George Mason University
The Volgenau School of Engineering
4300 Nguyen Engineering, 703-993-1530
http://cs.gmu.edu/

B.S. Degree in Computer Science Checklist
2016-2017 Catalog

This bachelor's degree program is accredited by the Computing Accreditation Commission of ABET, http://www.abet.org.

Degree Requirements

For the BSCS degree, students must complete 120 credits, including the Mason Core requirements. The program requires foundation, core, and concentration courses as described below.

Mason Core (24 Credits) - See http://catalog.gmu.edu for course listings

Course Name	Credits:	Term Taken	Grade
Written Communication: ENGH 101 (100) & 302 **(Natural Science)**	Credits: 6		
Literature	Credits: 3		
Arts	Credits: 3		
Western Civilization/World History: HIST 100 or 125	Credits: 3		
Social and Behavioral Science	Credits: 3		
Global Understanding	Credits: 3		
COMM 100 - Public Speaking	Credits: 3		

• Computer Science students must make a technical presentation. COMM 100 fulfills the Mason Core requirement in oral communication for Volgenau School students.

Additional Humanities (3 credits)

Students must complete three additional credits of Humanities courses. This can be fulfilled by any Mason Core course **except** those listed under Information Technology, Synthesis, Quantitative Reasoning, or Natural Science. Students wishing to substitute alternate courses for this requirement must obtain departmental approval.

Additional Humanities Course:	Credits: 3		

Computer Science Core (36 Credits)

Course Name	Credits:	Term Taken	Grade
CS 101 - Preview of Computer Science	Credits: 2		
CS 105 - Computer Ethics and Society	Credits: 1		
CS 112 - Introduction to Computer Programming	Credits: 4		
CS 211 - Object-Oriented Programming	Credits: 3		
CS 262 - Introduction to Low-Level Programming	Credits: 2		
CS 306 – Synthesis of Ethics and Law for the Computing Professional	Credits: 3		
CS 310 – Data Structures	Credits: 3		
CS 321 – Software Engineering	Credits: 3		
CS 330 – Formal Methods and Models	Credits: 3		
CS 367 – Computer Systems and Programming	Credits: 3		
CS 465 – Computer Systems Architecture	Credits: 3		
CS 483 – Analysis of Algorithms	Credits: 3		
ECE 301 – Digital Electronics	Credits: 3		

Senior Computing Science (15 Credits)			
Course Name (One of the following): (3 Credits)	Credits:	Term Taken	Grade
CS 463 – Comparative Programming Languages or	Credits: 3		
CS 471 – Operating Systems or	Credits: 3		
CS 475 – Concurrent and Distributed Systems	Credits: 3		
And four additional courses chosen from: (12 Credits)			
Course Name			
CS 425 - Game Programming I	Credits: 3		
CS 440 - Language Processors and Programming Environments	Credits: 3		
CS 450 - Database Concepts	Credits: 3		
CS 451 - Computer Graphics	Credits: 3		
CS 455 - Computer Communications and Networking	Credits: 3		
CS 463 - Comparative Programming Languages	Credits: 3		
CS 468 - Secure Programming and Systems	Credits: 3		
CS 469 - Security Engineering	Credits: 3		
CS 471 - Operating Systems	Credits: 3		
CS 475 - Concurrent and Distributed Systems	Credits: 3		
CS 477 - Mobile Application Development	Credits: 3		
CS 480 - Introduction to Artificial Intelligence	Credits: 3		
CS 482 - Computer Vision	Credits: 3		
CS 484 - Data Mining	Credits: 3		
CS 485 - Autonomous Robotics	Credits: 3		
CS 490 - Design Exhibition	Credits: 3		
CS 499 - Special Topics in Computer Science (Only three credits of CS 499 can be used toward the senior computer science requirement.)	Credits: 3		
MATH 446 - Numerical Analysis I **OR** OR 481 - Numerical Methods in Engineering	Credits: 3		

Computer Science-Related Courses (6 credits)			
Course Name (Two courses chosen from):	Credits:	Term Taken	Grade
STAT 354 - Probability and Statistics for Engineers and Scientists II	Credits: 3		
OR 335 - Discrete Systems Modeling and Simulation	Credits: 3		
OR 441 - Deterministic Operations Research	Credits: 3		
OR 442 - Stochastic Operations Research	Credits: 3		
ECE 280 - Electric Circuit Analysis	Credits: 5		
ECE 431 - Digital Circuit Design	Credits: 3		
ECE 447 - Single-Chip Microcomputers	Credits: 4		
ECE 450 - Introduction to Robotics	Credits: 3		
ECE 511 - Microprocessors	Credits: 3		
SWE 432 - Design and Implementation of Software for the Web	Credits: 3		
SWE 437 - Software Testing and Maintenance	Credits: 3		
SWE 443 - Software Architectures	Credits: 3		
SYST 371 - Systems Engineering Management	Credits: 3		
SYST 470 - Human Factors Engineering	Credits: 3		
PHIL 371 - Philosophy of Natural Sciences	Credits: 3		
PHIL 376 - Symbolic Logic	Credits: 3		
ENGH 388 - Professional and Technical Writing	Credits: 3		
Any MATH or CS course numbered above 300 (except MATH 351)	Credits: 3		
Note: Those planning to take MATH 352 should replace STAT 344 with MATH 351			

Mathematics/Statistics (20 credits)			
Course Name	**Credits:**	**Term Taken**	**Grade**
MATH 113 - Analytic Geometry and Calculus I	Credits: 4		
MATH 114 - Analytic Geometry and Calculus II	Credits: 4		
MATH 125 - Discrete Mathematics I	Credits: 3		
MATH 203 - Linear Algebra	Credits: 3		
MATH 213 - Analytic Geometry and Calculus III	Credits: 3		
STAT 344 - Probability and Statistics for Engineers and Scientists I	Credits: 3		

Natural Science (12 credits)			
The BS in Computer Science requires 12 credits of natural science. The courses should be intended for science and engineering students and **must include a two course sequence** with laboratories. Some approved combinations have a total of more than 12 hours. Approved two course sequences with laboratories are:			
· **Astronomy:**			
ASTR 111 - Introductory Astronomy: The Solar System ASTR 112 - Introductory Astronomy Lab: The Solar System	Credits: 3 Credits: 1		
ASTR 113 - Introductory Astronomy: Stars, Galaxies, and the Universe ASTR 114 - Introductory Astronomy Lab: Stars, Galaxies, and the Universe	Credits: 3 Credits: 1		
· **Biology:**			
BIOL 103 - Introductory Biology I	Credits: 4		
BIOL 104 - Introductory Biology II	Credits: 4		
· **Chemistry:**			
CHEM 211 - General Chemistry I CHEM 213 –General Chemistry Laboratory I	Credits: 3 Credits: 1		
CHEM 212 - General Chemistry II CHEM 214 - General Chemistry Laboratory II	Credits: 3 Credits: 1		
· **Environmental Science:**			
EVPP 110 - The Ecosphere: An Introduction to Environmental Science I	Credits: 4		
EVPP 111 - The Ecosphere: An Introduction to Environmental Science II	Credits: 4		
· **Geology:**			
GEOL 101 - Introductory Geology I	Credits: 4		
GEOL 102 - Introductory Geology II	Credits: 4		
· **Physics:**			
PHYS 160 - University Physics I PHYS 161 - University Physics I Laboratory	Credits: 3 Credits: 1		
PHYS 260 - University Physics II PHYS 261 - University Physics II Laboratory	Credits: 3 Credits: 1		

Electives (4 credits) Students must complete 4 elective credits.
Total: 120 credits (with 45+ Upper Division)

See page 4 for CS Policies and Procedures

CS Policies and Procedures

- **Note**: MATH 104, MATH 105, and MATH 108 cannot be counted toward this degree.

- **CS 101, 105, and 306:** Students must take CS 101 within their first year at the university. Students should take CS 105 during their second semester. A grade of C or better must be earned in CS 306 for this course to satisfy the Mason Core synthesis requirement.

- **Grades**

  Students must earn a C or better in any course intended to satisfy a prerequisite for a computer science course. Computer science majors may not use more than one course with grade of C- or lower toward department requirements.

- **Repeating Courses**

  Students may attempt an undergraduate course taught by the Volgenau School of Engineering twice. A third attempt requires approval of the department offering the course. This policy does not apply to STAT 250, which follows the normal university policy for repeating undergraduate courses.

  The CS Department may not allow students to retake certain high-demand CS courses in which they have already earned a grade of C or better simply to improve their GPA.

- **Termination from the Major**

  No math, science, or Volgenau School of Engineering course, required for the major, may be attempted more than three times. Those students who do not successfully complete such a course within three attempts will be terminated from the major. Undeclared students in the Volgenau School who do not successfully complete a course required for a Volgenau School major within three attempts will also be terminated. For more information, see the "Termination from the Major" section under AP.5 Undergraduate Policies.

  Once a student has attempted one of these courses twice unsuccessfully, the third attempt must be no later than the next semester of enrollment, excluding summers. Failure to take the course at that time will result in termination from the major. If the student is unable to take the course when required, the student may request an extension to a future semester; extensions require approval of the student's advisor, their department, and the Associate Dean for Undergraduate Programs. The deadline for extension requests is the add deadline for the semester in which the course is required.

  Students who have been terminated from a Volgenau School of Engineering major may not register for a Volgenau School course without permission of the department offering the course. This applies to all undergraduate courses offered by the Volgenau School except IT 104 and STAT 250.

  A student may not declare any major in the Volgenau School of Engineering if the student has previously met the termination criteria for that major at any time, regardless of what the student's major was at the time the courses were taken.

- **Writing-Intensive Requirement**

  Computer science majors complete the writing-intensive requirement through a sequence of projects and reports in CS 306 and CS 321. Faculty members provide feedback on students' expository writing.