

## School of Computing and Information Sciences

**Course Title:** Computer Science  
Education for Middle School Children

**Date:** Oct. 23, 2017

**Course Number:** IDC 4011C

**Number of Credits:** 4

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Subject Area: Interdisciplinary Computing      Subject Area Coordinator: Mark Weiss  
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**Catalog Description:** Provide teachers with the knowledge of **intermediate-level** Computer Science topics, as well as the pedagogy on how to teach the topics. Computer Science topics include computational thinking, logic, visual programming, computer hardware and networking, and social issues related to computer technologies including Internet safety.

Textbooks:

*Online Curriculum:* <https://studio.code.org/s/csd1> thru <https://studio.code.org/s/csd6> by Code.org

References:

<https://curriculum.code.org/csd/>

Prerequisite Courses: None

Corequisites Courses: None

**Type: General Elective**

**Prerequisite Topics: (none)**

### Course Outcomes:

- O1. Be able to explain, create, follow, and debug algorithms to solve problems.
- O2. Demonstrate ability to develop web pages, build games, animations, and interactive art, using a prototyping design process that identifies the needs of the user, designs a solution, gets feedback, and repeats the cycle.
- O3. Be able to understand how data can be generated, analyzed, and used by society to solve problems.
- O4. Research smart devices and explore sensors using Adafruit's Circuit Playground, to learn how to develop App Lab programs that utilize hardware inputs and outputs.

This course should be taught by FIU faculty that have completed a 5-day Code.org workshop for Middle School Curriculum, as scheduled in the website:

<https://code.org/educate/professional-learning/cs-discoveries>

## Outline

Topic	Number of Lecture Hours	Outcome
<ul style="list-style-type: none"> <li>● Problem Solving Process               <ul style="list-style-type: none"> <li>○ Learn the Define-Prepare-Try-Reflect process                   <ul style="list-style-type: none"> <li>▪ Strategies to define open-ended problems</li> <li>▪ Identifying I/O devices</li> <li>▪ Develop and understand algorithms</li> <li>▪ Learn the Develop-Test-Share model</li> <li>▪ Learn the Input-Storage-Processing-Output model</li> <li>▪ Propose and design an App to solve a real world problem</li> </ul> </li> </ul> </li> </ul>	5	O1
<ul style="list-style-type: none"> <li>● Software Programming               <ul style="list-style-type: none"> <li>▪ Web Development                   <ul style="list-style-type: none"> <li>● HTML</li> <li>● CSS</li> <li>● Creating &amp; Debugging Multi-page websites</li> <li>● Creating a personal portfolio website</li> </ul> </li> <li>▪ Game Lab                   <ul style="list-style-type: none"> <li>● Drawing &amp; Plotting Shapes</li> <li>● Random Numbers</li> <li>● Animating Sprites</li> <li>● Loops &amp; Conditionals</li> <li>● Keyboard &amp; Other Input to Games</li> <li>● Collision Detection</li> <li>● Functions</li> </ul> </li> <li>▪ Game Design Process</li> </ul> </li> </ul>	20	O2
<ul style="list-style-type: none"> <li>● Data and Society               <ul style="list-style-type: none"> <li>○ ASCII and Binary Representation</li> <li>○ Encryption</li> <li>○ Collection, Visualization of Data</li> <li>○ Problem Solving, Interpreting, and Making Decisions with Data</li> <li>○ Digital Footprints</li> <li>○ Intellectual Property</li> <li>○ Search Engines &amp; Credible Sources</li> </ul> </li> </ul>	10	O3
<ul style="list-style-type: none"> <li>● Hardware Programming               <ul style="list-style-type: none"> <li>○ Using Circuit Playground, write programs                   <ul style="list-style-type: none"> <li>▪ To Output:                       <ul style="list-style-type: none"> <li>● Blink an LED</li> <li>● Make Noise with Buzzer</li> <li>● Control a List of Color LEDs using For &amp; Timed Loop</li> </ul> </li> <li>▪ Take Input:                       <ul style="list-style-type: none"> <li>● Buttons, switches</li> <li>● Sound, Light, and Temperature Sensors</li> </ul> </li> <li>▪ To Prototype an Innovative Computing Device</li> </ul> </li> </ul> </li> </ul>	10	O4

## Course Outcomes Emphasized in Laboratory Projects / Assignments

Projects and assignments will interactive lessons presented by students, as well as programming, projects done individually and collaboratively. Teaching demonstrations should be completed in a laboratory environment that includes short lectures by the instructor.

Outcome	
O1	Be able to explain, create, follow, and debug algorithms to solve problems.
O2	Demonstrate ability to develop web pages, build games, animations, and interactive art, using a prototyping design process that identifies the needs of the user, designs a solution, gets feedback, and repeats the cycle.
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O4	Research smart devices and explore sensors using Adafruit's Circuit Playground, to learn how to develop App Lab programs that utilize hardware inputs and outputs.

### Oral and Written Communication:

- Written and oral discussions of social issues in computing

### Theoretical Contents:

- Abstraction
- Algorithms

### Problem Analysis Experiences:

None

### Solution Design Experiences:

- Weekly teaching labs, teaching lessons, programming/puzzles