

WILLIAM PATERSON UNIVERSITY OF NEW JERSEY
COLLEGE OF SCIENCE AND HEALTH
Computer Science Department Course Outline

1. Title of Course, Course Number and Credits:

CS335 Fundamentals of Computer Networking, 3 credits
(Required for CIS Minor; cannot be used to fulfill Computer Science major requirement)

2. Course Prerequisites

CS235

3. Description of the Course Consistent With the WPUNJ catalog

This course is intended for the non-CS major students with an interest in computer networking. The course presents the fundamentals of data communication and computer networking. Major topics include state-of-the-art local and wide area networking technologies; layered internetworking architecture; TCP/IP protocol suite and the Internet; networking standards and standard organizations; network security, privacy, management, and administration; network applications emphasizing the Internet; networking industry; social impact of networking; and new trends and emerging technologies such as the increasingly popular mobile and wireless data communication.

4. Course Objectives

The main objective of this course is to learn the principles of computer networking and its applications with an emphasis on the following:

- Basic concepts of computer networking.
- Layered model of computer networks.
- Networking protocols and the TCP/IP.
- Local, metropolitan, and wide area networking technologies.
- Network applications and digital convergence.
- Social impact of computer networks.

5. Student Learning Outcomes

Upon completion of this course, students will be able to:

- comprehend and demonstrate command in the principles of data communication and computer networking.
- describe the networking technologies including LANs, MANs, and WANS.
- understand the functions of TCP/IP and the organization of the Internet.

- grasp the privacy and security issues prevalent and know how to enforce standards for them through technologies such as firewalls and encryption
- evaluate a network in terms of cost, performance, privacy and security.
- understand how business, education, and government organizations can use the Internet, intranets, and extranets to support their objectives
- plan and design a small and practical network for home or small business applications under a specified set of constraints.
- articulate how computer networks can positively benefit as well as negatively impact on society.
- recognize and appreciate digital convergence: multimedia network

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 networking, 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 constructing networks, troubleshooting them, and adapting to new technologies such as wireless.
- Effectively express themselves in written and oral form. Students will be expected to deliver progress reports on network design projects. Another assessment tool for this outcome involves student reports on "current events", new standards and technologies (such as 802.11a/b/g, Bluetooth and Blackberry devices). Examinations will have several essay questions on network design, security/privacy issues and hypothetical cases.

6. Topical Outline of the Course Content

Topics covered in the course will be taken from but not necessarily limited to the following:

- Concepts of distributed data processing
- Communication networks and applications
- Communication hardware and software
- Layered network architectures and functions
- Standards and standard organizations
- Classifying networks by topology, technology, and scope
- Circuit-switched voice and packet-switched data networks
- TCP/IP protocols and the Internet
- Telnet, FTP, SMTP, SNMP, HTTP, and WWW

- Multimedia and high-speed networks
- Network privacy, security, and management
- Communication industry and major service providers
- Issues related to the planning and designing a network
- Social impact of networks
- 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 take an active role in the learning process.

9. Suggested Reading, Texts, Objects of Study

B. Forouzan, *Data Communication and Networking*, 3rd edition, McGraw Hill, 2004

10. Bibliography of Supportive Texts and Other Materials

F. Halsall, *Computer Networking and the Internet*, 5th edition, Addison Wesley 2005

N. Olifer and v. Olifer, *Computer Networks: Principles, Technologies and Protocols for Network Design*, John Wiley 2005

M. Bishop, *Introduction to Computer Security*, Addison Wesley 2005

J. Kurose and K. Rose, *Computer Networking: A Top-Down Approach Featuring the Internet*, 3rd edition, Addison Wesley 2005

D. Comer, *Internetworking with TCP/IP*, Vol 1, 5th edition, Prentice Hall 2005

D. Comer, *Hands-on Networking with Internet Technologies*, 2nd edition, Prentice Hall 2005

- W. Stallings, *Business Data Communications*, 5th edition, Prentice Hall 2005
- W. Stallings, *Wireless Communications & Networks*, 2nd edition, Prentice Hall 2005
- K. Ivens, *Home Networking For Dummies*, 3rd edition, John Wiley 2005
- W. Stallings, *Data and Computer Communications*, 7th edition, Prentice Hall 2004
- A. Leon-Garcia and I. Widjaja, *Communication Networks*, 2nd edition, , McGraw Hill 2004
- D. Comer, *Computer Networks and Internets with Internet Applications*, 4th edition, Prentice Hall 2004
- P. Gregory, *Computer Viruses For Dummies*, John Wiley 2003
- B. Forouzan, *TCP/IP Protocol Suite*, 2nd edition, , McGraw Hill, 2003
- F. Halsall, *Multimedia Communications: Applications, Networks, Protocols and Standards*, Addison Wesley 2001
- W. Stallings, *Data and Computer communications*, 6th edition, Prentice Hall 2001
- B. Douskalis, *IP Telephony*, Prentice Hall 2000
- D. Comer, *The Everything You Need to Know About Computer Networking and How the Internet Works*, 3rd edition, Prentice Hall 2000
- W. Stallings, *Local and Metropolitan Area Networks*, 6th edition, Prentice Hall 2000

11. Preparers' Name and Date

Erh-Wen Hu, February 21, 2006.

12. Original Departmental Approval Date: March 7, 2006

13. Reviser's Name and Date: NA

14. Departmental Revision Approval Date: NA