The Bachelor of Science degree in Applied Computer Science (BS ACS) has been created for those students who want the knowledge and expertise of computer science to work in one of the many disciplines that require advanced computing techniques. These fields do not merely “use” computing but create new and interesting problems for the computer scientist. One such field is the area of Software Engineering.

The objectives of the BS ACS concentration in Software Engineering are to provide students with the following:

1. The fundamental knowledge regarding theory, methods and applications of Computer Science.
2. Foundational knowledge in engineering principles as applied to producing high quality software.
3. An understanding of how to integrate Computer Science and Software Engineering to produce software that is usable, reliable, maintainable, secure, scalable and efficient.
4. Preparation for employment as a software engineer in the software industry.
5. Preparation for graduate studies in fields such as Software Engineering and Computer Science.

Application Area

Software Engineering is one of the largest global industries today. Jobs are plentiful and salaries are high. Whereas in past decades, the success of software was due to efficiency, algorithms and time-to-market; 21st century software must be usable, reliable, maintainable, secure, scalable and efficient. Creating high quality software requires teams of people with highly developed and diverse skills and knowledge of cutting-edge technologies. This program is ideal for students who want careers designing, building and evaluating high quality software products, either as part of a unified team or in leadership roles.

Degree Requirements

The BS ACS in Software Engineering program can be successfully completed within the normal 120 semester hour degree at GMU. In addition to Mason Core requirements including humanities, and social science, the BS ACS Software Engineering concentration requires foundation, core, and elective courses. These course requirements provide students with expertise in programming, computer systems, software requirements and modeling, formal methods and analysis of algorithms. At least 45 semester hours of the degree requirements must be at the 300 level or above.

Sample Schedule

FIRST SEMESTER (14 CREDITS)
CS 110 Essentials of Computer Science 3
CS 112 Introduction to Programming 4
MATH 113 Analytical Geometry & Calculus 4
Mason Core* 3

SECOND SEMESTER (16 CREDITS)
CS 211 Object-Oriented Programming 3
MATH 114 Analytical Geometry & Calculus II 4
SWE 205 Software Usability Design & Analysis 3
Mason Core* 3
Mason Core* 3

THIRD SEMESTER (14 CREDITS)
CS 262 Low-Level Programming 3
CS 310 Data Structures 3
MATH 125 Discrete Mathematics 3
Natural Science w/ Lab 4
Elective 1

FOURTH SEMESTER (16 CREDITS)
CS 330 Formal Methods & Models 3
CS 367 Computer Systems and Programming 4
MATH 203 Linear Algebra 3
Mason Core* 3
Natural Science 3

FIFTH SEMESTER (15 CREDITS)
CS/SWE 332 OO Software Design & Implementation 3
STAT 344 Prob/Stat for Engrs & Scientists 3
SWE Cross Disciplinary Elective 3
ENGH 302 Advanced Composition*** 3
Mason Core* 3

SIXTH SEMESTER (15 CREDITS)
CS/SWE 321 Software Engineering 3
SWE 437 Software Testing and Maintenance 3
SWE 301 Internship Preparation 0
SWE Related Elective 3
Mason Core* 3
Mason Core* 3

SEVENTH SEMESTER (15 CREDITS)
SWE Related Elective 3
SWE Related Elective 3
CS 471 Operating Systems 3
ENGH 388 Professional/Technical Writing 3
SWE 401 Internship Reflection 1
Elective 2

EIGHTH SEMESTER (15 CREDITS)
SWE Related Elective 3
SWE Related Elective 3
CS 306 Synth of Ethics & Law for Computing Professional 3
CS 483 Analysis of Algorithms 3
CS Senior Elective 3

We invite requests for additional information. Please contact:
Phone: 703-993-1530; Email: csug@gmu.edu; Website: cs.gmu.edu

* http://catalog.gmu.edu/mason-core  Mason Core Categories: One course from each: ENGH101, Oral Communication, Arts, Global Understanding, Literature, Western Civilization/World History, Social Behavioral Science, Natural Science, and Natural Science w/ Lab

*** ENGH 101 and Mason Core-Literature must be completed before taking ENGH 302. ACS-SWE students do not need to seek out IT, and Quantitative Reasoning categories as they are built into the major curriculum.
Volgenau School of Engineering

APPLIED COMPUTER SCIENCE, B.S.
Concentration in Computer Game Design
2019 - 2020

The Bachelor of Science degree in Applied Computer Science (BS ACS) has been created for those students who want the knowledge and expertise of computer science to work in one of the many disciplines that require advanced computing techniques. These fields do not merely “use” computing but create new and interesting problems for the computer scientist. One such field is the area of Computer Game Design.

The objectives of the BS ACS concentration in Computer Game Design are to provide students with the following:

1. The fundamental knowledge regarding theory, methods and applications of Computer Science.
3. Knowledge of concepts that integrate Computer Science and artistic creativity to develop computer games.
4. Preparation for employment as a programmer in the computer games industry.
5. Preparation for graduate studies in fields such as Computer Science and digital entertainment.

Application Area

Computer game development is a global multi-billion dollar industry with popular titles generating millions of dollars in revenue, sometimes in their first few weeks of release. Creating such titles require teams of highly skilled individuals covering such disciplines as computer science, art, animation, music, and storytelling. This program is aimed at those individuals wishing to pursue a career as a programmer in the computer games industry. As part of a highly skilled team, programmers should have an appreciation of all the disciplines in the game development process. Therefore, this program of study provides students with not only a sound background in Computer Science but also an opportunity to undertake courses in the College of Visual and Performing Arts. In addition, a number of Computer Science courses have been specially designed for this program to allow students to become proficient in the computer game development process (by actually creating games during their program of study). Many industries prize skills associated with computer game programming.

Degree Requirements

The BS ACS Game Design concentration can be successfully completed within the normal 120 semester hour degree at GMU. In addition to Mason Core requirements including humanities, and social science, the BS ACS Game Design concentration requires foundation, core, and elective courses. Course requirements provide students with expertise in programming, systems, software engineering, formal methods and analysis of algorithms. At least 45 semester hours of the degree requirements must be at the 300 level or above.

Sample Schedule

**FIRST SEMESTER (14 CREDITS)**
CS 110 Essentials of Computer Science 3
CS 112 Introduction to Programming 4
MATH 113 Analytical Geometry & Calculus 4
Mason Core* 3

**SECOND SEMESTER (14 CREDITS)**
AVT 104 Studio Fundamentals I (Art MC) 4
CS 211 Object-Oriented Programming 3
MATH 114 Analytical Geometry & Calculus II 4
GAME 230 History of Computer Game Design 3

**THIRD SEMESTER (15 CREDITS)**
MATH 125 Discrete Mathematics 3
CS 262 Low-Level Programming 3
CS 310 Data Structures 3
Mason Core* 3
Mason Core* 3

**FOURTH SEMESTER (16 CREDITS)**
CS 325 Introduction to Game Design 3
CS 351 Visual Computing 3
CS 367 Computer Systems and Programming 4
MATH 203 Linear Algebra 3
Mason Core* 3

**FIFTH SEMESTER (16 CREDITS)**
AVT 382 Digital Art and Animation 3
CS 330 Formal Methods and Models 3
ENGH 302 Advanced Composition*** 3
PHYS160+161 University Physics I + Lab 4
Mason Core* 3

**SIXTH SEMESTER (15 CREDITS)**
AVT 383 Three Dimensional Digital Art 3
CS 321 Software Engineering 3
CS 451 Computer Graphics 3
Natural Science w/ Lab 4
Elective 2

**SEVENTH SEMESTER (15 CREDITS)**
CS 425 Game Programming I 3
CS 483 Analysis of Algorithms 3
STAT 344 Prob/Stat for Engrs & Scientists 3
Mason Core* 3
Game Elective 3

**EIGHTH SEMESTER (15 CREDITS)**
CS 306 Synthesis of Ethics & Law 3
CS 471 Operating Systems 3
CS 426 Game Programming II 3
CS Senior Elective 3
Elective 3


*** ENGH 101 and Mason Core-Literature must be completed before taking ENGH 302. ACS-CGD students do not need to seek out IT, Arts, and Quantitative Reasoning categories as they are built into the major curriculum.