Nature of Program

Computer science is a discipline that involves the understanding and design of computational processes. The discipline ranges from a theoretical study of algorithms and information processing in general, to a practical design of efficient and reliable software that meets given specifications. This differs from most physical sciences, engineering included, that separate theoretical underpinnings of the science from applications within it. The computer science major prepares students for careers in fields such as software development, cybersecurity, machine learning, data analytics, virtual reality, and human computer interfaces. The computer science program is accredited by the Computing Accreditation Commission (CAC) of ABET, http://www.abet.org.

Program Educational Objectives

The Program Educational Objectives (PEO) of the Bachelor of Science in Computer Science (B.S.C.S.) program at West Virginia University is to produce graduates who will apply their knowledge and skills to achieve success in their careers in industry, research, government service or graduate study. It is expected that in the first five years after graduation our graduate will achieve success and proficiency in their profession, be recognized as leaders, and contribute to the well-being of society.

Student Outcomes

Upon graduation, all Bachelor of Science students in Computer Science will:

• Be exposed to a variety of programming languages and systems and will be proficient in programming in at least two languages
• Have knowledge of the basic principles and methods of programming language translation, formal languages, and automata
• Have knowledge of the basic principles of data structures, discrete mathematics and algorithms, and be able to apply this knowledge to problem solving in relevant application areas
• Be familiar with principles of computer organization, operating systems, and networks
• Have knowledge of software engineering principles and be able to design, implement, and analyze moderately complex and robust systems.
• Be able to communicate ideas effectively in writing
• Be able to communicate ideas effectively verbally
• Be able to work and learn effectively as members of a team
• Have knowledge of and a commitment to the social and ethical responsibilities of computing professionals
• Have experienced a well-rounded education in areas outside of the computer science major, with emphasis on the arts, sciences, and humanities
• Be familiar with laboratory procedures and use of the scientific method in at least two different physical or biological sciences
• Be familiar with advanced concepts of some specialized computer science areas
• Have knowledge of mathematics through differential and integral calculus, discrete mathematics, and probability and statistics

Click here to view the Suggested Plan of Study (p. 3)

Curriculum in Computer Science

GENERAL EDUCATION FOUNDATIONS

Please use this link to view a list of courses that meet each GEF requirement. (http://registrar.wvu.edu/gef)

NOTE: Some major requirements will fulfill specific GEF requirements. Please see the curriculum requirements listed below for details on which GEFs you will need to select.

General Education Foundations

F1 - Composition & Rhetoric

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 101</td>
<td>Introduction to Composition and Rhetoric</td>
<td>3-6</td>
</tr>
<tr>
<td>&amp; ENGL 102</td>
<td>and Composition, Rhetoric, and Research</td>
<td></td>
</tr>
<tr>
<td>or ENGL 103</td>
<td>Accelerated Academic Writing</td>
<td></td>
</tr>
</tbody>
</table>

F2A/F2B - Science & Technology

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>F3 - Math &amp; Quantitative Skills</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td>F4 - Society &amp; Connections</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>F5 - Human Inquiry &amp; the Past</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>F6 - The Arts &amp; Creativity</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>F7 - Global Studies &amp; Diversity</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>
F8 - Focus (may be satisfied by completion of a minor, double major, or dual degree)

Total Hours

Please note that not all of the GEF courses are offered at all campuses. Students should consult with their advisor or academic department regarding the GEF course offerings available at their campus.

Curriculum Requirements

To receive a degree of bachelor of science in computer science, a student must meet the University's undergraduate degree requirements, take all the courses indicated below, and attain a grade point average of 2.0 or better for all Lane Department of Computer Science and Electrical Engineering courses. If a Lane Department of Computer Science and Electrical Engineering course is repeated, only the last grade received is used to compute the major grade point average, and the course credit hours are counted only once. This requirement assures that the student has demonstrated overall competence in the major.

All CPE, CS, MATH, and STAT courses must be completed with a grade of C- or better.

<table>
<thead>
<tr>
<th>Non-Computer Science Core</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 112</td>
<td>Small Group Communication (GEF 4)</td>
</tr>
<tr>
<td>ENGR 101</td>
<td>Engineering Problem Solving 1</td>
</tr>
<tr>
<td>ENGR 199</td>
<td>Orientation to Engineering</td>
</tr>
<tr>
<td>Calculus I (GEF 3):</td>
<td>4</td>
</tr>
<tr>
<td>MATH 155</td>
<td>Calculus 1</td>
</tr>
<tr>
<td>MATH 153</td>
<td>Calculus 1a with Precalculus</td>
</tr>
<tr>
<td>&amp; MATH 154</td>
<td>and Calculus 1b with Precalculus</td>
</tr>
<tr>
<td>MATH 156</td>
<td>Calculus 2 (GEF 8)</td>
</tr>
<tr>
<td>MATH 251</td>
<td>Multivariable Calculus (Minimum Grade of C- Required)</td>
</tr>
<tr>
<td>STAT 215</td>
<td>Introduction to Probability and Statistics (Minimum grade of C- required)</td>
</tr>
<tr>
<td>ENGL 305</td>
<td>Technical Writing</td>
</tr>
</tbody>
</table>

Lab Science I (GEF 2B) & II (GEF 8): Select one of the following 8-hr sequences

| BIOL 115                  | Principles of Biology             |     |
| & BIOL 117                | and Introductory Physiology       |     |
| CHEM 115                  | Fundamentals of Chemistry         |     |
| & CHEM 116                | and Fundamentals of Chemistry     |     |
| CHEM 117                  | Principles of Chemistry           |     |
| & CHEM 118                | and Principles of Chemistry       |     |
| PHYS 111                  | General Physics                   |     |
| & PHYS 112                | and General Physics               |     |
| GEOL 101                  | Planet Earth                      |     |
| & GEOL 102                | and Planet Earth Laboratory       |     |
| & GEOL 103                | and Earth Through Time            |     |
| & GEOL 104                | and Earth Through Time Laboratory |     |
| or GEOL 110               | Environmental Geoscience           |     |
| & GEOL 111                | and Environmental Geoscience Laboratory |     |
| & GEOL 103                | and Earth Through Time            |     |
| & GEOL 104                | and Earth Through Time Laboratory |     |

Lab Science III (GEF 8): Choose an additional 4-hr lab science from a second discipline

| BIOL 115                  | Principles of Biology             | 4 |
| CHEM 115                  | Fundamentals of Chemistry         |     |
| CHEM 117                  | Principles of Chemistry           |     |
| GEOL 101                  | Planet Earth                      |     |
| & GEOL 102                | and Planet Earth Laboratory       |     |
| or GEOL 110               | Environmental Geoscience           |     |
| & GEOL 111                | and Environmental Geoscience Laboratory |     |
| PHYS 111                  | General Physics                   |     |

Major requirement Extra GEF 2-7

Free Electives (200 level or higher)

<table>
<thead>
<tr>
<th>Computer Science Core Requirements</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CPE 271</td>
<td>Introduction to Digital Logic Design</td>
</tr>
</tbody>
</table>
### Suggested Plan of Study

It is important for students to take courses in the order specified as closely as possible; all prerequisites and concurrent requirements must be observed.

A typical B.S. degree program that completes degree requirements in four years is as follows.

#### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 110</td>
<td>4</td>
<td>CS 111</td>
<td>4</td>
</tr>
<tr>
<td>COMM 112 (GEF 4)</td>
<td>3</td>
<td>ENGL 101 (GEF 1)</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 101</td>
<td>2</td>
<td>MATH 156 (GEF 8)</td>
<td>4</td>
</tr>
<tr>
<td>ENGR 199</td>
<td>1</td>
<td>GEF 5</td>
<td>3</td>
</tr>
<tr>
<td>MATH 155 (GEF 3)</td>
<td>4</td>
<td>Lab Science II (GEF 8)</td>
<td>4</td>
</tr>
<tr>
<td>Lab Science I (GEF 2)</td>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\[18 \quad 18\]

#### Second Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 210</td>
<td>4</td>
<td>CPE 271</td>
<td>3</td>
</tr>
</tbody>
</table>

\[4 \quad 18\]
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COMPUTER SCIENCE MINOR

MINOR CODE - U002

Any student may take a minor in computer science by taking the following courses and making a minimum overall GPA of 2.0 in all courses required for the minor and a C or higher in each course.

A minimum overall GPA of 2.0 and a C or higher must be earned in all required courses.
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 110</td>
<td>Introduction to Computer Science</td>
<td>8</td>
</tr>
<tr>
<td>&amp; CS 111</td>
<td>and Introduction to Data Structures</td>
<td></td>
</tr>
<tr>
<td>select one of the following:</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>CS 210</td>
<td>File and Data Structures</td>
<td></td>
</tr>
<tr>
<td>CS 220</td>
<td>Discrete Mathematics</td>
<td></td>
</tr>
<tr>
<td>CS 230</td>
<td>Introduction to Software Engineering</td>
<td></td>
</tr>
<tr>
<td>CS 310</td>
<td>Principles of Programming Languages</td>
<td>6</td>
</tr>
<tr>
<td>&amp; CS 350</td>
<td>and Computer System Concepts</td>
<td></td>
</tr>
<tr>
<td>at least one CS 400-level course</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>total hours</td>
<td></td>
<td>20</td>
</tr>
</tbody>
</table>