DO NOT TYPE IN THIS BOX

Bulletin # : 3

Academic Year : 2020-2021

FLORIDA INTERNATIONAL UNIVERSITY
UNIVERSITY CURRICULUM COMMITTEE
Proposal for a New Course

1. **School/College** ~~Business~~ College of Engineering and Computing
   Div./Dept. in Which Taught School of Computing and Information Sciences
2. IDC (Alpha Prefix) | 5 (1st Digit) | XXX (Last 3 Digits) | ____ ("C"-lec-lab "L"-Lab) | 3 (Cr. Hrs.) — **CIP Code** *(Leave this blank):* ____

IDC 5014

3. **Grading Method (select one):** ☒ Graded ☐ Pass/Fail
4a. **Course Title** Computer Science for High School Teachers
   b. **Abbreviated course Title** *(for computer class schedules, transcripts)* CS Ed for High School
   LIMITED TO 25 Characters *(including spaces)*
5. **Statewide Course Numbering Subject Matter Area** ____
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.

   Computer Science topics such as computational thinking, logic, visual programming, social and ethical issues related to computer technologies, appropriate for high school students.

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:**

    Provide teachers with the knowledge to teach Computer Science topics to high school students.

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?**
    Dept of Teaching & Learning
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 Giri Narasimhan (Type name) — (Signature) — 09 / 23 / 2020
giri@fiu.edu (Email address) — x3748 (Phone number)

Chairperson (Dept./Div.) Jason Liu (Type name) — (Signature) — 09 / 23 / 2020

Chairperson (Curr. Comm.) Wei-Chiang Lin (Type name) — (Signature) — 11 / 30 / 2020

College/School Dean John Volakis (Type name) — Anthony McGoron Digitally signed by Anthony McGoron Date: 2020.12.07 09:40:20 -05'00' (Signature) — ____ / ____ / 20____

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

Course Title: Computer Science for High School Teachers

Course Justification: Computer science drives job growth and innovation throughout our economy and society. Computing occupations are the number 1 source of all new wages in the U.S. and make up over half of all projected new jobs in STEM fields, making Computer Science one of the most in-demand college degrees. Yet, only about 30% of Florida public high schools teach a foundational or AP course in computer science. While thousands of trained science and math K-12 teachers are available, there is a dearth of trained computer science K-12 teachers in Florida. No computer science teacher preparation programs exist in Florida currently. Training K-12 teachers in computational thinking with nationally-recognized curricula is now being adopted across the nation. This course addresses the need to provide training for K-12 teachers to teach computing principles in high schools.

School of Computing and Information Sciences

Course Title: Computer Science for High School Teachers **Date:** 09/14/2020

Course Number: IDC 5XXX

Number of Credits: 3

Subject Area: Computer Science Education	**Subject Area Coordinator:** **email:**
Catalog Description: Computer Science topics such as computational thinking, logic, visual programming, social and ethical issues related to computer technologies, appropriate for high school students.	
Textbook:	
References: None	
Prerequisite Courses: None	
Corequisite Courses: None	

Type: **Elective**

Course Purpose:

High school teachers will learn computer science concepts, computational thinking, problem solving, programming concepts, and other content and competencies related to computer science education that is appropriate for high school aged learners in diverse educational settings. The course will also teach various pedagogical approaches that are currently used in computer science education and recommended by the Florida Department of Education.

Course Outcomes:

After completing this course, students will be able to:

1. Explain how innovations in computing have revolutionized the world we live in.
2. Represent data using different encoding schemes and translate between representations
3. Evaluate and refine computational artifacts for use in programs
4. Evaluate tradeoffs in how data are organized, stored, and manipulated
5. Compare levels of abstraction and software and hardware
6. Explain legal and ethical concerns with use of computing and data
7. Evaluate impacts of computing on personal, ethical, social, economic, and cultural practices
8. Learn pedagogical concepts that are useful as a K-12 teacher for grades 9-12.

Resources:

- https://www.cpalms.org/Standards/Computer_Science_Standards.aspx
- Graduate Certificate: https://education.ufl.edu/computer-science-education/
- FTCE competencies and skills: http://www.fl.nesinc.com/studyguide/FL_SG_obj_005.htm

Outline:

Topic	Number of Lecture Hours (Total: 30 hours = 2 weeks * 5 lectures/week * 3 hrs/lecture)	Outcomes
1. Digital Information • Representing digital information in computers • Representing numbers, text, images, sound, and video • Data Compression • Social impact of digitization • **Pedagogy**: vocabulary, brainstorm, pair activity	3	1,2,8
2. The Internet • Design of the internet • Connectivity, modern life and the internet • Internet of things • **Pedagogy**: team work, group discussion, share out	3	1,2,8
3. Intro to App Design • Programming and App design • Debugging, pair programming • Event-driven programs and App design • Designing projects to teach a topic • **Pedagogy**: journaling, reflection, using resources	3	3,8
4. Variables, Conditionals, and Functions • Variables, conditionals, and functions • Collaborative activity for App design using above concepts • **Exercise**: Designing a decision-making App • **Pedagogy**: Communication, Expression, Critique	3	3,4,8
5. Lists, Loops, and Traversals • Storing and processing data using lists, loops, & traversals • Using data libraries for App design • **Exercise**: A simple hackathon • **Pedagogy**: Learning outcomes, rubrics	3	4,8
6. Algorithms • Problem solving and algorithm design • Algorithm efficiency and analysis • Computational thinking and modern computing • **Pedagogy**: Assessment, evaluation	3	1,5,8
7. Parameters, Return values, and Libraries • Functions with parameters and return values • Designing Apps with function libraries • Code reuse • **Exercise:** Pair programming for reuse	3	1,5
8. AP Create Performance Task • Understanding a task and developing an implementation	3	2,3,4,5,8
9. Data Analysis and visualization • Analyzing data and data visualization • Modern society and the Data-driven decision process	3	1,4
10. Cybersecurity and Global Impacts • Privacy and security, encryption and communication • **Exercise:** Crafting a proposal for the future of society	3	1,6,7

11. Computing and Society • Explore and debate current events at the intersection of data, public policy, law, ethics, and societal impact • **Pedagogy:** peer evaluation and self-evaluation	3	7,8
12. Classroom Dynamics • **Pedagogy:** Reflections on coding and debugging skills • **Pedagogy:** Classroom engagement, culture, equity, research & inquiry, personal expression & creativity	3	7,8

Gmail Masoud Sadjadi <sadjadis@gmail.com>

Fw: CS Courses for MS in C&I degree program

Giri Narasimhan <giri@fiu.edu> Fri, Nov 13, 2020 at 8:14 AM
To: Masoud Sadjadi <sadjadi@fiu.edu>, sadjadiATcs <sadjadi@cs.fiu.edu>

Masoud, here you go -- the email from the chair of Teaching and Learning.
Best, --giri

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== Giri Narasimhan, Professor
== Head, Bioinformatics Research Group (BioRG)
== School of Computing and Information Sciences
== ECS 254B, University Park Campus
== Ph: (+1) 305.348.3748
== http://www.cs.fiu.edu/~giri/
== http://biorg.cs.fiu.edu/
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From: Sarah Mathews <samathew@fiu.edu>
Sent: Wednesday, November 4, 2020 12:14 PM
To: M.O. Thirunarayanan <thiru@fiu.edu>
Cc: Melanie Morales <moralem@fiu.edu>; Giri Narasimhan <giri@fiu.edu>
Subject: Re: CS Courses for MS in C&I degree program

Dear all,
I support the use of these courses in the Department of Teaching and Learning's MSC&I.

Sincerely,
Sarah Mathews

From: M.O. Thirunarayanan <thiru@fiu.edu>
Sent: Wednesday, October 28, 2020 7:20 PM
To: Sarah Mathews <samathew@fiu.edu>
Cc: Melanie Morales <moralem@fiu.edu>; Giri Narasimhan <giri@fiu.edu>
Subject: CS Courses for MS in C&I degree program

Dear Dr. Mathews,

As you know, earlier today our department faculty approved the two new courses that are being developed by the school of computer science, for inclusion in the learning technologies track under the MS in C& I degree program:

The two courses are:

IDC 5XXX "Computer Science for Middle School Teachers"

IDC 5XXX "Computer Science for High School Teachers"

The attached files contain the syllabi for the two courses.

I request you to write a letter addressed to Dr. Jason Liu, Chair School of Computing and Information Sciences, stating that our department will use the two courses as part of the Learning Technologies track under the MS in C&I degree program.

FYI, the two courses have been approved by the School of Computing and Information Sciences and are currently awaiting approval at the College level. Your letter will help facilitate the final approval of the courses.

Thank you.

Thiru.
(M.O. Thirunarayanan)

Fw: CS Courses

1 message

Giri Narasimhan <giri@fiu.edu> Fri, Nov 13, 2020 at 8:12 AM
To: Masoud Sadjadi <sadjadi@fiu.edu>, sadjadiATcs <sadjadi@cs.fiu.edu>

Masoud, here is the message from the folks in Education. I will forward you another email from the chair.
Best, --giri

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== Giri Narasimhan, Professor
== Head, Bioinformatics Research Group (BioRG)
== School of Computing and Information Sciences
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== http://biorg.cs.fiu.edu/
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From: M.O. Thirunarayanan <thiru@fiu.edu>
Sent: Wednesday, October 28, 2020 6:58 PM
To: Giri Narasimhan <giri@fiu.edu>
Subject: Re: CS Courses

Hi Giri,

The two courses were approved by my department and the Chair will write a letter stating that the two courses will be used as a part of the Learning Technologies track under the MS in C&I degree program.

I have a question: The cover sheets for the new course proposals list "Business" at the top of the form. Should it not be Engineering?

In a few minutes I will send a message to my chair requesting her to send your chair a letter about the two courses.

Thank you.

Thiru.
(M.O. Thirunarayanan)

From: Giri Narasimhan <giri@fiu.edu>
Sent: Tuesday, October 27, 2020 6:27 PM
To: M.O. Thirunarayanan <thiru@fiu.edu>
Subject: Re: CS Courses

Hi Thiru,
The courses were approved by the department committees and faculty. It is now under review by the college curriculum committee. Approval by your program would, of course, facilitate that process.
The department did ask me to complete the package. I am attaching the 6 files that are being used for the approval process.
Note that any changes you request would reset the process and I may need to seek reapproval from the department.
Best regards, --giri

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From: M.O. Thirunarayanan <thiru@fiu.edu>
Sent: Tuesday, October 27, 2020 2:53 PM
To: Giri Narasimhan <giri@fiu.edu>
Subject: CS Courses

Giri,

Have the two courses been approved by your department?

My department is meeting tomorrow and will be discussing the changes proposed to the Learning Technologies track under the MS in C&I degree program.

Thank you.

Thiru.
(M.O. Thirunarayanan)