

Knight Foundation School of Computing and Information Sciences

Course Title: Software Design and Development Project

Date: 3/5/2010

Course Number: CEN 4012

Number of Credits: 3

Subject Area: Software Engineering	Subject Area Coordinator: Peter Clarke email: clarkep@cis.fiu.edu
Catalog Description: Student's design, implement, document, and test software systems working in faculty supervised project teams and utilizing knowledge obtained in previous courses. Required for Software Design and Development track.	
Textbook: No required textbook	
References: Bernd Bruegge, Allen H Dutoit, "Object-Oriented Software Engineering: Using UML, Patterns, and Java", 2 nd Edition, Prentice Hall, ISBN 0-13-0471100. Text is available in the university bookstore.	
Prerequisites Courses: CEN 4010	
Corequisites Courses: None	

Type: SDD Track Required Upper Division

Prerequisites Topics:

- Software Development Life Cycle
- Requirements specifications
- Software Design and implementation

Course Outcomes:

1. Demonstrate mastery of techniques of analyzing and designing software systems
2. Demonstrate mastery of software planning
3. Demonstrate mastery of software systems implementation
4. Demonstrate mastery of software testing techniques
5. Demonstrate ability to work effectively in a software development team

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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	
b) Demonstrate proficiency in various areas of Computer Science including data structures and algorithms, concepts of programming languages and computer systems.	1, 4
c) Demonstrate proficiency in problem solving and application of software engineering techniques	1, 2, 3, 4,
d) Demonstrate mastery of at least one modern programming language and proficiency in at least one other.	
e) Demonstrate understanding of the social and ethical concerns of the practicing computer scientist.	
f) Demonstrate the ability to work cooperatively in teams.	1, 2, 3, 4, 5
g) Demonstrate effective communication skills.	1, 2, 3, 4, 5

Assessment Plan for the Course & 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:
<https://abet.cs.fiu.edu/csassessment/>

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Outline

Topic	Number of Lecture Hours	Outcome
<ul style="list-style-type: none"> • Project Management <ul style="list-style-type: none"> ○ Role identification and assignment ○ Creation of project schedule ○ Project tracking 	6	2, 5
<ul style="list-style-type: none"> • Feasibility Study <ul style="list-style-type: none"> ○ Problem definition ○ Alternative Solutions ○ Analysis of alternative solutions ○ Cost estimation 	6	1, 2, 5
<ul style="list-style-type: none"> • Requirements Elicitation and Analysis <ul style="list-style-type: none"> ○ Functional requirements ○ Non-functional requirements ○ Analysis models (static and dynamic) 	6	1, 5
<ul style="list-style-type: none"> • Software Design <ul style="list-style-type: none"> ○ System design <ul style="list-style-type: none"> ▪ Architectural patterns ▪ Subsystem decomposition ▪ Hardware and software mapping ▪ Persistent data management ○ Detailed design <ul style="list-style-type: none"> ▪ Design patterns ▪ Static model (e.g., class diagrams) ▪ Dynamic model (e.g., state machines, sequence diagrams) 	12	1, 3, 5
<ul style="list-style-type: none"> • Software Testing <ul style="list-style-type: none"> ○ Model validation (requirements and design) ○ Software Testing <ul style="list-style-type: none"> ▪ Unit testing ▪ Subsystem testing ▪ Integration testing ▪ Systems testing 	6	3, 4, 5

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Course Outcomes Emphasized in Laboratory Projects / Assignments

Outcome	Number of Weeks
1. Feasibility Study Outcomes: 1, 2, 5	3
2. Software Requirements Specification Outcomes: 1, 5	3
3. Software Design: Outcomes: 1, 5	3
4. Software Testing: Outcomes: 3, 4, 5	3
5. Final System Documentation: Outcomes: 1, 2, 3, 4, 5	

Oral and Written Communication:

Written Reports		Oral Presentations	
Number Required	Approx. Number of pages for each	Number Required	Approx. Time for each
5 (Feasibility Study, Software Requirements Specification, Software Design, Software Testing, Final System documentation)	30	5	30 minutes per group

Social and Ethical Implications of Computing Topics:

No significant coverage

Topic	Class time	Student Performance Measures

Approximate number of credit hours devoted to fundamental CS topics

Topic	Core Hours	Advanced Hours
Algorithms:		
Software Design:		3.0
Computer Organization and Architecture:		
Data Structures:		

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Concepts of Programming Languages:		
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Theoretical Contents

Topic	Class time

Problem Analysis Experiences

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Solution Design Experiences

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The Coverage of Knowledge Units within Computer Science Body of Knowledge¹

Knowledge Unit	Topic	Lecture Hours
<u>SE 1</u>	Design patterns Software architecture Object-oriented analysis and design	8
<u>SE 3</u>	Programming environments	3
<u>SE 4</u>	Software life-cycle and process models	3
<u>SE 5</u>	Requirement Elicitation, Requirements Analysis Modeling Techniques, Functional and Nonfunctional requirements, Basic Concepts of Formal specification techniques	6
<u>SE 6</u>	Validation Planning, Testing Fundamentals, Black-box and White-box testing, Unit, integration, validation and system testing, Object-Oriented Testing, Inspections	6
<u>SE 8</u>	Team management: Roles and responsibilities in a software team, Project tracking, Team problem resolution; Project scheduling; Software measurement and estimation techniques; Software configuration management.	6
<u>SE 10</u>	Pre and post assertions	3

¹See https://www.acm.org/binaries/content/assets/education/cs2013_web_final.pdf for a description of Computer Science Knowledge units