

APPLIED COMPUTER SCIENCE, B.S.
Concentration in Geoinformatics
2023-2024

The Bachelor of Science degree in Applied Computer Science (BS ACS) has been created for those students who want and need 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.

The objectives of the BS ACS program are to provide students with the following:

1. The fundamental knowledge regarding theory, methods and applications of Computer Science.
2. A foundation in a second chosen discipline.
3. Knowledge of concepts that integrate Computer Science with the second chosen discipline using senior level classes that focus on the emerging issues.
4. Preparation for employment as a computational expert in a non-computer science discipline.
5. Preparation for graduate studies in fields such as Computer Science, their second discipline and related computational areas.

Application Area

The study of computational issues central to Geographic Information Systems (GIS) requires both computing knowledge as well as a solid background in geography. GIS generate vast files of raw data that can be analyzed for answers to important questions. Computer scientists have a better understanding of the computational techniques, but do not have the background required to formulate questions related to the compilation, display, and analysis of geographic spatial data. This interdisciplinary field of study requires a strong preparation in both computer science and the geography fundamentals associated with cartography, aerial photography and satellite image analysis and modeling.

Degree Requirements

The geoinformatics concentration of the ACS program can be successfully completed within the normal 120 semester hour degree GMU. In addition to Mason Core requirements including humanities, and social science,

the BS ACS program requires foundation, core, and concentration courses.

The foundation and core course requirements provide the student 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.

ACS Foundation Courses:

CS 110, 112, 211
MATH 113, 114, 125, 203

ACS Core:

CS 262, 310, 321, 330, 367, 471, 483

One CS course numbered above 400

All BS ACS majors must complete at least 36 additional credits to meet the course requirements of the Geography concentration. These credits will include a course in Statistics relevant to the concentration.

Geography Concentration

Foundation:

CS 306
STAT 250
GGS 102, 103, 110, 300

Core:

GGS 310, 311, 366, 379

12 credits chosen from:

GGS 354, 411, 416, 422, 426, 429, 462, 463, 470

Sample Schedule

Below is one example of how the ACS in Geoinformatics major may be achieved within eight semesters.

FIRST SEMESTER (14 CREDITS)

CS 110 Essentials of Computer Science	3
CS 112 Introduction to Programming	4
MATH 113 Analytical Geometry & Calculus	4
GGG 102 Physical Geography [MC-NatSci]*	3

SECOND SEMESTER (16 CREDITS)

CS 211 Object-Oriented Programming	3
MATH 114 Analytical Geometry & Calculus II	4
MATH 125 Discrete Mathematics	3
COMM 100/COMM 101 [MC]*	3
GGG 103 Human Geography [MC - SBS]*	3

THIRD SEMESTER (15 CREDITS)

Global History [MC]*	3
ENGG 100/101 [MC] *	3
CS 262 Low-Level Programming	3
CS 310 Data Structures	3
GGG 110 Intro to Geoinformation Technologies	3

FOURTH SEMESTER (16 CREDITS)

MATH 203 Linear Algebra	3
Natural Science with lab [MC]*	4
GGG 300 Quant. Methods for Geographical Anal.	3
GGG 366 Intro to Spatial Computing	3
Literature [MC] *	3

FIFTH SEMESTER (15 CREDITS)

CS 330 Formal Methods and Models	3
CS 367 Computer Systems and Programming	4
GGG 311 Geographic Information Systems	3
STAT 250 Introductory Statistics I	3
General Elective	2

SIXTH SEMESTER (15 CREDITS)

CS 321 Software Engineering	3
CS 471 Operating Systems	3
GGG 310 Cartographic Design	3
GGG 379 Remote Sensing	3
Arts [MC]*	3

SEVENTH SEMESTER (15 CREDITS)

CS 483 Analysis of Algorithms	3
GINF Elective	3
GINF Elective	3
ENGG 302 Advanced Composition [MC]*	3
Global Understanding [MC]*	3

EIGHTH SEMESTER (14 CREDITS)

CS 306 Synthesis of Ethics & Law	3
GINF Elective	3
GINF Elective	3
ACS Elective	3
General Elective	2

- see <http://catalog.gmu.edu/mason-core> Mason Core Categories for full listings of accepted courses. ACS-GINF students do not need to seek out Natural Science (without lab), Social and Behavioral Sciences, IT, Quantitative Reasoning, and Oral Communication categories as they are built into the major curriculum. One Natural Science with lab is still needed.