

**GEORGE MASON UNIVERSITY
VOLGENAU SCHOOL OF ENGINEERING
B.S. DEGREE IN APPLIED COMPUTER SCIENCE (COMPUTER GAME DESIGN CONCENTRATION)
(4300 Nguyen Engineering Building, 703-993-1530)
<http://cs.gmu.edu/programs/undergraduate/acs/>
2018 - 2019 CATALOG**

| | <u>Department(s) & Course #(s)</u> | <u>Completed/ Grade(s)</u> | <u>Needed</u> |
|--|--|--------------------------------|---------------|
| <u>MASON CORE REQUIREMENTS (21 credit hours required)</u> | | | |
| a. Written Communication: ENGH 101 (100), ENGH 302 – Natural Science Section Only (C or better) (3,3) | | | |
| b. Oral Communication: COMM 100 (3) | | | |
| c. Quantitative Reasoning (satisfied by completion of major requirements) | | | |
| d. Literature (3) | | | |
| e. Arts (satisfied by AVT 104) | | | |
| f. Western Civilization (HIST 100, 125, or acceptable transfer course) (3). | | | |
| g. Social & Behavioral Science (3) | | | |
| h. Natural Science (satisfied by completion of major requirements) | | | |
| i. Global Understanding (3) | | | |
| j. Information Technology (satisfied by completion of major requirements) | | | |
| k. Synthesis (satisfied by CS 306) Grade of C or Better Required | | | |

Applied Computer Science majors must take the Natural Sciences section of [ENGH 302](#).
Go to: <http://catalog.gmu.edu/mason-core/> to link to information on Mason Core requirements.

MAJOR REQUIREMENTS (94 credit hours required)

ACS Foundation Courses (24 credits)

| | | | |
|------------------------|----|---------|---------|
| a. CS 110 (3) | a. | ___ ___ | ___ ___ |
| b. CS 112, 211 (4,3) | b. | ___ ___ | ___ ___ |
| c. MATH 113, 114 (4,4) | c. | ___ ___ | ___ ___ |
| d. MATH 125, 203 (3,3) | d. | ___ ___ | ___ ___ |

ACS Core (22 credits)

| | | | |
|----------------------|----|---------|---------|
| a. CS 262 (3) | a. | ___ ___ | ___ ___ |
| b. CS 310, 321 (3,3) | b. | ___ ___ | ___ ___ |
| c. CS 330, 367 (3,4) | c. | ___ ___ | ___ ___ |
| d. CS 465, 483 (3,3) | d. | ___ ___ | ___ ___ |

ACS Elective (3 credits)

| | | | |
|--|----|-------|-------|
| a. One CS course numbered above 400 except CS 498 (3) CS _____ | a. | _____ | _____ |
|--|----|-------|-------|

COMPUTER GAME DESIGN CONCENTRATION (45 credit hours required)

| | | | |
|---|----|---------|---------|
| a. GAME 230, CS 325 (3,3) | a. | ___ ___ | ___ ___ |
| b. CS 306, 351 (3,3) | b. | ___ ___ | ___ ___ |
| c. AVT 104 (4) | c. | ___ ___ | ___ ___ |
| d. STAT 344 (3) | d. | ___ ___ | ___ ___ |
| e. CS 425, 426 (3,3) | e. | ___ ___ | ___ ___ |
| f. CS 451 (3) | f. | ___ ___ | ___ ___ |
| g. AVT 382, 383 (3,3) | g. | ___ ___ | ___ ___ |
| h. One approved elective related to game design (3) (circle choice) Chosen from: CS 332, 455, 475, 477, 480, 485; SWE 432; GAME 332; AVT 370, 374, 487 | h. | ___ ___ | ___ ___ |
| i. PHYS 160/161 & one additional lab science (list course) (3/1, 4) | i. | ___ ___ | ___ ___ |

GENERAL ELECTIVES (5 credits) (List courses) At most 3 credits of 100-level RECR coursework may be taken to satisfy the degree requirements of those VSE programs that allow general electives. _____

MATH 104, MATH 105, and MATH 108 cannot be counted toward this degree.

Students must take CS 110 within their first year at the university. A grade of C or better must be earned in [CS 306](#) for this course to satisfy the [Mason Core](#) synthesis requirement.

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.

MINIMUM 120 HOURS (including Minimum 45 UPPER DIVISION HOURS) to GRADUATE

This planning form is intended to be used in consultation with your academic advisor and reflects the requirements for the 2018 - 2019 Catalog; the University Catalog is the official reference for program requirements.

Volgenau School of Engineering

APPLIED COMPUTER SCIENCE, B.S. Concentration in Computer Game Design 2018 - 2019

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.
2. A foundation in artistic creativity subjects associated with digital entertainment.
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 | 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 |
| COMM 100 | 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 |
| Lab science | 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 |

* <http://catalog.gmu.edu/mason-core> Mason Core Categories: One course from each: ENGH101, 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, Quantitative Reasoning, and Oral Communication categories as they are built into the major curriculum.