



**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 5 XXX 3 CIP Code (Leave this blank): \_\_\_\_\_  
 Alpha Prefix 1st Digit Last 3 Digits "C"-lec-lab "L"-Lab Cr. Hrs.

**IDC 5013**

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

4a. Course Title Computer Science for Middle School Teachers

b. Abbreviated course Title (for computer class schedules, transcripts) CS Ed for Middle 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.*

Provide teachers with the knowledge to teach Computer Science topics such as programming, physical computing, web development, design, and data, appropriate for middle 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 middle 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	<u>Giri Narasimhan</u>		<u>09 / 23 / 2020</u>
	<small>(Type name)</small>	<small>(Signature)</small>	
	<u>giri@fiu.edu</u>	<u>x3748</u>	
	<small>(Email address)</small>	<small>(Phone number)</small>	
Chairperson (Dept./Div.)	<u>Jason Liu</u>		<u>09 / 23 / 2020</u>
	<small>(Type name)</small>	<small>(Signature)</small>	
Chairperson (Curr. Comm.)	<u>Wei-Chiang Lin</u>		<u>11 / 30 / 2020</u>
	<small>(Type name)</small>	<small>(Signature)</small>	
College/School Dean	<u>John Volakis</u>	<small>Anthony McGoron</small> 	<u> / / 20</u>
	<small>(Type name)</small>	<small>(Signature)</small>	

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 Middle 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 middle schools.

## School of Computing and Information Sciences

**Course Title:** Computer Science for Middle School Teachers

**Date:** 09/14/2020

**Course Number:** IDC 5XXX

**Number of Credits:** 3

<b>Subject Area:</b> Computer Science Education	<b>Subject Area Coordinator:</b> <b>email:</b>
<b>Catalog Description:</b> Computer Science topics such as programming, physical computing, web development, design, and data, appropriate for middle school students.	
<b>Textbook:</b> Class Notes	
<b>References:</b> None	
<b>Prerequisite Courses:</b> None	
<b>Corequisite Courses:</b> None	

**Type:** Elective

**Course Purpose:**

Middle 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 middle 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:**

Students will learn:

1. the problem-solving process, the input-output-store-process model of a computer, and how computers help humans solve problems;
2. to create websites using HTML and CSS, while being aware of privacy and ownership on the internet;
3. to use fundamental programming constructs in JavaScript while developing animations and games;
4. to apply the problem solving process to understand the needs of a user and design appropriate solutions;
5. to explore how information is represented in a computer and to use collections of data to solve problems;
6. to explore the relationship between hardware and software and develop simple programs
7. pedagogical concepts that are useful as a middle school teacher

**Resources:**

- [https://www.cpalms.org/Standards/Computer\\_Science\\_Standards.aspx](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](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)	Outcome
<b>1. Problem Solving</b> <ul style="list-style-type: none"> <li>• Introduction to problem solving</li> <li>• Problem solving process: define – prepare – try – reflect;</li> <li>• Problem classes, problem decomposition, collaboration</li> <li>• <b>Pedagogy:</b> vocabulary, brainstorm, pair activity</li> <li>• <b>Exercise:</b> word search, seat arrangements, trip planning</li> </ul>	3	1,7
<b>2. Computer and Problem Solving</b> <ul style="list-style-type: none"> <li>• Computers and problem solving</li> <li>• Input and Output</li> <li>• Processing &amp; Storage</li> <li>• <b>Pedagogy:</b> team work, group discussion, share out</li> <li>• <b>Exercise:</b> Pair Project: Propose an App</li> </ul>	3	1,7
<b>3. Web Development</b> <ul style="list-style-type: none"> <li>• Exploring Web Pages: Content and Structure; HTML</li> <li>• Creating web page – define, prepare, try, reflect</li> <li>• <b>Pedagogy:</b> journaling, reflection, using resources</li> <li>• <b>Exercise:</b> Creating a personal web page</li> </ul>	3	2,7
<b>4. More Web Development</b> <ul style="list-style-type: none"> <li>• Digital Footprint and Privacy; Copyright and IP</li> <li>• Styling with CSS</li> <li>• Multipage websites, linking</li> <li>• <b>Pedagogy:</b> Communication, Expression, Critique</li> </ul>	<b>3</b>	2,7
<b>5. Animations</b> <ul style="list-style-type: none"> <li>• Programming and App design</li> <li>• Drawing shapes, parameters, random numbers</li> <li>• Objects and properties, text</li> <li>• Draw loops and animations, conditionals</li> <li>• <b>Pedagogy:</b> Learning outcomes, rubrics</li> <li>• <b>Exercise:</b> Create captioned scene</li> </ul>	3	3,7
<b>6. Interactive Games</b> <ul style="list-style-type: none"> <li>• Interactions from mouse and keyboard</li> <li>• Event-driven programs and App design</li> <li>• Movement, velocity, collisions</li> <li>• Game design process</li> <li>• <b>Pedagogy:</b> Assessment, evaluation</li> </ul>	3	3,7
<b>7. The Design Process</b> <ul style="list-style-type: none"> <li>• Users, needs, products, user interface, feedback, testing,</li> <li>• Variables, conditionals, and functions</li> <li>• Collaborative activity for App design using above concepts</li> <li>• <b>Exercise:</b> Designing a decision-making App</li> <li>• <b>Pedagogy:</b> role playing</li> </ul>	3	4,7
<b>8. App Prototyping</b> <ul style="list-style-type: none"> <li>• Apps for good, market research</li> <li>• Mock prototype, mock interaction, prototype testing</li> <li>• Create, test, iterate</li> </ul>	3	4,7

<ul style="list-style-type: none"> <li>• <b>Pedagogy:</b> self-evaluation, peer review, motivations</li> <li>• <b>Exercise:</b> App hackathon</li> </ul>		
<b>9. Concepts of Data</b> <ul style="list-style-type: none"> <li>• Concepts of data and representations</li> <li>• ASCII, binary representations, images</li> <li>• Encoding and decoding</li> <li>• Problem solving with data</li> </ul>	3	5
<b>10. Data and Society</b> <ul style="list-style-type: none"> <li>• Big Data, structured data</li> <li>• Interpreting data, decisions with data</li> <li>• Data visualization, automating data decisions</li> <li>• Modern society and the Data-driven decision process</li> <li>• <b>Pedagogy:</b> Developing program guides</li> <li>• <b>Exercise:</b> A simple data-driven recommender system</li> </ul>	3	5
<b>11. Physical Computing</b> <ul style="list-style-type: none"> <li>• Hardware and non-traditional computing platforms</li> <li>• Designing complex Apps</li> <li>• More event-driven programming</li> <li>• Analog inputs</li> <li>• <b>Pedagogy:</b> Reflections on history and future of computing</li> </ul>	3	6
<b>12. Program Design Process</b> <ul style="list-style-type: none"> <li>• A case study</li> <li>• <b>Exercise:</b> From concept to a program</li> <li>• <b>Pedagogy:</b> Reflections on society</li> </ul>	3	6

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

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Giri Narasimhan <giri@fiu.edu>  
To: Masoud Sadjadi <sadjadi@fiu.edu>, sadjadiATcs <sadjadi@cs.fiu.edu>

Fri, Nov 13, 2020 at 8:14 AM

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

=====  
== 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

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**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)

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**Fw: CS Courses**

1 message

**Giri Narasimhan** <giri@fiu.edu>

Fri, Nov 13, 2020 at 8:12 AM

To: Masoud Sadjadi &lt;sadjadi@fiu.edu&gt;, sadjadiATcs &lt;sadjadi@cs.fiu.edu&gt;

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

=====  
== 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:** 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)

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**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

=====  
== 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/>  
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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)