Knight Foundation School of Computing and Information Sciences

Course Title: Components-Based Programming **Date:** 03/29/2009

Course Number: COP 4009

Number of Credits: 3

Subject Area: Systems	**Subject Area Coordinator:** S. Masoud Sadjadi **Email:** sadjadi@cs.fiu.edu
Catalog Description: This course introduces the concept of software components and reviews the current technologies and standards. A project will be used to provide the students with a practical experience.	
Textbook: Clemens Szyperski with Dominik Gruntz and Stephan Murer. *Component Software - Beyond Object-Oriented Programming.* Second Edition, Addison-Wesley / ACM Press, 2002. ISBN: 0-201-74572-0.	
References:	
Prerequisites Courses: COP 3337	
Corequisites Courses: None	

Type: Elective

Prerequisites Topics:

- Good understanding of object-oriented concepts.
- Enjoy software design and development (programming).
- Mastering at least one of these programming languages: Java, C++, C#.

Course Outcomes:

1. Master the principles for building software systems from components.
2. Be familiar with the technologies and standards for distributed object-based components and service-oriented components
3. Be familiar with the Windows realization of components including COM, DCOM, ActiveX, and .NET assemblies.
4. Be familiar with the Java realization of components including Java Beans, JSP, Servlets, EJB, and Java RMI.
5. Be familiar with the CORBA realization of components (CCM).
6. Be familiar with the Web realization of components (Web Services).

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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, 2, 3, 4, 5, 6
c) Demonstrate proficiency in problem solving and application of software engineering techniques	1, 2
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.	
g) Demonstrate effective communication skills.	

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
• Fundamentals o The definition and nature of components o Components and interfaces o Interfaces as contracts o The benefits of components	6	1
• Basic techniques o Component design and assembly o Relationship with the client-server model and with patterns o Object-oriented middleware o Service-oriented middleware	6	2
• Realization in Windows o COM/DCOM/ActiveX/COM+ o .NET Assemblies o .NET Remoting/.NET CLR	6	3
• Realization in Java o JavaBeans/ Servlets/JSP/EJB o Java RMI	6	4
• Realization in CORBA o ORB/CORBA o CCM	6	5
• Realization in Web (integration) o XML/SOAP/WSDL/UDDI	6	6

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Course Outcomes Emphasized in Laboratory Projects / Assignments

Outcome	Number of Weeks
1	2
2	2
3	2
4	2
5	2
6	2

Oral and Written Communication:

- Number of written reports: **One** (a project report by the whole group. Typically each group has 5-6 students.)

- Approximate number of pages for each report: **30 pages**.

- Number of required oral presentations: **One**

- Approximate time for each presentation: **30 minutes** for each group.

Social and Ethical Implications of Computing Topics

Topic	Class time	Student performance measures
N/A		

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Approximate number of class hours devoted to fundamental CS topics

Topic	Core Hours	Advanced Hours
Algorithms:		**1.0**
Software Design:		**1.0**
Computer Organization and Architecture:		
Data Structures:		
Concepts of Programming Languages:		**1.0**

Theoretical Contents

Topic	Class time
N/A	

Problem Analysis Experiences

1. **N/A**

Solution Design Experiences

1. Component-base programming in .NET.
2. Component-base programming in Java.
3. Component-base programming in CORBA.
4. Component-base programming using Web Services.

The Coverage of Knowledge Units within Computer Science Body of Knowledge[1]

Knowledge Unit	Topic	Lecture Hours
SE1, SE2, SE9	Fundamentals Basic Techniques	12
SE3, SE9, NC5, PL2, PF5	Realization in Windows Realization in Java Realization in CORBA Realization in Web	24

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