Computational Thinking in Context: Images, Animation, and Games

CSE 1211

Credit Hours:
3.00

Course Coordinator:

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

Representative Textbooks and Other Course Materials:

<table>
<thead>
<tr>
<th>Title</th>
<th>Author</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phrogram (Windows Computer Program (Software))</td>
<td>The Phrogram Company</td>
<td></td>
</tr>
</tbody>
</table>

Course Description:
Introduction to computational thinking, focusing on problem solving and programming concepts and skills needed to manipulate digital images and to create interactive graphics, animations, and games; creativity and imagination encouraged.

Designation:
Elective
Course Goals / Objectives:
Be competent with using basic constructs provided by high-level imperative programming languages: sequencing, selection, and iteration
Be familiar with algorithmic thinking
Be familiar with simple media manipulation algorithms and how to apply them to solve interesting media manipulation problems
Be familiar with using basic data structure interfaces such as arrays or lists in simple programs
Be familiar with procedural composition
Be familiar with many of the possibilities available for creative combination in programmed interactive animations
Be familiar with working in a window-based computing environment
Be familiar with using a modern interactive program development environment
Be exposed to the virtual machine model of modern computer systems

ABET-CAC Criterion 3 Outcomes:
No outcome selected

ABET-EAC Criterion 3 Outcomes:

<table>
<thead>
<tr>
<th>Substantial contribution (3-6 hours)</th>
<th>1</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>Substantial contribution (3-6 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>5</td>
<td>an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives</td>
</tr>
<tr>
<td>Some contribution (1-2 hours)</td>
<td>7</td>
<td>an ability to acquire and apply new knowledge as needed, using appropriate learning strategies</td>
</tr>
</tbody>
</table>
**Course Topics:**

- Software installation, and basic concepts
- Introduction to programming with media, images, colors, encodings
- Loops, new definitions, simple image manipulations
- Nested loops, conditionals, Boolean expressions, advanced image manipulations
- Animation via sprite movement using iteration
- Sequencing, iteration, and drawing
- Selection and collision detection and polled input for user interaction
- Managing sprite velocities
- Discussion and evaluation of preliminary ideas
- Discussion of problems encountered and possible solutions
- Presentation and evaluation of final projects