

## School of Computing and Information Sciences

**Course Title:** Components-Based Software Development **Date:** 03/13/05

**Course Number:** CEN 4023

**Number of Credits:** 3

<b>Subject Area:</b> Software Engineering	<b>Subject Area Coordinator:</b> Peter Clarke <b>email:</b> clarkep@cis.fiu.edu
<b>Catalog Description:</b> Concept of software components, component models and web services such as WSDL and SOAP.	
<b>Textbook:</b> Component-Based Software Engineering: Putting the Pieces Together, George T. Heineman and William T. Councill, Editors, Addison-Wesley, ISBN 0201704854.	
<b>References:</b> Clemens Szyperski with Dominik Gruntz and Stephan Murer. <i>Component Software - Beyond Object-Oriented Programming</i> . Second Edition, Addison-Wesley / ACM Press, 2002. ISBN: 0-201-74572-0.	
<b>Prerequisites Courses:</b> <ul style="list-style-type: none"><li>• COP 4338 – Computer Programming III. Or</li><li>• COP 4005 - Windows Programming for IT majors. Or</li><li>• Permission of the instructor.</li></ul>	
<b>Corequisites Courses:</b> 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#.

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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.

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**Relationship between Course Outcomes and Program Outcomes**

<b>BS in CS: Program Outcomes</b>	<b>Course Outcomes</b>
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.	

**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:  
<http://www.cis.fiu.edu/programs/undergrad/cs/assessment/>

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**Outline**

<b>Topic</b>	<b>Number of Lecture Hours</b>	<b>Outcome</b>
<ul style="list-style-type: none"> <li>• Fundamentals               <ul style="list-style-type: none"> <li>○ The definition and nature of components</li> <li>○ Components and interfaces</li> <li>○ Interfaces as contracts</li> <li>○ The benefits of components</li> </ul> </li> </ul>	6	1
<ul style="list-style-type: none"> <li>• Basic techniques               <ul style="list-style-type: none"> <li>○ Component design and assembly</li> <li>○ Relationship with the client-server model and with patterns</li> <li>○ Object-oriented middleware</li> <li>○ Service-oriented middleware</li> </ul> </li> </ul>	6	2
<ul style="list-style-type: none"> <li>• Realization in Windows               <ul style="list-style-type: none"> <li>○ COM/DCOM/ActiveX/COM+</li> <li>○ .NET Assemblies</li> <li>○ .NET Remoting/.NET CLR</li> </ul> </li> </ul>	6	3
<ul style="list-style-type: none"> <li>• Realization in Java               <ul style="list-style-type: none"> <li>○ JavaBeans/ Servlets/JSP/EJB</li> <li>○ Java RMI</li> </ul> </li> </ul>	6	4
<ul style="list-style-type: none"> <li>• Realization in CORBA               <ul style="list-style-type: none"> <li>○ ORB/CORBA</li> <li>○ CCM</li> </ul> </li> </ul>	6	5
<ul style="list-style-type: none"> <li>• Realization in Web (integration)               <ul style="list-style-type: none"> <li>○ XML/SOAP/WSDL/UDDI</li> </ul> </li> </ul>	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:**

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		

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**Approximate number of class hours devoted to fundamental CS topics**

Topic	Core Hours	Advanced Hours
<b>Algorithms:</b>		1.0
<b>Software Design:</b>		1.0
<b>Computer Organization and Architecture:</b>		
<b>Data Structures:</b>		
<b>Concepts of Programming Languages:</b>		1.0

**Theoretical Contents**

Topic	Class time
N/A	

**Problem Analysis Experiences**

1. 

N/A
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**Solution Design Experiences**

1. 

Component-base programming in .NET.
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2. 

Component-base programming in Java.
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3. 

Component-base programming in CORBA.
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4. 

Component-base programming using Web Services.
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**The Coverage of Knowledge Units within Computer Science Body of Knowledge<sup>1</sup>**

<b>Knowledge Unit</b>	<b>Topic</b>	<b>Lecture Hours</b>
<a href="#">SE1, SE2, SE9</a>	Fundamentals Basic Techniques	12
<a href="#">SE3, SE9, NC5, PL2, PF5</a>	Realization in Windows Realization in Java Realization in CORBA Realization in Web	24

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