Cleveland State University
Department of Electrical and Computer Engineering

CIS 454 /554: Data Communications and Networking

Catalog Description: CIS 454 /554 Data Communications and Networking (4-0-4)

Pre-requisite: CIS 345
Data communications: characteristics of physical transmission media, including international standards for data encoding and device interfacing; transmission principles, modems and multiplexers, data link protocols, mechanisms for error detection/correction, and flow control. Computer Networks: broad survey of existing networks; network topology; network layers from the ISO OSI reference model; network programming; analytical tools for network analysis and design.

Textbook: Fred Halsall, Computer Networking and the Internet, Addison-Wesley, 5th Edition

Coordinator: Janche Sang
Phone: 687-4780
email: sang@cis.csuohio.edu

Expected Outcomes: After completing this course, students should be able to:
1. Be familiar with the basics of data communications and network architecture.
2. Understand the link layer control and protocols.
3. Understand the network layer control and protocols.
4. Be familiar with the TCP/IP suite.
5. Be familiar with writing and designing socket-based programs.

Fulfillment of CS Program Objectives, Outcomes and Characteristics:
Objectives:
1. Graduates will apply the concepts of the discipline including analysis, design, and implementation of information and computing systems.
2. Graduates of will be employed in the computing profession, and will be engaged in life-long learning, understanding, and applying new ideas and technologies as the field evolves.
3. Graduates will be informed and involved members of their communities, and responsible engineering and computing professionals.

Outcomes:
1) An ability to apply knowledge of computing and mathematics appropriate to the program’s student outcomes and to the discipline
2) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
3) An ability to function effectively on teams to accomplish a common goal
5) An ability to translate fundamental computing concepts to a variety of emerging technologies

Characteristics:
(a) An ability to apply knowledge of computing and mathematics appropriate to the program’s student outcomes and to the discipline
(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
(d) An ability to function effectively on teams to accomplish a common goal
(i) An ability to use current techniques, skills, and tools necessary for computing practice.

**Contribution of Course to Meeting the Professional Component:**

Math & Basic Science: 1 credit;  
Engineering Topics: 2 credits;  
General Education: 0 credit

**Prerequisites by Topic:**  
Operating Systems Principles

**Topics:**

1. Data Communications and Networking Basics 5
2. Telephone Networks and Modems 3
3. Local Area Network 8
4. Wireless Networks 6
5. The Internet Protocol 9
6. Transport Protocols 6
7. Internet Applications and WWW 4
8. Network Socket Programming 4

Total 45

**Computer Usage:**  
Linux gcc/g++, Java