Department of Computer Science

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Professors
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Associate Professors
M. Aboutabl, F. Buchholz, M. Norton, S. Wang

Assistant Professors
J. Bowers, M. Kirkpatrick, M. Lam, C. Mayfield, F. Rahman, N. Sprague

Mission Statement
The computer science department strives to be an intellectual community that continually explores the broad field of computing, applies this knowledge to solve problems in a variety of domains and engages with the profession and society at large. Undergraduates join this community when they become majors, participating with faculty and other students in exploring computing through classes, projects, clubs and internships.

Goals
The goals of the computer science department are to:
- Offer small classes that provide opportunities for personal interaction with students.
- Provide a broad, inclusive and up-to-date computing curriculum.
- Provide students opportunities for professional and community engagement and real world experiences.
- Help students to become computing problem solvers and good communicators.
- Produce graduates who will succeed in the computing profession.

Career Opportunities and Marketable Skills
Computing technology pervades modern society and demand for computing professionals is strong and projected to remain strong for the foreseeable future. Careers in computing range from technical positions specifying, designing, building and maintaining networks and systems of all kinds, through project leadership and technical management. The computer science major prepares students for entry-level technical positions as programmers, software developers, requirements analysts, software designers, testers, software quality assurance professionals, system architects, network engineers, information security specialists and computing consultants.

Co-curricular Activities and Organizations
The James Madison University Student Chapter of the Association for Computing Machinery is the local student chapter of the national association for computing professionals. The JMU chapter of Upsilon Pi Epsilon, the international honor society in computer science, recognizes outstanding academic achievement by students and outstanding contributions to education by faculty. The department also sponsors the Cyber Defense, Digital Forensics and Women in Technology clubs.

Students are encouraged to intern in a business or government organization during the summer. Students may receive elective credit toward their major requirements for internship experiences.

Degree and Major Requirements
Bachelor of Science in Computer Science

Degree Requirements

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education 1</td>
<td>41</td>
</tr>
<tr>
<td>Quantitative requirement (in addition to General Education)</td>
<td>3</td>
</tr>
<tr>
<td>Major requirements (listed below)</td>
<td>52-55</td>
</tr>
<tr>
<td>University electives</td>
<td>22-25</td>
</tr>
<tr>
<td></td>
<td>120</td>
</tr>
</tbody>
</table>

1 The General Education program contains a set of requirements each student must fulfill. The number of credit hours necessary to fulfill these requirements may vary.

Major Requirements

<table>
<thead>
<tr>
<th>Major Requirements</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choose one:</td>
<td>3-4</td>
</tr>
<tr>
<td>CS 139. Programming Fundamentals</td>
<td></td>
</tr>
<tr>
<td>CS 149. Programming Fundamentals (Advanced)</td>
<td></td>
</tr>
<tr>
<td>Choose one:</td>
<td>3-4</td>
</tr>
<tr>
<td>CS 159. Advanced Programming</td>
<td></td>
</tr>
<tr>
<td>CS 239. Advanced Computer Programming</td>
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</tbody>
</table>
CS/MATH 227. Discrete Structures I 3
CS 240. Algorithms and Data Structures 3
CS 260. Technical Communication for Computer Science 3
CS 261. Computer Systems I 3
CS 327. Discrete Structures II 3
CS 345. Software Engineering 3
CS 361. Computer Systems II 3
CS 430. Programming Languages 3
CS 474. Database Design and Application 3
Choose one systems elective:
    CS 450. Operating Systems
    CS 456. Computer Architecture
    CS 470. Parallel and Distributed Systems
Computer Science electives above CS 300 9
Choose one of the following statistics courses: 3-4
    MATH 220. Elementary Statistics
    MATH 318. Introduction to Probability and Statistics

The credit/no-credit option may not be applied to any courses specifically listed above, nor may that option be applied to Computer Science electives above CS 300.

Progressing in the Major
Students may repeat CS 139/149 and CS 159/239 only once. Most CS courses require a grade of “C-” or better (“B-” or better in CS 139/149) in prerequisites courses. Students must achieve a cumulative grade point average of 2.0 or better in all courses used to satisfy CS major degree requirements.

Certificates
Periodically, the department may offer a collection of two or more advanced courses in a particular area of study. Students successfully completing those courses will obtain a certificate in that area of study. Examples of possible certificate programs include networking, software engineering and information security.

U.S. Government Requirements for Computer Scientists
The U.S. government standard for occupational category GS-1550: Computer Science Series includes a requirement of 15 hours in statistics and mathematics including differential and integral calculus. This means that students considering a career as a computer scientist with the U.S. government (including DoD, NASA, etc.) must complete more math courses than the minimum requirement for a B.S. degree. Recommended calculus sequences for these students are MATH 235-236 or MATH 231-232-236. However, only the U.S. Office of Personnel Management can give final approval of individual qualifications.

Minor Requirements

Computer Science Minor
Minor Adviser: Dr. Michael Kirkpatrick

Courses Credit Hours
Choose one:
    CS 139. Algorithm Development
    CS 149. Programming Fundamentals (Accelerated)
    CS 159. Advanced Programming 3
Choose twelve credits from the following courses. Must include at least one of CS 240, CS 261 or CS 345
    CS 227. Discrete Mathematics I
    CS 240. Algorithms and Data Structures
    CS 261. Computer Systems I

Computer Science courses above CS 300

52-55

Robotics Minor
Minor Adviser: Dr. Ralph Grove
The robotics minor provides students with appropriate preparation the opportunity to investigate technical issues in the design, construction and application of robots. For a full description of the requirements for the minor in Robotics, see Cross Disciplinary Programs.

Telecommunications Minor
Minor Adviser: Dr. Mohamed Aboutabl
The Department of Computer Science, in cooperation with other departments, offers a cross disciplinary minor in telecommunications. The program is intended to augment major programs in preparing students to become network and telecommunications professionals. For a full description of the requirements for the minor in telecommunications, see Cross Disciplinary Programs.