1. Title of Course, Course Number and Credits:

   CS399  Net-Centric Computing, 3 credits  
   (Core/Elective for Computer Science Major)

2. Course Prerequisites

   CS 342

3. Description of the Course Consistent With the WPUNJ catalog

   Beginning with fundamentals of computer networking, this course emphasizes software development in Java for Inter-Process Communications in standard networks, wireless, and mobile contexts. Major topics include computer networking basics, the Internet, Java programming and applets, Java-based concurrency/threads, Java for networked client/server applications, mobile and wireless applications, and non-Java alternatives (such as ASP.Net development and web-based scripting).

4. Course Objectives

   The main objective of this course is to learn the basics of computer networking at the software development level, Java fundamentals, and networked applications with an emphasis on the following:

   - Basic concepts of computer networking and the Internet.
   - Networking hardware and protocols.
   - Java programming and applet fundamentals.
   - Java concurrency and threading
   - Java networking and RMI.
   - Java applications design for networks,
   - Client-side versus server-side; JSP.
   - Wireless considerations
   - Mobile Computing: the new frontier
   - Non-Java alternatives (X-Windows, MS ASP.Net solutions, and web-based scripting)

5. Student Learning Outcomes

   Upon completion of this course, students will be able to:
   - identify, explain, and use hardware components of a computer network, both wired and wireless.
• prepare for the Network+ certification exam.
• set-up a small computer network for standard networking and mobile contexts, primarily to test network software.
• understand the basics of protocols for computer networking in a software context
• program basic applications and applets in Java
• install, work with, and contrast Java IDE’s such as Netbeans, Studio-1, J++/J#, Eclipse, and others,
• design and develop Java IPC for threaded and networked applications
• explore networked game development basics as an application area
• use Java to develop applications on clients and servers
• appreciate new technologies such as 802.11a/b/g, Bluetooth and Blackberry devices with a software development perspective
• code rudimentary mobile computing applications
• know about and experiment with non-Java alternatives (X-Windows and Microsoft ASP.NET solutions)
• explore current web-based scripting models
• conduct further inquiry into modern directions in network-based programming

Additionally, students are also expected to achieve in the context of the above topics the below university-wide student learning outcomes through lectures; classroom discussions; homework, essay and project assignments; and oral presentations.
• Demonstrate the ability to think critically. This is achieved by and best measured by problem-solving applying principles and methodologies of network programming, which will be conducted in examinations and projects.
• Locate and use information on these topics. Projects and written assignments will involve current communications technologies, requiring research on the Internet and the library’s recent periodicals.
• Integrate knowledge and ideas in a coherent and meaningful manner. Projects and examinations will have problems applying and integrating various tools and components towards learning Java, applying Java in a networking context, and adapting Java and other technologies to mobile computing.
• Effectively express themselves in written and oral form. Students will be expected to deliver progress reports on network design and programming projects.. Examinations will have several essay questions on network programming, the web, security / privacy issues in programming and hypothetical cases.

6. **Topical Outline of the Course Content**

Topics covered in the course include but are not necessarily limited to the following:
• Networking Fundamentals
• Hardware and components for network design
• Networking protocols (Telnet, FTP, HTTP, and others)
• Software aspects of networking
• Java Fundamentals
• Java support for networking (Basics)
• Java concurrency and threading (Basics)
• Java networking and RMI.
• Java application design for networks,
• Client-side versus server-side applications; JSP
• Wireless considerations
• Mobile Computing: the new frontier (Java ME style)
• Non-Java alternatives (X-Windows and MS ASP.Net solutions)
• Current web-based scripting models
• New trends and emerging technologies

7. Guidelines/Suggestions for Teaching Methods and Student Learning Activities

Lecture, demonstrations, and hands – on activities
Problem solving sessions
Group work
Written homework/exercises
Inquiry – based instruction.

8. Guidelines/Suggestions for Methods of Student Assessment (student learning outcomes)

Attendance will be taken.
Homework and projects will be assigned.
Written and group activities will be distributed and collected.
Projects will be demonstrated.
All students are expected to participate, taking an active role in the learning process.

9. Suggested Reading, Texts, Objects of Study

Gaddis, *Starting Out with Java: From Control Structures through Objects*, Addison-Wesley, 2008


and O’Reilly or SUN texts on specific chosen network API’s.
10. Bibliography of Supportive Texts and Other Materials

General Networking:


Network+ and Networking Pragmatics:


Java Basics:


Java for Network Applications:


Brian Goetz (Author), Tim Peierls, et al., *Java Concurrency in Practice*, Addison-Wesley, 2006. (*best on Java concurrency*)


Patrick Keegan, L. Champenois, et al., *NetBeans™ IDE Field Guide: Developing*


Bruce W. Perry, Java Servlet & JSP Cookbook, O’Reilly, 2004


David Reilly and Michael Reilly, Java™ Network Programming and Distributed Computing, Addison-Wesley, 2002.
http://www.davidreilly.com/jnpbook


Kim Topley, Java Web Services in a Nutshell, O’Reilly, 2003

Current (continuously updated) source of network API Java books: http://www.sun.com/books/java_series.html

Wireless and Mobile Computing:


Harold Davis, Absolute Beginner's Guide to Wi-Fi Wireless Networking,
Que Publishing, 2004


11. Preparers’ Name and Date: Dr. John Najarian, March 21, 2009.

12. Original Departmental Approval Date: Fall 2009

13. Reviser’s Name and Date: NA

14. Departmental Revision Approval Date: NA