BACHELOR OF SCIENCE WITH A MAJOR IN COMPUTER SCIENCE

The program combines software development, computer systems and architecture, algorithms, project design, science, and mathematics to provide a strong foundation in the underpinnings of computer science. Students are prepared to design and implement software needed for Internet operations, computer graphics and animation, secure systems, and applications for small, large, and embedded systems. In consultation with the advisor, students choose a technical track and a non-technical track. The technical track provides depth in a particular area of computer science, while the non-technical track enables students to stay current with the rapidly evolving field and to establish the relevance of their studies in the ever-changing global environment. The BS in computer science degree program is accredited by ABET.

Medical Preparation Option in Computer Science

This option is for students interested in pursuing a computer science major as they prepare to apply to a medical school. The degree program combines additional natural science course work with computer science course requirements.

Visit the program website (http://www.cs.seas.gwu.edu/bachelor-science-program) for additional information.

Bachelor of Science With a Second Major in Computer Science

Students who are not enrolled in the School of Engineering and Applied Sciences (SEAS), who are enrolled in another Bachelor of Science program, but wish to declare a second major in computer science must apply and be admitted to the second major program in computer science. Students in this program must follow the same degree requirements as those receiving a Bachelor of Science in computer science as their primary major.

Criteria for admission:

To be considered for admission to the second major in computer science, a student must satisfy the following criteria:

- Take CSCI 1111 Introduction to Software Development or CSCI 1011 Introduction to Programming with Java or CSCI 1121 Introduction to C Programming and receive at least a B OR make a B or better in CSCI 1112 Algorithms and Data Structures; receive a minimum grade of B– in MATH 1220 Calculus with Precalculus I and MATH 1221 Calculus with Precalculus II or in MATH 1231 Single-Variable Calculus I.
- A minimum overall grade-point average of 3.0 at the time of application to the major.
- The application is due no later than the start of the fifth semester of study at GW or completion of the 60th credit, whichever comes first.

Contact the School of Engineering and Applied Science Undergraduate Advising Office (https://www.seas.gwu.edu/academic-advising) for current application deadlines for the second major in computer science.

Credits in residence requirement:
- For a second major, at least 24 credits in computer science courses must be completed in SEAS.

Graduation grade-point average criteria:
- To satisfactorily complete a second major in computer science, a student must have a minimum grade-point average of 2.2 in all the computer science courses. See the department webpage (http://www.seas.gwu.edu/department-computer-science) for more information on curriculum requirements for the second major in computer science.

REQUIREMENTS

Residency Requirement

As part of a residency requirement, all computer science majors must take a minimum of 30 credits in computer science courses at GW. Should a student pursue an approved study abroad program, credits earned in that program count toward this requirement. For a second major, at least 24 credits in computer science courses must be completed in SEAS.

Recommended program of study

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First semester</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UW 1020</td>
<td>University Writing *</td>
<td></td>
</tr>
<tr>
<td>CSCI 1010</td>
<td>Computer Science Orientation</td>
<td></td>
</tr>
<tr>
<td>CSCI 1111</td>
<td>Introduction to Software Development</td>
<td></td>
</tr>
<tr>
<td>SEAS 1001</td>
<td>Engineering Orientation</td>
<td></td>
</tr>
<tr>
<td>Math requirement *</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Humanities or social sciences elective</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Second semester</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSCI 1311</td>
<td>Discrete Structures I</td>
<td></td>
</tr>
<tr>
<td>CSCI 1112</td>
<td>Algorithms and Data Structures</td>
<td></td>
</tr>
<tr>
<td>Math requirement *</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Science requirement *</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Humanities or social sciences elective</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Third semester</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSCI 2312</td>
<td>Discrete Structures II</td>
<td></td>
</tr>
<tr>
<td>Semester</td>
<td>Courses</td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>---------</td>
<td></td>
</tr>
</tbody>
</table>
| Fourth   | CSCI 3410 Systems Programming  
|          | CSCI 2541W Database Systems and Team Projects  
|          | CSCI 2501 Ethical Issues in Computing  
|          | Computer science elective  
|          | Science requirement *  
|          | Statistics requirement - one of the following:  
|          | CSCI 4341 Continuous Algorithms  
|          | CSCI 3362 Probability for Computer Science  
|          | APSC 3115 Engineering Analysis III  
|          | STAT 4157 Introduction to Mathematical Statistics I  
| Fifth    | CSCI 3313 Foundations of Computing  
|          | CSCI 3212 Algorithms  
|          | CSCI 3411 Operating Systems  
|          | Humanities or social sciences elective  
| Sixth    | Technical track elective  
|          | Non-technical track elective  
|          | Math or science elective *  
|          | Humanities or social sciences elective  
|          | Unrestricted elective  
| Seventh  | CSCI 4243W Capstone Design Project I  
|          | Technical track elective  
|          | Non-technical track elective  
|          | Humanities or social sciences elective  
|          | Unrestricted elective  
| Eighth   | CSCI 4244 Capstone Design Project II  
|          | Technical track elective  
|          | Non-technical track elective  
|          | Two unrestricted electives  

*Course satisfies the University General Education Requirement in mathematics, science, or writing. UW 1020 must be completed prior to enrolling in any writing course in the major, including CSCI 2441W and CSCI 2541W.

**Humanities and social science requirements:** All BS in computer science students must take one humanities course and two social science courses from the University General Education Requirement (http://bulletin.gwu.edu/university-regulations/general-education) list and three additional humanities, social science, and/or non-technical courses from a list preapproved by SEAS/ the Department of Computer Science. All courses selected to satisfy this requirement must be at least 3 credits and approved by the faculty advisor.

**Mathematics requirement:** Can be met by taking MATH 1220 and MATH 1221 and MATH 1232 or by taking MATH 1231 and MATH 1232. All students must take two MATH courses not counting MATH 1220; students who take MATH 1220 must take it as one of their unrestricted electives.

**Science requirement:** Can be met by choosing from BISC 1115 and BISC 1125; BISC 1116 and BISC 1126; CHEM 1111 and CHEM 1112; and PHYS 1021 and PHYS 1022. The three science requirement courses must include a two-course sequence.

**Statistics requirement:** Can be met by choosing from APSC 3115, CSCI 4341, CSCI 3362 or CSCI 6362, or STAT 4157. CSCI 4341 and CSCI 3362/ CSCI 6362 may count toward the statistics requirement or the mathematics or science elective, but not both. Students who were admitted prior to fall 2014 may count STAT 1051 and STAT 1053 toward the statistics requirement, if they took the course prior to the spring 2015 semester.

**Computer science elective:** Can be met with one computer science course numbered 3000 or above.

**Mathematics or science elective:** Can be met with one course in mathematics or science in addition to the courses taken to fulfill the mathematics and science requirements. APSC 3115, CSCI 4341 or CSCI 4314, CSCI 3362 or CSCI 6362, EMSE 2705, MATH 2233, MATH 3125, or PHIL 3121 may be taken as a mathematics elective. Students who choose to take a science elective may select an additional course from the list under science requirements, above, or they may choose another.
natural science, such as astronomy, earth science, or forensic science.

Non-technical track requirement

All BS in computer science students must complete a non-technical track that consists of at least three non-technical courses (for a minimum of 9 credits) with prior approval of the faculty advisor. To satisfy this requirement, students may choose one of the following:

Technology and law—three pre-law related courses, for a minimum total of 9 credits, from the following: CSCI 4532, MAE 3171, MAE 4172, and EMSE 6018. Additional courses may be included with prior approval of the faculty advisor.

Business—three courses, for a minimum total of 9 credits, in Business Administration (BADM) coursework. Courses that may be taken as part of this track include ACCY 2001, ACCY 2002, BADM 2101, BADM 3401, and BADM 3501. Other BADM courses may be included with prior approval of the faculty advisor.

Pre-medical—three courses, for a minimum total of 9 credits, from the following: CHEM 1111 and CHEM 1112, CHEM 2151, CHEM 2152, CHEM 2153, CHEM 2154, BISC 1111 and BISC 1112, PHYS 1011 and PHYS 1012, or PHYS 1021 and PHYS 1022. Additional courses may be included with prior approval of the faculty advisor.

Project management and leadership—three courses, for a minimum total of 9 credits, of project management, communication, leadership, or engineering management coursework, including EMSE 4410, EMSE 6010, EMSE 6005, EMSE 6001, MGT 3201, NSC 2175, NSC 4176, ORSC 1109, ORSC 2116, COMM 1041, COMM 1042, and COMM 3174. Additional courses may be included with prior approval of the faculty advisor.

Global engineering—three non-technical courses, for a minimum total of 9 credits, in one of the follow options with prior approval the faculty advisor: (1) while studying abroad; (2) in a single foreign language; (3) in International Affairs; or, (4) in aspects of non-English speaking cultures from the fields of anthropology, history, literatures, geography, political science, or religion.

Environment and climate change—three courses, for a minimum total of 9 credits, related to the environment and climate change which may include BISC 2454, BISC 2455, BISC 3456, BISC 3457, BISC 3460, CHEM 2085, CEE 6503, GEOG 2108, GEOG 2110, GEOG 2134, GEOG 2136, GEOG 3132, ECON 2136, EMSE 6200, EMSE 6220, EMSE 6260, EMSE 6225, EMSE 6235, and EMSE 6230. Additional courses may be included with prior approval of the faculty advisor.

Public health—three courses, for a minimum total of 9 credits, in public health coursework that may include PUBH 1101, PUBH 1102, PUBH 3133, PUBH 2114, and PUBH 2115. Additional courses may be included with prior approval of the faculty advisor.

Individually designed—student select a series of related three non-technical courses (for a minimum of 9 credits). Any course completed for this track must be approved by the faculty advisor prior to completing the course.

Special option: minor or second major—students can combine at least three non-technical courses (for a minimum total of 9 credits), not closely related to the discipline of computing allotted to their non-technical track with their unrestricted electives to complete a non-technical minor or second major.

Technical Track Requirements

All students in the BS in computer science program are required to take three technical courses (for a minimum of 9 credits) of computer science coursework for their technical track. The computer science courses selected must have a common theme and must have CSCI 2113 as a prerequisite or within the prerequisite chain. The faculty advisor’s documented approval is required before these courses may be applied towards degree completion. The Department of Computer Science website lists choices for the technical track in more detail.

Unrestricted electives

All students in the BS in Computer Science are required to complete four unrestricted elective courses. All courses used to fulfill this requirement must have the explicit, documented approval from the faculty adviser, even when such courses are required for a minor or have transferred to the University as Advanced Placement (AP) credit.

The following guidelines and/or restrictions apply to selecting courses to satisfy this requirement:

1. Additional CSCI courses numbered above 2461 may count toward this requirement. Students may take a maximum of two research and independent study courses, for which the student must provide documentation of output, such as papers, presentations, or software. For courses from other departments, the student must provide documentation of output, such as papers, presentations, or software. Courses that significantly overlap with, or are not as advanced as, the required content for the computer science degree program do not count toward this requirement. Such courses include, but are not limited to, the following: BADM 2301, EMSE 4197, ISTM 3119, ISTM 4120, ISTM 6224, ISTM 6235, and ISTM 6236.

2. Approved courses from the SEAS Humanities and Social Science Electives lists may count toward this requirement.

3. Approved courses listed in non-technical track lists count toward this requirement.

4. Computer science course taught by another department generally do not count toward this requirement.

5. Courses that significantly overlap with, or are not as advanced as, the required content for the computer science degree program do not count toward this requirement. Such courses include, but are not limited to, the following: BADM 2301, EMSE 4197, ISTM 3119, ISTM 4120, ISTM 6224, ISTM 6235, and ISTM 6236.
4121, ISTM 4123, STAT 1051, STAT 1053, STAT 1091, and STAT 1129.

6. Courses that significantly overlaps with any other course(s) used towards the computer science degree, regardless of the department(s) in which they are taken, may not count toward this requirement.

7. Some courses may be approved for one student and not for another, based on other courses the student has taken. For example, if a student uses PHYS 1021 towards either the science, math/science, or unrestricted elective requirement, PHYS 1011 may not be used to fulfill this requirement, but it would count for a student who has not taken PHYS 1021.