Knight Foundation School of Computing and Information Sciences

Course Title: Components-Based Software Development   **Date:** 03/13/2005

Course Number: CEN 4023

Number of Credits: 3

Subject Area: Software Engineering	Subject Area Coordinator: Peter Clarke email: clarkep@cis.fiu.edu
Catalog Description: Concept of software components, component models and web services such as WSDL and SOAP.	
Textbook: Component-Based Software Engineering: Putting the Pieces Together, George T. Heineman and William T. Councill, Editors, Addison-Wesley, ISBN 0201704854.	
References: 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.	
Prerequisites Courses: COP 4338 or COP 4005	
Corequisites Courses: None	

Type: Elective for CS (list 1) Elective for IT (Applications Area)

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#.

Knight Foundation School of Computing and Information Sciences
CEN 4023
Components-Based Software Development

Course Outcomes:

1. Familiarity with the principles of software components.

2. Familiarity with the Web basics and distributed computing concepts and mastering with Java Remote Method Invocation (RMI).

3. Familiarity with Service-Oriented Architecture (SOA) and mastering with Web services and associated protocols including WSDL, SOAP, UDDI, and XML.

4. Mastering the Java realization of Web services and familiarity with the .NET realization of Web services

5. Familiarity with the BPEL workflow languages.

6. Familiarity with Grid computing and Grid services.

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
c) Demonstrate proficiency in problem solving and application of software engineering techniques	
d) Demonstrate mastery of at least one modern programming language and proficiency in at least one other.	2, 3, 4
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.	

Knight Foundation School of Computing and Information Sciences
CEN 4023
Components-Based Software Development

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/

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

Knight Foundation School of Computing and Information Sciences
CEN 4023
Components-Based Software Development

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:

Written Reports		Oral Presentations	
Number Required	Approx. Number of pages for each	Number Required	Approx. Time for each
3 (all three related to one term project for groups of 5-6 students.)	30	1	30 minutes per group

Social and Ethical Implications of Computing Topics

Topic	Class time	Student performance measures
N/A		

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