

## School of Computing and Information Sciences

**Course Title:** Capstone I

**Date:** 11/22/19

**Course Number:** CIS 3XXX

**Number of Credits:** 1

<b>Subject Area:</b> Knowledge focus groups covered in the curriculum of the BS in Computer Science.	<b>Subject Area Coordinator:</b> Monique Ross <b>email:</b> moross@fiu.edu
<b>Catalog Description:</b> Students learn how to perform efficiently in Agile/Scrum teams of up to 5 members and learn how to design and implement solutions to problems as a team.	
<b>Textbook:</b> No text book required	
<b>References:</b>	
<b>Prerequisites Courses:</b> COP 3337 (Programming II) and Junior standing	
<b>Corequisites Courses:</b> None	

Type: Required

Prerequisites Topics:

- Programming knowledge.

Course Outcomes:

1. Demonstrate the ability to work effectively in a project team.
2. Demonstrate familiarity of formulating problems.
3. Demonstrate familiarity of specifying the requirements of a problem.
4. Demonstrate familiarity of designing the solution to a problem.
5. Demonstrate familiarity of realizing the solution to a problem.
6. Demonstrate familiarity to validate and evaluate the solution to a problem.
7. Demonstrate familiarity to manage a semester long project.
8. Demonstrate familiarity to think logically and critically when developing the solution to a given problem.
9. Demonstrate familiarity to apply concepts learned in various courses when developing the solution to a given problem.
10. Demonstrate familiarity to communicate the details of the technical solution through verbal and written modes.
11. Demonstrate familiarity to incorporate ethical issues into the project development and documentation process.

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**Relationship between Course Outcomes and Program Outcomes**

<b>BS in CS: Program Outcomes</b>	<b>Course Outcomes</b>
a) Demonstrate proficiency in the foundation areas of Computer Science including mathematics, discrete structures, logic and the theory of algorithms	1, 2, 3, 4, 5, 9
b) Demonstrate proficiency in various areas of Computer Science including data structures and algorithms, concepts of programming languages and computer systems.	1, 2, 3, 4, 5, 8, 9
c) Demonstrate proficiency in problem solving and application of software engineering techniques	1, 2, 3, 4, 5, 6, 7, 8, 9
d) Demonstrate mastery of at least one modern programming language and proficiency in at least one other.	4, 9
e) Demonstrate understanding of the social and ethical concerns of the practicing computer scientist.	11, 9
f) Demonstrate the ability to work cooperatively in teams.	7
g) Demonstrate effective communication skills.	10, 9

**Assessment Plan for the Course and how Data in the Course are used to assess Program Outcomes**

Student and Instructor Course Outcome Surveys are administered at the conclusion of each offering, and are evaluated as described in the School's Assessment Plan:  
<http://www.cis.fiu.edu/programs/undergrad/cs/assessment/>

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**Outline**

<b>Topic</b>	<b>Number of Lecture Hours</b>	<b>Outcome</b>
<ul style="list-style-type: none"> <li>• Project management               <ul style="list-style-type: none"> <li>○ Organization</li> <li>○ Planning</li> <li>○ Monitoring</li> </ul> </li> </ul>	2	1, 2, 7, 8, 10, 11
<ul style="list-style-type: none"> <li>• Problem Formulation               <ul style="list-style-type: none"> <li>○ Motivation</li> <li>○ Problem feasibility</li> <li>○ Problem statement</li> </ul> </li> </ul>	2	1, 2, 7, 8, 10
<ul style="list-style-type: none"> <li>• Requirements Specification               <ul style="list-style-type: none"> <li>○ Domain analysis</li> <li>○ Objectives of the solution</li> <li>○ Validation adequacy criteria</li> </ul> </li> </ul>	2	1, 3, 7, 8, 9, 10, 11
<ul style="list-style-type: none"> <li>• Design               <ul style="list-style-type: none"> <li>○ Formulation of a plan to implement requirements</li> <li>○ Limits on scope of solution</li> </ul> </li> </ul>	2	1, 4, 6, 7, 8, 9, 10
<ul style="list-style-type: none"> <li>• Realization               <ul style="list-style-type: none"> <li>○ Realize solution from design</li> </ul> </li> </ul>	2	1, 5, 6, 7, 8, 9, 10
<ul style="list-style-type: none"> <li>• Validation/Evaluation               <ul style="list-style-type: none"> <li>○ Check solution against requirements using adequacy criteria</li> <li>○ Compare solution to alternative solutions.</li> </ul> </li> </ul>	2	1, 6, 7, 8, 9, 10

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**Course Outcomes Emphasized in Laboratory Projects / Assignments**

<b>Outcome</b>	<b>Number of Weeks</b>
1. Project Plan Outcomes: 1, 2, 7, 8, 10, 11	variable 1 - 2
2. Requirements Specification Outcomes: 1, 2, 7, 8, 10, 11	variable 1 - 2
3. Solution Design Outcomes: 1, 3, 7, 8, 9, 10	variable 1 - 2
4. Final Project Outcomes: 1,2,3,4,5,6, 7, 8, 9, 10, 11	variable 1 - 2

**Oral and Written Communication:**

<b>Written Reports</b>		<b>Oral Presentations</b>	
Number Required	Approx. Number of pages	Number Required	Approx. Time for each
4 (Project Plan, Requirements Document, Design Document, Final Project Document)	Variable (1-30)	at least 3 no more than 5	15 minutes per group (5 minutes per student)

**Social and Ethical Implications of Computing Topics**

<b>Topic</b>	<b>Class time</b>	<b>student performance measures</b>
Intellectual property - Patents, trademarks, copyrights of other similar products, and licensing of final product		Written reports – Requirements document and Final Project Document.
Privacy – privacy protection		Written reports – Requirements document and Final Project Document.
Economic issues – pricing strategies		

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**Approximate number of credit hours devoted to fundamental CS topics**

Topic	Core Hours	Advanced Hours
<b>Algorithms:</b>	<b>0.5</b>	
<b>Software Design:</b>	<b>0.5</b>	
<b>Computer Organization and Architecture:</b>	<b>0.5</b>	
<b>Data Structures:</b>	<b>0.5</b>	
<b>Concepts of Programming Languages</b>	<b>0.5</b>	

**Theoretical Contents**

Topic	Class time

**Problem Analysis Experiences**

Feasibility study of alternative solutions
Specifying the requirements for a problem
Analyzing the requirements of a problem

**Solution Design Experiences**

Designing the solution to a problem
Techniques to validate the problem solution

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**The Coverage of Knowledge Units within Computer Science Body of Knowledge<sup>1</sup>**

<b>Knowledge Unit</b>	<b>Topic</b>	<b>Lecture Hours</b>
<a href="#"><u>AL</u></a>	Algorithms and Complexity	variable (1-2)
<a href="#"><u>AR</u></a>	Architecture and Organization	variable (1-2)
<a href="#"><u>IM</u></a>	Information Management	variable (1-2)
<a href="#"><u>NC</u></a>	Net-Centric Computing	variable (1-2)
<a href="#"><u>OS</u></a>	Operating Systems	variable (1-2)
<a href="#"><u>PL</u></a>	Programming Languages	variable (1-2)
<a href="#"><u>SE</u></a>	Software Engineering	variable (1-2)
<a href="#"><u>SP</u></a>	Social and Professional Issues	variable (1-2)

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<sup>1</sup>See [https://www.acm.org/binaries/content/assets/education/cs2013\\_web\\_final.pdf](https://www.acm.org/binaries/content/assets/education/cs2013_web_final.pdf) for a description of Computer Science Knowledge units