Knight Foundation School of Computing and Information Sciences

Course Title: Component-Based Software Development **Date:** 12/20/2022

Course Number: COP 4814

Number of Credits: 3

Subject Area: Programming	**Subject Area Coordinator:** Antonio Hernandez **email:** antherna@fiu.edu
Catalog Description: Integrating, exchanging, and transforming XML data, building software from components, understanding security concepts, basic Web services.	
Textbooks: XML: Visual QuickStart Guide (2/e) by Kevin Howard Goldberg; Head First Design Patterns, by Eric Freeman, et al.	
References:	
Prerequisites Courses: COP 4703 and CGS 4854	
Corequisites Courses:	

Type: Required for BS-in-IT

Prerequisites Topics:

- Familiarity with CSS styles and XHTML
- Knowledge of creating web applications
- Experience with simple data validation techniques
- Knowledge of object-oriented programming, including composition, inheritance, and interfaces

Course Outcomes:

1. Identify principles and techniques for integrating and exchanging data
2. Use XML/DOM to integrate and exchange data, and use XSL/XSLT to transform data.
3. Recognize simple design patterns commonly used when creating software components.
4. Use objects and standard collection classes to build software components related to common business applications.
5. Demonstrate methodologies for project management, including creating unit tests, a basic understanding of code access security, and basic functions of a software version control system.
6. Produce and consume a simple Web service application.

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Association between Student Outcomes and Course Outcomes

BS in Computing: Student Outcomes	Course Outcomes
1) Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.	1, 3
2) Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.	2, 4
3) Communicate effectively in a variety of professional contexts.	
4) Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.	
5) Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.	6

Program Specific Student Outcomes

6) Apply computer science theory and software development fundamentals to produce computing-based solutions. [CS]	
6) Apply security principles and practices to maintain operations in the presence of risks and threats. [CY]	
6) Use systemic approaches to select, develop, apply, integrate, and administer secure computing technologies to accomplish user goals. [IT]	5

Assessment Plan for the Course and how Data in the Course are used to assess Student 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.cis.fiu.edu/

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Outline

Topic	Number of Lecture Hours	Course Outcome
• Data Representation and encoding o ASCII, Unicode o Binary, Octal, Hexadecimal	2	1
• XML Documents o Metadata o XML namespaces o Document Type Definition (DTD) o Querying documents using XPath	5	2
• XML Translation o XML schemas o XSLT template-based transformation o XSL files o translating XML to XHTML o Selecting XML data with XPath	6	2
• Integrative Coding o Interfaces (review) o Java Lists and Maps o Strategy, observer, decorator, factory method design patterns	8	3,4
• Overview of Architectures for Integrating Systems o DCOM, CORBA, RMI	2	3
• Web Services Overview o Applications of Web services o SOAP, UDDI, WSDL o Consuming Web services	4	6
• Project Management o Practices for managing a collaborative software project o Unit testing concepts and motivation o Creating unit tests o Need for versioning o Basic version control functions	10	5
• Security Concepts o evidence-based security o code access security o overview of best security practices o authentication to system resources and services	3	5

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Course Outcomes Emphasized in Laboratory Projects / Assignments

	Outcome	Number of Weeks
1	XML documents and translation Outcomes: 1, 2	4
2	Design patterns Outcomes: 3	3
3	Objects and Collection Classes Outcomes: 4	2
4	Web Services Outcomes: 3, 6	2
5	Project Management Outcomes:5	5

Oral and Written Communication

No significant coverage

Social and Ethical Implications of Computing Topics

No significant coverage

Estimate of Curriculum Category Content (credit hours)

Fundamental IT Area	Core	Advanced
Human computer interaction		
Information management		
Web systems and technologies	1.0	
System administration and maintenance		
Programming	1.0	
Networking		
Project Management: Information assurance and security	0.5	
Project Management: System integration and architecture	0.5	

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Theoretical Contents

No Significant Coverage

Problem Analysis Experiences

1.	Analyze application requirements and determine the need for data exchange and transformation

Solution Design Experiences

1.	Using XML/DOM API to integrate and exchange data
2.	Using XSL/XSLT API to transform data
3.	Implementation of applications that consume Web services
4.	Project management and group work