

College of Arts and Sciences

Computer Science

B.S. in Computer Science

Admission to the Program

Formal admission to the major requires a cumulative grade point average of 2.00 (on a 4.00 scale) and departmental approval.

University Requirements

- A total of 120 credit hours
- 6 credit hours of college writing
- 3 credit hours of college mathematics or the equivalent by examination

General Education Requirements

- A total of ten courses, consisting of one foundation course and one second-level course in an approved sequence from each of the five curricular areas
- No more than 6 credit hours may be taken in the same discipline

Major Requirements

- 55 credit hours with grades of C or better

Course Requirements

Core Courses (32 credit hours)

- CSC-280 Introduction to Computer Science I (4)
- CSC-281 Introduction to Computer Science II (3)
- CSC-330 Organization of Computer Systems (4)
- CSC-493 Computer Science Capstone Project (6)
- CSC-520 Algorithms and Data Structures (3)
- CSC-521 Design and Organization of Programming Languages (3)
- CSC-565 Operating Systems (3)
- CSC-570 Database Management Systems (3)
- 3 credit hours of CSC-xxx courses above the 300- level approved by the student's advisor

Related Courses (11 credit hours)

- MATH-221 Calculus I (4)
or
MATH-221 Applied Calculus I (4)
- MATH-222 Calculus II (4)
or
CSC-350 Introduction to Discrete Structures (3)
- STAT-202 Basic Statistics (4)

Concentration (12 credit hours)

- 12 credit hours in a concentration, selected from the following or with approval of their academic advisor and the department students may design an individual sequence of courses. Examples of individually-designed concentrations

include game programming, computer forensics, international services, neural sciences, physics, mathematics, economics, government computing, environmental studies, computer graphics design, bioinformatics, multimedia computing, or technical writing.

Computer Science

- 12 additional credit hours in CSC-xxx courses at the 300-level or above, or MATH-508, with approval of the academic advisor. No more than 3 credit hours of cooperative education, internship, independent study, or independent reading may be used to fulfill this requirement.

Consulting

- MGMT-353 Principles of Organizational Theory, Behavior and Management (3)
- MGMT-423 Managing Change and Innovation (3)
- MGMT-465 Negotiation (3)
- MGMT-484 Consulting and Project Management (3)

Digital Electronics

- PHYS-305 Acoustics (3)
- PHYS-312 Electronics I (3) *and* PHYS-322 Electronics I Lab I (2)
- PHYS-313 Electronics II (3) *and* PHYS-323 Electronics II Lab (2)

Entrepreneurship

- ACCT-240 Principles of Financial Accounting (3)
- FIN-365 Business Finance (3)
- MGMT-386 Entrepreneurship (3)
- MKTG-300 Principles of Marketing (3)

University Honors Program

All University Honors students must complete at least 12 credit hours of advanced-level (300-level and above) Honors courses including a 3 to 6 credit hour Honors Senior Capstone Project. Students may graduate with University Honors in the major if they complete at least 12 advanced-level Honors courses including the Senior Capstone Project in the department. Each department has three levels of University Honors requirements: Level I Options (100-200-level Honors classes); Level II Options (300-level and above Honors classes); and Level III Options (Honors Senior Capstone). The department Honors coordinator advises students in the University Honors Program regarding departmental options. For more information, go to www.american.edu/academic.depts/honors/.

Minor in Computer Science

- 19 credit hours with grades of C or better and at least 12 credit hours unique to the minor

Course Requirements

- CSC-280 Introduction to Computer Science I (4)
- CSC-281 Introduction to Computer Science II (3)
- 12 credit hours in CSC-xxx courses at the 300-level or above as approved by the student's advisor

Combined B.S. and M.S. in Computer Science

Admission to the Program

Admission is open to undergraduate computer science majors with a minimum grade point average of 3.20. Applicants must have completed the following by the end of the junior year:

- CSC-280 Introduction to Computer Science I
- CSC-281 Introduction to Computer Science II
- CSC-520 Algorithms and Data Structures

Requirements

- All requirements for the B.S. in Computer Science
Undergraduate students may apply up to 9 credit hours of approved graduate-level course work to satisfy the requirements of both degrees.
- All requirements for the M.S. in Computer Science, including a minimum of 18 credit hours completed in residence in graduate status after the undergraduate degree has been awarded.

Combined B.S. in Mathematics and M.S. in Computer Science

Admission to the Program

Admission is open to undergraduate mathematics majors with a minimum grade point average of 3.20. Applicants must have completed the following by the end of the junior year:

- CSC-280 Introduction to Computer Science I
- CSC-281 Introduction to Computer Science II
- CSC-520 Algorithms and Data Structures

Requirements

- All requirements for the B.S. in Mathematics
Undergraduate students may apply up to 9 credit hours of approved graduate-level course work to satisfy the requirements of both degrees.
- All requirements for the M.S. in Computer Science, including a minimum of 18 credit hours completed in residence in graduate status after the undergraduate degree has been awarded.

Combined B.S. in Physics and M.S. in Computer Science

Knowledge of physics and computing techniques can enhance careers in a variety of fields. Computing is an integral part of physicists' work, and a knowledge of physics gives computing professionals an advantage in today's technology and applications environment. A full-time student can complete this program and receive a B.S. in Physics and a M.S. in Computer Science in five years.

Admission to the Program

Admission is open to undergraduate physics majors with a minimum grade point average of 3.00. Applications must be accompanied by two letters of recommendation and a statement of purpose.

Requirements

- All requirements for the B.S. in Physics
- Undergraduate students may apply up to 9 credit hours of approved graduate-level course work to satisfy the requirements of both degrees.
- All requirements for the M.S. in Computer Science, including a minimum of 18 credit hours completed in residence in graduate status after the undergraduate degree has been awarded.

M.S. in Computer Science

Admission to the Program

In addition to meeting the minimum university requirements for graduate study, applicants must have adequate undergraduate preparation or experience in computer science. Students entering the program without the appropriate background will be expected to take certain undergraduate courses as a prerequisite. Applicants must submit scores from the Graduate Record Examination (GRE) aptitude test.

Degree Requirements

- 30 credit hours of approved graduate work
CSC-520, CSC-521, CSC-540, and all course work for comprehensive, and thesis or nonthesis requirements must be passed with grades of B or better
- Comprehensive examination: satisfied by completion of CSC-694 Capstone Project or CSC-797 Master's Thesis Seminar in Computer Science with grades of B or better
- 6 credit hours of thesis or nonthesis option
Thesis option: CSC-797 Master's Thesis Seminar in Computer Science with grades of B or better and an oral defense of the thesis
Nonthesis option: 6 credit hours with grades of B or better from the following:
CSC-694 Capstone Project and 3 credit hours from the following:
CSC-636 Advanced Database Management
CSC-637 Database Administration
CSC-689 Topics in Computer Science
CSC-690 Independent Study in Computer Science

Course Requirements

- CSC-520 Algorithms and Data Structures (3) (or equivalent)
- CSC-521 Design and Organization of Programming Languages (3) (or equivalent)
- CSC-540 Computer System Organization and Programming (3) (or equivalent)
- CSC-565 Operating Systems (3)
- CSC-570 Database Management Systems (3)
- 9 credit hours from the following:
CC-510 Legal Issues in Computing (3)
CSC-535 User Interface Analysis and Design (3)
CSC-543 Object-Oriented Analysis and Design (3)
CSC-544 Advanced Object-Oriented Programming (3)
CSC-546 Introduction to Computer Networks (3)
CSC-568 Artificial Intelligence (3)
CSC-589 Topics in Computer Science (3)
CSC-596 Selected Topics (with departmental approval)
CSC-610 Introduction to Geographic Information Systems (3)
CSC-636 Advanced Database Management (3) (if not used to fulfill nonthesis option requirement)
CSC-637 Database Administration (3) (if not used to fulfill nonthesis option requirement)

- CSC-689 Topics in Computer Science (3)
- CSC-691 Internship (1-6)
- CSC-692 Cooperative Education Field Experience (3-6)
- CSC-696 Selected Topics (with departmental approval)

Thesis or Nonthesis Option

- CSC-797 Master's Thesis Seminar in Computer Science (6)
or
CSC-694 Capstone Project 93) *and*
3 credit hours from the following:
CSC-636 Advanced Database Management (3)
CSC-637 Database Administration (3)
CSC-689 Topics in Computer Science (3)
CSC-690 Independent Study in Computer Science (1-6)

Graduate Certificate in Computer Science

Admission to the Program

Open to students with a bachelor's degree from an accredited institution and a course in calculus.

Requirements

- 15 credit hours of approved course work with at least 6 credit hours at the 600-level or above, with grades of B or better
Grades of C or D in certificate program courses are not accepted toward the fulfillment of certificate requirements, although these grades will be included in the calculation of the GPA. Students must have at least a 3.0 GPA in certificate courses in order to be awarded a certificate. Students in certificate programs must take a minimum of 6 credit hours during each 12-month period and complete the certificate in four years. International students must enroll in 9 credit hours each semester (except for summer). A maximum of 3 credit hours earned at an accredited college or university may be applied toward the certificate as transfer credit.

Course Requirements

- CSC-520 Algorithms and Data Structures (3) (or equivalent)
- CSC-521 Design and Organization of Programming Languages (3)
- CSC-540 Computer System Organization and Programming (3)
- CSC-600 Simulation (3)
- 3 credits from the following:
CSC-689 Topics in Computer Science (3)
CSC-696 Selected Topics: Nonrecurring (3)

M.S. in Applied Science

Admission to the Program

In addition to meeting the minimum university requirements for graduate study, applicants must have taken undergraduate science courses appropriate to the concentration, or have significant practical background in a relevant science area. A cumulative undergraduate grade point average of 3.00 (on a 4.00 scale) is required. Specific courses needed to prepare for entering the program will be identified through interviews with the applicant.

Degree Requirements

- 36 credit hours of approved graduate work
- Tool of research: analytical courses (see Course Requirements, below)
- One written comprehensive examination
- Non thesis course work: 6 credit hours in 600-level courses as approved by a faculty advisor, with grades of B or better
- Students participate in noncredit workshops and seminars on professional skills and current issues in science and technology. Students are required to demonstrate proficiency in these areas as part of the capstone project and internship.

Course Requirements

Core (18 credit hours)

- 9 credit hours in analytical courses from the following:
CSC-610 Introduction to Geographic Information Systems (3)
CSC-689 Topics in Computer Science: Simulation and Modeling (3)
Informatics and Analytics (3)
STAT-514 Statistical Methods (3)
STAT-525 Statistical Software (3)

Internship and Capstone Project

- One of the following:
BIO-691 Internship (6)
CHEM-691 Internship (6)
CSC-691 Internship (6)
ENVS-691 Internship (6)

- One of the following:
BIO-697 Research Methods in Biology (3)
CSC-694 Capstone Project (3)
ENVS-681 Environmental Research Seminar and Practicum (3)

Concentration (18 credit hours)

Applied Computing

- CSC-520 Algorithms and Data Structures (3)
- CSC-546 Introduction to Computer Networks (3)
- CSC-570 Database Management Systems (3)
- 9 credit hours as approved by of the faculty advisor, including from the following:
CSC-543 Object-Oriented Analysis and Design (3)
CSC-544 Advanced Object-Oriented Programming (3)
CSC-568 Artificial Intelligence (3)
CSC-589 Topics in Computer Science (3)
CSC-689 Topics in Computer Science (3)

Biotechnology

- BIO-583 Molecular Biology (3)
- BIO-589 Topics in Biology: Bioinformatics and Genomics (3)
- CHEM-560 Biochemistry I (3)
- 9 credit hours as approved by of the faculty advisor, including from the following:
BIO-589 Topics in Biology
BIO-677 Special Topics in Developmental Biology (1)
BIO-679 Topics in Evolutionary Biology (1)
CHEM-589 Topics in Biochemistry (3)

Environmental Science and Assessment

- ENVS-580 Environmental Science I: A Quantitative Approach (3)
- ENVS-581 Environmental Science II: A Quantitative Approach (3)
- ENVS-575 Environmental Risk Assessment (3)
- 9 credit hours as approved by the faculty advisor, from areas such as conservation biology, ecology, or toxicology