

Volgenau School of Engineering - Computer Engineering, BS with Concentration in Hardware and System Security				
Catalog Year: 2019 - 2020		Grades		
Mason Core Res (21 credits)	Course Information	Credits	Earned	Needed
Written Communication:	ENGH 101 (100)	3		
*Oral Communication	*Satisfied by Major Requirements			
*Quantitative Reasoning	*Satisfied by Major Requirements			
*Information Technology	*Satisfied by Major Requirements			
Arts		3		
Global Understanding		3		
Literature		3		
*Natural Science	*Satisfied by Major Requirements			
*Social & Behavioral Science	*Satisfied by ECON 103	3		
Western Civ/World History		3		
**Written Communication	ENGH 302 - **Natural Science Section Only	3		
*Capstone/Synthesis	*Satisfied by Major Requirements			
Major Requirements (117 credits) Students must complete each ECE, ENGR, BENG, CS, MATH, PHYS and STAT course presented as part of the required 126 credits for the degree with a grade of C or better and any course required by the program that is a prerequisite to another course applicable to the degree with a grade of C or better				
Electrical and Computer Engineering Requirements (44 credits)		Credits	Earned	Needed
ECE 101	Introduction to Electrical and Computer Engineering	3		
ECE 201	Introduction to Signals and Systems	3		
ECE 220	Continuous-Time Signals and Systems	3		
ECE 285	Electric Circuit Analysis I	3		
ECE 286	Electric Circuit Analysis II	3		
ECE 331	Digital System Design	3		
ECE 332	Digital Electronics and Logic Design Lab	1		
ECE 333	Linear Electronics I	3		
ECE 334	Linear Electronics Lab I	1		
ECE 350	Embedded Systems and Hardware Interfaces	3		
ECE 445	Computer Organization	3		
ECE 447	Single-Chip Microcomputers	4		
ECE 448	FPGA and ASIC Design with VHDL	4		
ECE 465	Computer Networking Protocols	3		
ECE 491	Engineering Seminar	1		
ECE 492	Senior Advanced Design Project I	1		
ECE 493	RS: Senior Advanced Design Project II	2		
Technical Electives (9 credits) from: ECE 370, 410, 415, 421, 422, 424, 431, 433, 446, 450, 460, 462, 463, 470, 499; CYSE 425, 462, 476. These courses may be taken with prior approval: ECE 505, 508, 510, 516, 521, 527, 528, 530, 531, 535, 542, 567, 580, 590				
Additional Support Coursework (62 credits)		Credits		
COMM 100 or 101	Public Speaking or Fundamentals of Communication	3		
CS 112	Introduction to Computer Programming	4		
CS 211	Object-Oriented Programming	3		
CS 222	Computer Programming for Engineers	3		
CS 310	Data Structures	3		
CS 471	Operating Systems	3		
MATH 113	Analytic Geometry and Calculus I	4		
MATH 114	Analytic Geometry and Calculus II	4		
MATH 125	Discrete Mathematics I	3		
MATH 203	Linear Algebra	3		
MATH 213	Analytic Geometry and Calculus III	3		
MATH 214	Elementary Differential Equations	3		
STAT 346	Probability for Engineers	3		
PHYS 160/161 and 260/261	University Physics I & II	8		
ENGR 107	Introduction to Engineering (Mason Core)	2		
Concentration in Hardware and System Security (12 credits)				
ECE 465	Computer Networking Protocols	3		
ECE 505	Hardware Security	3		
Two from: ECE 462; CYSE 425, 476		6		



Volgenau School of Engineering

COMPUTER ENGINEERING, B.S. 2019 - 2020

The field of computer engineering plays a major role in everyone's life. Computer engineers are involved in research, development, design, production and operation of a wide variety of products ranging from devices as small as a billionth of a meter, to systems of communication networks spanning large geographical areas and serving millions of people. Computer Engineering is an amalgam of the strongly computer hardware orientation of an electrical engineering program and the operating systems and languages of a computer science program. Reflecting the industry trend to integrate hardware and software development, as well as to blur the lines between hardware and software, the Computer Engineering program is built around software, running on advanced hardware that can simulate and assist in the design of hardware. The curriculum incorporates VHDL (VHSIC Hardware Description Language), one of the two major hardware description languages used throughout the computer engineering industry to model hardware and hardware functionality from the system and architecture level down to the gate level and to include relations to integrated circuit fabrication technology. Senior level coursework delivers in-depth knowledge in the important areas of Computer Networks, Embedded Systems, Hardware and System Security, Internet of Things and Robotics. The program culminates with a senior design project in the final year, where students work in teams to design and build a physical, functional device relying on knowledge and experience gained through the theoretical and laboratory based coursework. Career opportunities exist in the areas of basic research, product design, software engineering, project engineering, engineering management, engineering consultancy, technical sales and many others.

The Computer Engineering program prepares the graduate either for direct entry into a career in engineering or for graduate study. It is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>. Recent George Mason computer engineering graduates have gone on to graduate work at highly competitive institutions such as MIT, Stanford, Cornell and California Institute of Technology, and as working engineers at high technology companies and government agencies such as Amazon, BAE Systems, Boeing, General Electric, General Dynamics, IBM, INTEL, Lockheed-Martin, MITRE, NASA, Naval Research Lab, Northrop Grumman, Orbital Sciences, Raytheon, among many others.

Degree Requirements

The computer engineering curriculum requires 126 total credit hours, which can be completed within eight semesters. At least 45 semester hours of the degree requirements must be level 300 or above. Students may wish to consider an extra semester or two for the purpose of lightening the course load (particularly for those with part-time employment); participating in Cooperative Education or work-study (with local industry); achieving a double major (for example with electrical engineering, physics, mathematics, systems engineering or computer science); or adding a minor such as mechanical engineering, business, computer science, mathematics or physics.

COMPUTER ENGINEERING, B.S.

2019-2020 Sample Schedule for Undergraduate Computer Engineering Majors

First Semester

CS 112 Intro to Computer Programming	4
ECON 103 Contemp. Microeconomic Prin.	3
*Mason Core	3
ENGR 107 Intro to Engineering	2
MATH 113 Calculus I	4

Total Hours 16

Second Semester

CS 211 Object-Oriented Programming	3
MATH 114 Analytic Geom. and Calculus II	4
MATH 125 Discrete Math	3
PHYS 160 University Physics I	3
PHYS 161 University Physics I Lab	1
ECE 101 Intro. to Electrical and Computer Engg	3

Total Hours 17

Third Semester

CS 222 Computer Programming for Engineers	3
MATH 213 Analytic Geom. and Calculus III	3
ECE 201 Intro. to Signals and Systems	3
PHYS 260 University Physics II	3
PHYS 261 University Physics II Lab	1
*Mason Core	3

Total Hours 16

Fourth Semester

ECE 285 Electric Circuit Analysis I	3
MATH 203 Linear Algebra	3
MATH 214 Elem. Differential Equations	3
CS 310 Data Structures	3
ECE 331 Digital System Design	3
ECE 332 Digital Electr. and Logic Design Lab	1

Total Hours 16

Fifth Semester

ECE 220 Cont-Time Signals and Systems	3
ECE 445 Computer Organization	3
ECE 286 Electric Circuit Analysis II	3
ECE 333 Linear Electronics I	3
ECE 334 Linear Electronics Lab I	1
ECE 350 Embedded Systems and H/W Interfaces	3

Total Hours 16

Sixth Semester

*Mason Core	3
CS 471 Operating Systems	3
ECE 448 FPGA and ASIC Design w/VHDL	4
**ENGH 302 Advanced Composition (Natural Science/ Tech section)	3
STAT 346 Probability for Engineers	3

Total Hours 16

Seventh Semester

Technical Elective	3
*Mason Core	3
ECE 447 Single-Chip Microcomputers	4
ECE 491 Engineering Seminar	1
ECE 492 Senior Advanced Design Project I	1
*Mason Core	3

Total Hours 15

Eighth Semester

Technical Elective	3
Technical Elective	3
*Mason Core	3
ECE 493 Senior Advanced Design Project II	2
ECE 465 Computer Networking Protocols	3

Total Hours 14

*<http://catalog.gmu.edu/mason-core> Mason Core Categories: One course from each: Oral Communication, ENGH101, Arts, Global Understanding, Literature, and Western Civilization/World History. VSE students do not need to seek out Science, Math, and IT categories as they are built into the major curriculum.

**ENGH 101 and Mason Core-Literature must be completed before taking ENGH 302.-The ECE technical electives should be selected from the department's list of approved courses. -Undergraduate students may be able to take some 500 level ECE courses as technical electives with permission from the department.

-Students who are accepted into the accelerated Master's program entering their senior year may use up to 6 credits of 500-level courses to meet both BS and MS program requirements, thereby reducing the number of credits required to complete a Master's program upon transition to graduate studies. -While students are encouraged to follow this schedule to ensure that course pre-requisites are met, please come and see the ECE Dept Academic Advisor for alternate schedules.

We invite requests for additional information. Please contact:

George Mason University
 Volgenau School of Engineering
 Department of Electrical and Computer Engineering
 Nguyen Engineering Building, Suite 3100, Mail Stop 1G5
 Fairfax, VA 22030-4444
 Phone: (703) 993-1569 Fax: (703) 993-1601 ece@gmu.edu
<http://ece.gmu.edu> <http://vse.gmu.edu>