.6.7 Bachelor's/Accelerated Master's Degrees (http://catalog.gmu.edu/policies/academic/graduate-policies/#ap-6-7). For policies governing all graduate degrees, see AP.6 Graduate Policies (http://catalog.gmu.edu/policies/academic/graduate-policies/#text).

Admission Requirements

Students in the Mechanical Engineering, BS (http://catalog.gmu.edu/colleges-schools/engineering-computing/engineering/mechanical/mechanical-engineering-bs/) program may apply for this option if they have earned 60 undergraduate credits, with an overall GPA of at least 3.0, and passed MATH 203 Linear Algebra and STAT 346 Probability for Engineers, or their equivalents, with the grade C or better. Criteria for admission are identical to criteria for admission to the Electrical Engineering, MS program.

Students who are accepted into the BAM Pathway will be allowed to register for graduate level courses after successful completion of a minimum of 75 undergraduate credits and course-specific pre-requisites.

Accelerated Option Requirements

Students must complete all credits that satisfy the requirements for the BS and MS programs, with up to 9 credits overlapping.

Students take up to 9 credits of 500-level ECE (http://catalog.gmu.edu/courses/ece/) or SYST (http://catalog.gmu.edu/courses/syst/) courses as part of their technical electives or substitutes for required courses in the Mechanical Engineering, BS (http://catalog.gmu.edu/colleges-schools/engineering-computing/engineering/mechanical/mechanical-engineering-bs/) program.

Specifically, students are encouraged to take up to three of the following courses:

Code	Title	Credits
ECE 521	Linear Systems and Control	3
ECE 527	Learning From Data	3
ECE 528	Introduction to Random Processes in Electrical and Computer Engineering	3
ECE 539	Neural Engineering	3
ECE 580	Small Spacecraft Engineering	3
SYST 521	Network Analysis	3

Degree Conferral

Students must apply the semester before they expect to complete the BS requirements to have the BS degree conferred. In addition, at the beginning of the student's final undergraduate semester, students must complete a Bachelor's/Accelerated Master's Transition form. At the completion of MS requirements, a master's degree is conferred.