

# CSE 473s

## Introduction to Computer Networks

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These slides are available on-line at:

<http://www.cse.wustl.edu/~jain/cse473-05/>



- Why Study Computer Networking?
- Goal of This Course
- Instructor
- Grading
- Contents of the course
- Tentative Schedule

## Why Study Computer Networking?

- ❑ Networking is the “plumbing” of computing
- ❑ Almost all areas of computing are network-based.
  - ❑ Distributed computing
  - ❑ Distributed databases
  - ❑ Distributed storage
- ❑ Fast growing field
- ❑ Good research funding

## Goal of This Course

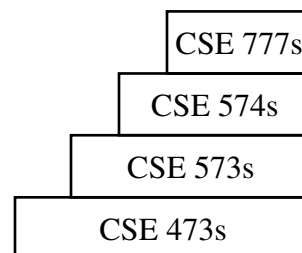
- ❑ First course in networking
- ❑ Fundamentals
- ❑ Broad coverage of key areas of networking
- ❑ Networking background for networking applications in other areas of computing
- ❑ This is a course on Networking Architecture
- ❑ This is not a course on network building or usage
- ❑ You will be able to understand protocols
- ❑ An example of the difference between architecture and implementation is the computer architecture course and a course on Intel Pentium Chip.

## Goals of This Course (Continued)

- ❑ You will learn about networking concepts that will help you understand networking jargon:
  - ❑ TCP/IP
  - ❑ Window Flow Control
  - ❑ Cyclic Redundancy Check
  - ❑ Parity
  - ❑ Start and Stop Bits
  - ❑ Baud, Hertz, and Bits/sec
  - ❑ Algorithms for determining packet routes
- ❑ This is the **first** course on networking.
- ❑ Basis for more advanced networking courses

## Networking Courses at WUSTL

- ❑ CSE 473s: Introduction to Computer Networks
- ❑ CSE 573s: Protocols for Computer Networks
- ❑ CSE 574s: Advanced Topics in Networking
- ❑ CSE 777s: Research Seminar in Networking



## Instructor

- Raj Jain
- <http://www.cse.wustl.edu/~jain>
- 1978: PhD in Computer Science from Harvard
- 1978-1994: Networking Architect at Digital Equipment
- 1994-2000: Professor at Ohio State University
- 2000-2005: Co-Founder and CTO of Nayna Networks (Symbol: NAYN)
- Active participation in many industry and standards forums IEEE, ATM Forum, IETF, OIF, ANSI
- Inventor of DECbit for traffic management (14 patents)

## Student Questionnaire

- Name: \_\_\_\_\_
- Major: \_\_\_\_\_
- Email: \_\_\_\_\_
- Degree/Expected Year: \_\_\_\_\_
- Operating Systems/Architecture course taken:  
\_\_\_\_\_
- Computer networking courses taken:  
\_\_\_\_\_
- What do you expect to learn from this course:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## Grading

- ❑ Exams (Best 2 of 3)                    50%
- ❑ Class participation                    10%
- ❑ Homeworks                                20%
- ❑ Labs                                         20%
- ❑ Note: Labs require programming in C
- ❑ Academic integrity is expected in home works.

## Frequently Asked Questions

- ❑ Yes, I do use “curve”. Your grade depends upon the performance of the rest of the class.
- ❑ All homeworks are due at the beginning of the next Monday class.
- ❑ All late submissions must be preapproved.
- ❑ All exams are open-book and extremely time limited.
- ❑ Exams consist of numerical as well as multiple-choice (true-false) questions.
- ❑ There is negative grading on incorrect multiple-choice questions. Grade: +1 for correct.  $-1/(n-1)$  for incorrect.
- ❑ Everyone including the graduating seniors are graded the same way.

## Textbook

- ❑ William Stallings, “Data & Computer Communications,” **Seventh Edition**, Prentice-Hall, ISBN 0-13-100681-9, **2004**. Required.
- ❑ Only key concepts will be covered in the class. You are expected to read the rest from the book.
- ❑ Feel free to ask questions in the next class about any concepts that are not clear to you
- ❑ Material covered in the class will include some concepts from other textbooks. Please pay attention to the class discussion and lecture.

## Prerequisite

- ❑ CSE: Operating Systems
  - ❑ Memory
  - ❑ System bus
  - ❑ Interrupt
  - ❑ Power
  - ❑ Voltage
  - ❑ Current
  - ❑ Peak and RMS values
  - ❑ Sine curve
  - ❑ Amplitude, Frequency, Phase
- ❑ CSE 422S: Operating Systems Organization

## Tentative Schedule

Date	Chapter	Topic
31-Aug-05		Course Introduction
5-Sep-05		Holiday
7-Sep-05	1+2	Data Communications and Protocol Architecture:OSI and TCP/IP Reference Models
12-Sep-05	3	Data Transmission:Channel Capacity
14-Sep-05	4	Wireless Transmission
19-Sep-05	5	Modulation and Coding
21-Sep-05	6	Error Detection and Correction
26-Sep-05	7	Flow/Error Control
28-Sep-05	15	Local Area Networks
3-Oct-05		Mid Term 1

## Tentative Schedule (cont)

Date	Chapter	Topic
5-Oct-05		
10-Oct-05	16	High Speed LANs
12-Oct-05	9	Spread Spectrum
17-Oct-05	17	Wireless LANs
19-Oct-05		
24-Oct-05	14	Cellular Wireless Networks
26-Oct-05		
31-Oct-05	18	Internetwork Protocols
2-Nov-05		Mid Term 2

## **Tentative Schedule (Cont)**

<b>Date</b>	<b>Chapter</b>	<b>Topic</b>
7-Nov-05	12	Routing Algorithms
9-Nov-05		
14-Nov-05	20	Transport Protocols
16-Nov-05		
21-Nov-05	21	Network Security
23-Nov-05		No Class
28-Nov-05		
30-Nov-05		
5-Dec-05	22	Distributed Applications: SNMP
7-Dec-05		
12-Dec-05		Final Exam

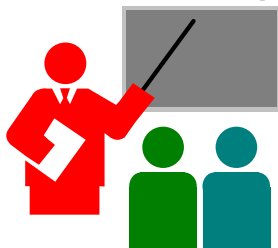
## **Why You Shouldn't take this course?**

- You aren't ready for the hard work
- You don't have 12 hours/week
- You don't have the background
- You just want to sit and listen
- You are not ready to take the initiative  
Only key concepts will be covered in the class.  
Students are expected to read the rest from the book.
- This does not cover what you want

## Office Hours

- ❑ Monday: 10:30 to 11:30 AM  
Wednesday: 10:30 to 11:30AM
- ❑ Office: Bryan 405D
- ❑ Graders:
  - ❑ Sajeeva Pallemulle, sajeeva@cse.wustl.edu
  - ❑ Chakchai So-in, cs5@cec.wustl.edu

## Summary



- ❑ Computer networking is important for all areas of computing
- ❑ First course in computer networking
- ❑ Goal: To prepare you for a career in networking
- ❑ Get ready to work hard

## Quiz 0: Prerequisites

True or False?

T F

- A system with 32kB memory can hold only 16000 ASCII characters
- An example of an I/O bus is PCI which connects a Pentium processor with its memory.
- An example of a system bus is SCSI which connects a PC system with its disks.
- Interrupts are used by CPU to stop an ongoing I/O.
- A DC current of 4 Ampere at 5 Volts will require 4/5 Watts of power
- An RMS value of 100 Volts is equivalent to a peak value of 141.4 V.
- For  $I = A \sin(2\pi ft + \phi)$ , the amplitude of the current I is A
- For  $I = A \sin(2\pi ft + \phi)$ , the frequency is f.
- If x is 0, then after x++, x will be 1.

Marks = Correct Answers \_\_\_\_\_ - Incorrect Answers \_\_\_\_\_ = \_\_\_\_\_