Introduction to Computer Programming in C++ for Engineers and Scientists

CSE 1222

Description / Conditions

Transcript Abbreviation:
Programming C++

Course Description:
Introduction to computer programming and to problem solving techniques using computer programs with applications in engineering and the physical sciences; algorithm development; programming lab experience.

Course Levels:
Undergraduate (1000-5000 level)

Designation:
Elective

General Education Course:
(N/A)

Cross-Listings:
(N/A)

Course Detail

Credit Hours (Minimum if “Range” selected):
3.00

Max Credit Hours:
(N/A)
Introduction to Computer Programming in C++ for Engineers and Scientists - 2/7

Select if Repeatable:
Off

Maximum Repeatable Credits:
(N/A)

Total Completions Allowed:
(N/A)

Allow Multiple Enrollments in Term:
No

Course Length:
14 weeks (autumn or spring)
12 weeks (summer only)

Off Campus:
Never

Campus Location:
Columbus
Lima
Mansfield
Marion
Newark

Instruction Modes:
In Person (75-100% campus; 0-24% online)

Prerequisites and Co-requisites:
Concur: Math 1151, 1154, or 1161.

Electronically Enforced:
No

Exclusions:
Not open to students with credit for Engr 1281.01 or 1281.02.

Course Goals and Learning Objectives
Course Goals / Objectives:
Be competent with writing simple C++ programs performing numerical calculations
Be competent with using basic C++ constructs; declarations and various statements including loops and conditionals
Be familiar with using C++ functions
Be familiar with using C++ arrays
Be familiar with using file input and output
Be exposed to algorithms
Be exposed to pointers
Be exposed to the C++ string and vector classes
Be exposed to defining C++ classes

Check if concurrence sought:
No

Contact Hours
**Contact Hours:**

<table>
<thead>
<tr>
<th>Topic</th>
<th>LEC</th>
<th>REC out-of-class</th>
<th>REC in-class</th>
<th>Weekly LAB out-of-class</th>
<th>Weekly LAB in-class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple input and output, cin and cout</td>
<td>2.0</td>
<td>0.0</td>
<td>0</td>
<td>1.0</td>
<td>0</td>
</tr>
<tr>
<td>Variables and assignments</td>
<td>2.0</td>
<td>0.0</td>
<td>0</td>
<td>1.0</td>
<td>0</td>
</tr>
<tr>
<td>Selection statements, if, then, else</td>
<td>2.0</td>
<td>0.0</td>
<td>0</td>
<td>1.0</td>
<td>0</td>
</tr>
<tr>
<td>Loops, for and while</td>
<td>3.0</td>
<td>0.0</td>
<td>0</td>
<td>2.0</td>
<td>0</td>
</tr>
<tr>
<td>File input and output.</td>
<td>2.0</td>
<td>0.0</td>
<td>0</td>
<td>1.0</td>
<td>0</td>
</tr>
<tr>
<td>Formatting output</td>
<td>1.0</td>
<td>0.0</td>
<td>0</td>
<td>1.0</td>
<td>0</td>
</tr>
<tr>
<td>Functions</td>
<td>3.0</td>
<td>0.0</td>
<td>0</td>
<td>1.0</td>
<td>0</td>
</tr>
<tr>
<td>Arrays</td>
<td>4.0</td>
<td>0.0</td>
<td>0</td>
<td>2.0</td>
<td>0</td>
</tr>
<tr>
<td>2D arrays</td>
<td>1.0</td>
<td>0.0</td>
<td>0</td>
<td>1.0</td>
<td>0</td>
</tr>
<tr>
<td>Pointers, new and delete[] operators</td>
<td>2.0</td>
<td>0.0</td>
<td>0</td>
<td>1.0</td>
<td>0</td>
</tr>
<tr>
<td>C++ string and C++ vector classes</td>
<td>2.0</td>
<td>0.0</td>
<td>0</td>
<td>1.0</td>
<td>0</td>
</tr>
<tr>
<td>Intro to defining C++ classes</td>
<td>2.0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>26</strong></td>
<td><strong>0</strong></td>
<td><strong>0</strong></td>
<td><strong>13</strong></td>
<td><strong>0</strong></td>
</tr>
</tbody>
</table>

**Grading and Texts**

**Grading Plan:**
Letter Grade
Course Components:
Lecture
Lab

Grade Roster Component:
Lecture

Credit by Exam (EM):
Yes

Grades Breakdown:

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Programming assignments.</td>
<td>30%</td>
</tr>
<tr>
<td>Labs</td>
<td>20%</td>
</tr>
<tr>
<td>Two midterms</td>
<td>25%</td>
</tr>
<tr>
<td>Final</td>
<td>25%</td>
</tr>
</tbody>
</table>

Representative Textbooks and Other Course Materials:

<table>
<thead>
<tr>
<th>Title</th>
<th>Author</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering Problem Solving with C++</td>
<td>Etter and Ingber</td>
<td></td>
</tr>
</tbody>
</table>

ABET Student Learning Outcomes
### ABET-CAC Criterion 3 Outcomes:

<table>
<thead>
<tr>
<th>Significant contribution (7+ hours)</th>
<th>1</th>
<th>Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Significant contribution (7+ hours)</td>
<td>2</td>
<td>Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program’s discipline.</td>
</tr>
<tr>
<td>Some contribution (1-2 hours)</td>
<td>3</td>
<td>Communicate effectively in a variety of professional contexts.</td>
</tr>
<tr>
<td>Some contribution (1-2 hours)</td>
<td>4</td>
<td>Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles</td>
</tr>
<tr>
<td>Significant contribution (7+ hours)</td>
<td>6</td>
<td>Apply computer science theory and software development fundamentals to produce computing-based solutions.</td>
</tr>
</tbody>
</table>

### ABET-ETAC Criterion 3 Outcomes:

(N/A)
**ABET-EAC Criterion 3 Outcomes:**

<table>
<thead>
<tr>
<th>Significant contribution (7+ hours)</th>
<th></th>
<th>an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Significant contribution (7+ hours)</td>
<td>2</td>
<td>an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors</td>
</tr>
<tr>
<td>Some contribution (1-2 hours)</td>
<td>3</td>
<td>an ability to communicate effectively with a range of audiences - pre-2019 EAC SLO (g)</td>
</tr>
<tr>
<td>Some contribution (1-2 hours)</td>
<td>4</td>
<td>an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts</td>
</tr>
<tr>
<td>Some contribution (1-2 hours)</td>
<td>6</td>
<td>an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions</td>
</tr>
<tr>
<td>Substantial contribution (3-6 hours)</td>
<td>7</td>
<td>an ability to acquire and apply new knowledge as needed, using appropriate learning strategies</td>
</tr>
</tbody>
</table>

**Embedded Literacies (UG courses only)**

Embedded Literacies Info:

**Attachments / Additional Notes or Comments**

Attachments:  
(N/A)

Additional Notes or Comments:  
(N/A)