George Mason University
Graduate Course Approval/Inventory Form

Please complete this form and attach a copy of the syllabus for new courses. Forward it as an email attachment to the Secretary of the Graduate Council. A printed copy of the form with signatures should be brought to the Graduate Council Meeting. Complete the Coordinator Form on page 2, if changes in this course will affect other units.

Please indicate:  

<table>
<thead>
<tr>
<th>NEW</th>
<th>MODIFY</th>
<th>DELETE</th>
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Local Unit:  ISE  

Graduate Council Approval Date:  

Course Abbreviation:  SWE  
Course Number: 622  
Full Course Title: Distributed Software Engineering  
Abbreviated Course Title (24 characters max.): Distributed Soft Eng  

Credit hours: 3  
Program of Record: MS in Software Engineering  

Repeatable for Credit?  

| D=Yes, not within same term | Up to hours |
| T=Yes, within the same term | Up to hours |
| N=Cannot be repeated for credit |

Activity Code (please indicate):  

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<th>Lecture (LEC)</th>
<th>Lab (LAB)</th>
<th>Recitation (RCT)</th>
<th>Studio (STU)</th>
<th>Internship (INT)</th>
<th>Independent Study (IND)</th>
<th>Seminar (SEM)</th>
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Catalog Credit Format  

| 3 : 3 : 0 |

Course Level: GF(500-600)  

Maximum Enrollment: 40  
For NEW courses, first term to be offered: Fall 2004  
Prerequisites or corequisites: SWE foundation material or equivalent.

Catalog Description (35 words or less)  

Please use catalog format and attach a copy of the syllabus for new courses.:  

Hands on introduction to techniques and programming interfaces for distributed software engineering. Networking protocols at several layers. Construction of distributed and concurrent software using network protocol services. Applications of Internet and Web-based software.

For MODIFIED or DELETED courses as appropriate:  

Last term offered:  
Previous Course Abbreviation:  
Previous number:

Description of modification:

APPROVAL SIGNATURES:

Submitted by:  
_Duminda Wijesekera_______ email: _dwijesek@gmu.edu_

Department/Program:  
_ISE/MS in Software Engineering_ Date: ________________

College Committee:  
________________________________________ Date: ________________

Graduate Council Representative:  
________________________________________ Date: ________________
GEORGE MASON UNIVERSITY  
Course Coordination Form

**Approval from other units:**

Please list those units outside of your own who may be affected by this new, modified, or deleted course. Each of these units must approve this change prior to its being submitted to the Graduate Council for approval.

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<th>Unit:</th>
<th>Head of Unit’s Signature:</th>
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Graduate Council approval: ____________________________ Date: __________
Graduate Council representative: ______________________ Date: __________
Provost Office representative: _________________________ Date: __________
1. CATALOG DESCRIPTION
   (a) SWE 622 Distributed Software Engineering (3:0:0)
   (b) Prerequisites: SWE foundation courses or equivalent
   (c) Catalog Description:
       Hands on introduction to techniques and programming interfaces for distributed software engineering. Networking protocols at several layers. Construction of distributed and concurrent software using network protocol services. Applications of Internet and Web-based software.

2. JUSTIFICATION
   (a) Course Objectives:
       The objective of this course is to introduce the student to techniques and programming interfaces for distributed software engineering. The first part of the course covers protocols and interfaces to upper layer protocols and libraries of the TCP/IP protocol stack including application level interfaces such as HTTP, TELNET, FTP, SNMP and their secure analogs, and the next level libraries such as TCP/UDP and IP. The second part of the course covers how these are used by distributed and concurrent software systems. That part discusses details and interfaces provided by middleware services, including remote procedure calls, CORBA, D-COM and JAVA RMI interfaces. The third phase applies these techniques to the emerging applications of the semantic web including UDDI, SOAP and DAML-S services. During each phase, corresponding software libraries will follow theoretical foundations.
   (b) Course Necessity:
       It has recently been said that the “network is the computer.” Recent developments in network centric computing, such as novel web-based distribution of data and remote access methods, allow well-established communication paradigms to be used in new applications in new ways. This course is a topic-by-topic introduction that fills in the gaps left behind between traditional networks, distributed systems and web-based programming courses with the aim of bringing them together under the software engineering curriculum. The course is part of an ongoing modernization of the SWE MS program and is intended to be a required foundation course.
   (c) Relationship to Existing Courses:
       The focus of this course is on building software using services provided by network protocols. Thus, some knowledge of network protocols is necessary. This course is intended to be at the introductory level, so it is not appropriate to have a networking course as a prerequisite. The course will have two weeks or less overlap with the existing networking courses of INFS 612, Principles and Practices of Communication Networks, CS 656, Computer Communications and Networking, and ECE 542, Computer Network Architectures and Protocols. This course is intended to become a core course under forthcoming changes to the MS in Software Engineering program. As thus, it will be a prerequisite for existing courses such as SWE 642. This course also complements CS 706, Concurrent Software Systems, and CS 707, Distributed Software Systems, both of which are cover more advanced and theoretical material.

3. SCHEDULING
   Every semester, starting Fall 2004.
   Proposed Instructors: Drs. Duminda Wijesekera, Paul Ammann, Hassan Gomaa, Jeff Offutt, and Ye Wu.
4. COURSE OUTLINE

1. **Introductory Material (1 Week)**: Introduction to distributed computing and software engineering: Introducing IP Addressing scheme.

2. **Underlying Paradigms and Services I: Networks (6 weeks)**
   1. TCP/IP Protocol stack interlink and explanation.
   2. Revisit IP Addressing scheme.
   3. Introduction to Layer supporting Applications: TCP, UDP and IP.
   4. IP routing.
   5. Application layer protocols: HTTP, TELNET, Rlogin, FTP, SMTP, NFS and SNMP.
   6. Introduction to distributed network programming.

3. **Underlying Paradigms and Services II: OS, Middleware and Application Layer Service/Protocols (5 weeks)**
   1. Threads & Streams.
   2. HTTP & Java – CGI.
   3. Traditional problems of distributed systems: synchronization, data sharing, XML.
   4. Introduction to servlet programming and servlet containers.
   5. Middleware and component based technologies: CORBA, COM, .NET, RMI, etc.

4. **Distributed Knowledge Sharing and Computing on the Web (2 weeks)**
   1. Syntax and semantics of web-based computing.
   2. The semantic web and layering.
   3. UDDI and DMAL-Services.

**Student Evaluation Methods**
Midterm exam, final exam, and programming exercises.

**Reading Materials**