Knight Foundation School of Computer and Information Science

Course Title: Data Communications   **Date:** 2/5/2004

Course Number: CEN 4500

Number of Credits: 3

Subject Area: Computer Systems	Subject Area Coordinator: Nagarajan Prabakar
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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, 2nd Edition, Kurose and Ross, Addison Wesley (ISBN: 0201976994)	
References: Computer Networks, 4th 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

Knight Foundation School of Computer and Information Science
CEN 4500
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Outline

Topic	Number of Lecture Hours	Outcome

• Network introduction
  o Network history, network architecture
  o Net-centric computing and network based applications
	6	1,8

• Application layer
  o Web based application
  o HTTP, FTP, SMTP protocols
  o client-server socket programming
  o Network management
  o Domain name system
	6	8

• Transport layer
  o Connection-oriented, connectionless service
  o TCP and UDP
  o Flow control and congestion control
	6	4,7

• Network layer
  o Static and dynamic routing
  o Routing algorithms
  o IP and ATM protocols
	10	4,5,6

• Link layer
  o Framing
  o Error control
  o Channel allocation
	6	2

• Physical layer
  o Transmission media
  o Interconnection topology
  o Switching technologies
	4	2,3

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

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CEN 4500
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Assessment Plan for the Course & how Data in the Course are used to assess Program Outcomes

Student and Instructor Course Outcome Surveys are administered at the conclusion of each offering, and are evaluated as described in the School's Assessment Plan: https://abet.cs.fiu.edu/csassessment/

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

Theoretical Contents

Topic	Class time

Problem Analysis Experiences

1. Network routing analysis

Solution Design Experiences

1.	Application layer protocol software design
2.	Comparison of flow control protocols

The Coverage of Knowledge Units within Computer Science Body of Knowledge[1]

Knowledge Unit	Topic	Lecture Hours
NC1	Network history, network architecture, and net-centric computing and network based applications	6
NC2	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
NC4	Web based application, HTTP protocol, client-server socket programming	6
NC9	Network management, domain name system, name services	4

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[1]See https://www.acm.org/binaries/content/assets/education/cs2013_web_final.pdf
for a description of Computer Science Knowledge units