School of Computing and Information Sciences

Course Title: Senior Project **Date:** 3/22/19

Course Number: CIS 4911

Number of Credits: 3

Subject Area: Knowledge focus groups covered in the curriculum of the BS in Computer Science.	**Subject Area Coordinator:** Peter Clarke **email:** clarkep@cis.fiu.edu
Catalog Description: Students work on faculty supervised projects in teams of up to 5 members to design and implement solutions to problems utilizing knowledge obtained across the spectrum of Computer Science courses.	
Textbook: No text book required	
References:	
Prerequisites Courses: CEN 4010 and Permission of the Senior Project Coordinator. *This course should be taken during the semester in which the student completes all the CS courses required for the CS major.*	
Corequisites Courses: None	

Type: Required

Prerequisites Topics:

- Software development process
- Basic project management concepts
- Domain specific knowledge (for project being developed)

Course Outcomes:

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

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Relationship between Course Outcomes and Program Outcomes

BS in CS: Program Outcomes	Course Outcomes
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

Topic	Number of Lecture Hours	Outcome
• Project management o Organization o Planning o Monitoring		1, 2, 7, 8, 10, 11
• Problem Formulation o Motivation o Problem feasibility o Problem statement		1, 2, 7, 8, 10
• Requirements Specification o Domain analysis o Objectives of the solution o Validation adequacy criteria		1, 3, 7, 8, 9, 10, 11
• Design o Formulation of a plan to implement requirements o Limits on scope of solution		1, 4, 6, 7, 8, 9, 10
• Realization o Realize solution from design		1, 5, 6, 7, 8, 9, 10
• Validation/Evaluation o Check solution against requirements using adequacy criteria o Compare solution to alternative solutions.		1, 6, 7, 8, 9, 10

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Course Outcomes Emphasized in Laboratory Projects / Assignments

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

Oral and Written Communication:

Written Reports		Oral Presentations	
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

Topic	Class time	student performance measures
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
Algorithms:		0.5
Software Design:		0.5
Computer Organization and Architecture:		0.5
Data Structures:		0.5
Concepts of Programming Languages		0.5

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[1]

Knowledge Unit	Topic	Lecture Hours
AL	Algorithms and Complexity	variable (1-3)
AR	Architecture and Organization	variable (1-3)
IM	Information Management	variable (1-3)
NC	Net-Centric Computing	variable (1-3)
OS	Operating Systems	variable (1-3)
PL	Programming Languages	variable (1-3)
SE	Software Engineering	variable (1-3)
SP	Social and Professional Issues	variable (1-3)

[1]See http://www.computer.org/education/cc2001/final/chapter05.htm for a description of Computer Science Knowledge units

Guidelines for Implementation of the Capstone Project

In the following guidelines, the "*capstone semester"* is defined as the semester in which a student enrolls and completes the capstone project. The "*prior semester"* is the semester preceding the capstone semester.

Guidelines for the Capstone Coordinator(s):

1. Ensure that students register for the capstone project in or after the semester in which they complete all the CS courses required for the CS major.
2. Ensure students successfully complete CEN 4010 Software Engineering I before they can enroll in the capstone project.
3. Ensure students obtain permission to register for the capstone project by the 4th week of the *prior semester*.
4. Assign student teams to individual Clients before the end of the prior semester.
5. Distribute the course syllabus to students at the beginning of the *capstone semester*.
6. Schedule final project presentations (in consultation with the Clients).
7. Ensure that each student team has two evaluators on their project committee. This committee shall consist of the Client and the Capstone Coordinator. *{Reason in the event that the Client is not available at the time of the scheduled presentation, the Capstone Coordinator will coordinate the presentation}*

Note: We recommend that for every 15 students there be a Capstone Coordinator.

Guidelines for the Client (may be a faculty member or an outside company representative):

1. Provide a brief description (or outline) of the project to the Capstone Coordinator during the prior semester.
2. Assign detailed project requirements to student teams in the first week of the capstone semester.
3. Identify specific dates for the project deliverables and presentations in consultation with the Capstone Coordinator.

Guidelines for the Student:

1. Meet with the Capstone Coordinator by the 4th week of the prior semester, to obtain permission to register for the course.
2. Meet with the Capstone Coordinator and discuss potential projects during the prior semester.
3. By the end of the prior semester, the student must select a project, subject to the approval of the Capstone Coordinator.
4. During the capstone semester, the student must schedule appointments with the client in order to produce the project deliverables in a timely manner.