

School of Computer Science

Course Title: Data Communications

Date: 2/5/04

Course Number: CEN-4500

Number of Credits: 3

Subject Area: Computer Systems	Subject Area Coordinator: S. Masoud Sadjadi email: sadjadi@cs.fiu.edu
Catalog Description: Study of computer network models and protocol layers. Topics include: error handling, frames, broadcast networks, channel allocation; network routing algorithms, internetworking, TCP/IP, ATM protocols.	
Textbook: Computer Networking, 2 nd Edition Kurose and Ross Addison Wesley (ISBN: 0201976994)	
References: Computer Networks, 4 th Edition Andrew S. Tanenbaum Prentice Hall (ISBN: 0130661023)	
Prerequisites Courses: CDA 4101	

Type: Elective

Prerequisites Topics:

- Hierarchy of virtual machines
- Bus, network topologies
- Multiplexing/Demultiplexing, Encoding/Decoding

Course Outcomes:

1. Be familiar with computer network architecture (set of layers and protocols)
2. Be exposed to data transmission - media and local & long distance communication
3. Be exposed to packet transmission in LAN, WAN and the associated protocols
4. Master the internetworking (TCP/IP protocols)
5. Be familiar with static and dynamic routing
6. Be familiar with virtual circuits and ATM protocols
7. Be familiar with flow control and congestion control methods
8. Be exposed to computer network applications

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Outline

Topic	Number of Lecture Hours	Outcome
<ul style="list-style-type: none"> • Network introduction <ul style="list-style-type: none"> ○ Network history, network architecture ○ Net-centric computing and network based applications 	6	1,8
<ul style="list-style-type: none"> • Application layer <ul style="list-style-type: none"> ○ Web based application ○ HTTP, FTP, SMTP protocols ○ client-server socket programming ○ Network management ○ Domain name system 	6	8
<ul style="list-style-type: none"> • Transport layer <ul style="list-style-type: none"> ○ Connection-oriented, connectionless service ○ TCP and UDP ○ Flow control and congestion control 	6	4,7
<ul style="list-style-type: none"> • Network layer <ul style="list-style-type: none"> ○ Static and dynamic routing ○ Routing algorithms ○ IP and ATM protocols 	10	4,5,6
<ul style="list-style-type: none"> • Link layer <ul style="list-style-type: none"> ○ Framing ○ Error control ○ Channel allocation 	6	2
<ul style="list-style-type: none"> • Physical layer <ul style="list-style-type: none"> ○ Transmission media ○ Interconnection topology ○ Switching technologies 	4	2,3

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Course Outcomes Emphasized in Laboratory Projects / Assignments

	Outcome	Number of Weeks
1	Application layer protocol simulation Outcomes: 1,8	2
2	Comparison of flow control protocols Outcome: 7	3
3	Network routing analysis Outcomes: 4,5	2

Oral and Written Communication

No significant coverage

Social and Ethical Implications of Computing Topics

No significant coverage

Approximate number of class hours devoted to fundamental CS topics

Topic	Core Hours	Advanced Hours
Algorithms:		
Software Design:		
Computer Organization and Architecture:		0.5
Data Structures:		0.5
Concepts of Programming Languages		
Other CS Topics:		2.0

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Theoretical Contents

Topic	Class time

Problem Analysis Experiences

1.

Network routing analysis

Solution Design Experiences

1.

Application layer protocol software design
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2.

Comparison of flow control protocols

The Coverage of Knowledge Units within Computer Science Body of Knowledge¹

Knowledge Unit	Topic	Lecture Hours
<u>NC1</u>	Network history, network architecture, and net-centric computing and network based applications	6
<u>NC2</u>	Network models; circuit & packet switching, connection-oriented and connectionless communication, transmission media, framing, error control, flow control, routing algorithm, congestion control, and reliable communication	18
<u>NC4</u>	Web based application, HTTP protocol, client-server socket programming	6
<u>NC9</u>	Network management, domain name system, name services	4

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