DO NOT TYPE IN THIS BOX

Bulletin # : _____

Academic Year : _____

# FLORIDA INTERNATIONAL UNIVERSITY
# UNIVERSITY CURRICULUM COMMITTEE
## *Proposal for a New Course*

1. **School/College** Engineering and Computing

   **Div./Dept. in Which Taught** School of Computing and Information Sciences

2. | Alpha Prefix | 1st Digit | Last 3 Digits | "C"-lec-lab "L"-Lab | Cr. Hrs. |
   |---|---|---|---|---|
   | CIS | 1 | | | 0 |

   **CIP Code** ***(Leave this blank):*** _____

3. **Grading Method (select one):** ☒ Graded ☐ Pass/Fail

4a. **Course Title** Internship for Teaching Computational Thinking in K-12

b. **Abbreviated course Title** ***(for computer class schedules, transcripts)*** Internship-Teaching CS

LIMITED TO 25 Characters *(including spaces)*

5. **Statewide Course Numbering Subject Matter Area** Computer Information Systems

6. **Catalog Description/Major Topics** *(not to exceed 200 characters including spaces)*

*College of Medicine and College of Law: Attach description not exceeding 1,000 characters including spaces.*

Internship for teaching computational thinking to students in K-12, following established CS curriculum such as Google CS First, Code.org, and MIT Media Lab's Scratch.

7. **Attach detailed syllabus course outline and course justification on separate page(s).**
8. **Prerequisite(s):** None
9. **Corequisite(s):** None
10. **Objective(s) of Course:**

Students will go to local elementary, middle, and senior high schools as interns in teaching computational thinking skills that will help younger students to develop animations and interactive games.

11. **Does this course duplicate/overlap other courses at FIU?** ☐ No ☐ Yes
    **If yes, please explain:** _____
12. **What other closely related department(s) have been consulted about this course?**

    _____
13. **Is this course used for the assessment of a program or a certificate (if yes, then send a notification to assessment@fiu.edu)?** **No** **Yes**

**PROPOSAL REQUESTED BY:**

**Faculty Contact** Maria C. Charters — M C. Charters — 3 / 16 / 20 20
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**Chairperson (Dept./Div.)** S.S. Iyengar — 3 / 16 / 20 20
(Type name) (Signature)

**Chairperson (Curr. Comm.)** Wei-Chiang Lin — / / 20 20
(Type name) (Signature)

**College/School Dean** John Volakis — / / 20 20
(Type name) (Signature)

**Submit one original form. Attach one copy of the course justification and course syllabus, course description, objectives, major topics and textbooks.**

## Internship for Teaching Computational Thinking in K-12 - Course Justification

FIU students recruited by the Honor Society for Computer Science, UPE, are interested in volunteering to teach computational thinking to students in nearby schools in K-12. These students commit to attending a specific school that has a schedule compatible with the student's, and the students regularly attend the school once a week, from the first through the last week of the semester.

In order to properly recognize the efforts of these students, who commit a minimum of 3 hours per week for an entire semester, the creation of a 0-credit Internship for Teaching Computational Thinking K-12 was conceived. With such an internship listed on their resume, students can receive credit for volunteering, get recognition from FIU, and increase their chances of getting selected for other career opportunities.

Because students in K-12 are increasingly required to learn computational thinking to be prepared for future careers in various fields, such an internship would increase the number of FIU students wishing to participate in the weekly teaching of K-12 students.

This internship for teaching computational thinking in K-12 would be mutually beneficial to the FIU students and to the K-12 students. It would also help to formalize and institutionalize the outreach activities, thereby providing a high-level overview by an FIU faculty, and another quality control checkpoint as well.

**School of Computing and Information Sciences**

**Course Title:** Internship for Teaching Computational Thinking in K-12 **Date:** February 4, 2020

**Course Number: CIS 1000**

**Number of Credits: 0**

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Subject Area: Programming

Subject Area Coordinator: Tim Downey
**email:** downeyt@cis.fiu.edu

**Catalog Description:** Internship for teaching computational thinking to students in K-12, following established CS curriculum such as Google CS First, Code.org, and MIT Media Lab's Scratch.

University students who register for this course will learn how to:

- Follow lesson plans for specific grade levels
- Teach how to breakdown a programming problem into smaller pieces
- Demonstrate how to design a program using pseudo code, storyboards, or flowcharts of the program's logic
- Explain how to write a program using CS tools targeted for children
- Monitor and give feedback to K-12 students as they practice computational thinking skills

Textbooks:
*Online Curriculum:*
*https://studio.code.org*
*https://scratch.mit.edu*
*https://csfirst.withgoogle.com/s/en/home*

References:
Wing, J. 2006. Computational Thinking. CACM. 15, 5 (March 2006), 33-35

Prerequisite Courses: None
Co-requisites Courses: None

## Type: Internship

## Prerequisite Topics: (none)

## Course Outcomes:

O1. Be able to follow plan lessons in computational thinking appropriate for the age-level and the prior knowledge of a K-12 student.
O2. Be able to teach how to plan a new program by breaking it down into smaller pieces, using storyboards, flowcharts, and pseudo code.
O3. Be able to teach how to use a programming tool such as MIT's Scratch or Code.org's app creation, to develop games and animations.
O4. Be able to provide feedback to K-12 students as they apply computational thinking skills.

This course should be overseen by FIU faculty that have experience in teaching computational thinking in programming classes.

## Outline

| Topic | Number of Lecture Hours | Outcome |
|---|---|---|
| ● Follow plan lessons in computational thinking appropriate for the age-level and the prior knowledge of a K-12 student<br>o Identify the various K-12 curriculum which exist<br>o Select the most appropriate curriculum for the target group of K-12 student<br>o Become familiar with the various lessons per level of student. | 5 | O1 |
| ● Teach how to plan a new program by breaking it down into smaller pieces<br>o Explain what the purpose of a storyboard and how it is used to plan an animation.<br>o Explain what pseudo code is and give basic examples of how to use it.<br>o Explain how to create a flowchart, and explain how you would create it. | 5 | O2 |
| • Teach how to use a programming tool targeted for K-12 children.<br>o Select Google CS First, MIT Scratch, or Code.org<br>▪ Teach how to open, save, and test code<br>▪ Following curriculum, teach progressively harder programs. | 15 | O3 |
| • Provide feedback to K-12 students as they learn computational thinking skills.<br>o Provide positive reinforcement to each student<br>o Help students identify their logic, syntax, and runtime errors.<br>o Help students to “debug” their code<br>o Help students correct errors in code<br>o Motivate students to keep learning | 10 | O4 |

## Course Outcomes Achieved by

## *Internship in Teaching Computational Thinking in K-12*

An internship in teaching computational thinking in K-12 will provide students with the following outcomes.

| Outcome | |
|---|---|
| O1 | Students will be able to follow lesson plans in computational thinking appropriate for the age-level and the prior knowledge of a K-12 student |
| O2 | Students will learn how to teach breaking down a problem into smaller pieces |
| O3 | Students will learn how to teach a programming tool targeted for K-12 children. |
| O4 | Students will learn how to provide feedback to K-12 students as they learn computational thinking skills. |

## Oral and Written Communication:

- Written and oral discussions of how to teach computational thinking

## Theoretical Contents:

- Abstraction
- Basic algorithmic thinking

## Problem Analysis Experiences:

None

## Solution Design Experiences:

- Weekly teaching internships, following lessons, programming with various CS tools