School of Computing and Information Sciences

Course Title: Computer Science
Education for Elementary School Children **Date:** Oct. 23, 2017

Course Number: IDC 4010C

Number of Credits: 4

Subject Area: Interdisciplinary Computing

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

Textbooks:
Online Curriculum: https://studio.code.org/s/coursea thru https://studio.code.org/s/coursef by Code.org for K thru 5.

References:
https://code.org/files/CSF_CoursesA-F_Curriculum_Guide.pdf

Prerequisite Courses:
Corequisites Courses:

Type: General Elective

Prerequisite Topics: (none)

Course Outcomes:

O1. Be able to explain, create, follow, and debug algorithms to solve problems.
O2. Demonstrate mastery of elementary programming techniques like conditionals, loops and nested loops, variables, abstractions, functions, and parameters passed to functions.
O3. Be able to understand how the internet can be used by society, and the digital footprints left behind as well as safety concerns.
O4. Be able to apply computing knowledge to create art, make a story, solve puzzles, and games using Art and Play Lab.

This course should be taught by FIU faculty that have completed a 1-day Code.org workshop for K-5 Curriculum, as scheduled in the website: https://code.org/educate/professional-learning/cs-fundamentals-directory

Outline

Topic	Number of Lecture Hours	Outcome
● Computational Thinking ○ Algorithms applied to: ▪ Solving puzzles ▪ Programming using graph paper ▪ Debugging graph paper algorithms ▪ Building paper planes, planting seeds, playing games ● Elementary Programming ○ Conditionals & Loops to: ▪ Traverse a maze to collect treasure ▪ Create art patterns ▪ Problem-solve & think critically ▪ Write dance steps ▪ Distinguish when to use counter loops vs while loops ▪ Play card & dice games ○ Abstractions to: ▪ Create functions ▪ Call functions ▪ Pass parameters to functions	10 15	O1 O2
● Computers and Society ○ URLs, IP addresses, and DNS ○ Digital safety ○ Avoiding Cyberbullying ○ Digital footprints ○ Crowdsourcing	5	O3
● Programming in Art Lab/Play Lab ○ Create animated, event-driven game ○ Create Flappy Bird to detect mouse clicks & collision ○ Build a shareable, online game with various kid-friendly themes ○ Understanding & implementing a design process for projects	15	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	Students will be able to explain, create, follow, and debug algorithms to solve problems.
O2	Students will demonstrate mastery of elementary programming techniques like conditional branching, loops and nested loops, abstractions, functions, and parameters passed to functions.
O3	Students will be able to understand how the internet can be used by society, and the digital footprints left behind, as well as safety concerns.
O4	Students will be able to apply computing knowledge to create art, make a story, solve puzzles, and games using Art and Play Lab.

Oral and Written Communication:

- Written and oral discussions of social issues in computing

Theoretical Contents:

- Abstraction
- Basic algorithmic thinking

Problem Analysis Experiences:

None

Solution Design Experiences:

- Weekly teaching labs, teaching lessons, programming/puzzles