

San José State University
Department of Electrical Engineering
EE 281, Internetworking, Section 01, Fall 2009

Instructor:	Jalel Rejeb
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Office Hours:	T. 14:00-16:00, W 13:30-15:30, or by an appointment
Class Days/Time:	MW 19:30-20:45
Classroom:	Clark Building 222
Prerequisites:	Graduate status, or instructor permission

Course Description

Network layers, packet networks, ATM, TCP/IP protocols, high performance switches and routers, error detection coding, quality of services, multicasting, and IPv6.

Course Goals and Student Learning Objectives

The course provides the underlying principles of modern network design through detailed discussion of existing standards. TCP/IP stack architecture is introduced in terms of the OSI model. Fundamental principles of data delivery and how it is provided by IP, and ATM are examined and analyzed. Emphasis is given to IP addressing and datagram routing mechanisms. Performance evaluation, congestion control, and fundamentals of queuing theory are also covered. By completing this course student would be able to:

- Understand networking Layers within the OSI reference model
- Analyze all building blocks of TCP/IP Protocol Suite, and comparing it to ATM
- Analyze important Internet routing protocols their performances and their design trade-offs
- Understand Switch Fabrics and basic principle in their design trade-offs
- Understand different existing Internet Congestion control techniques and avoidance, their effects on QoS and Internet performance.
- Understand multicasting and different existing approaches.
- Understand and analyze the main new features of IPv6, comparing them to IPv4
- Gain hands-on experience in using Cisco routers and using Wireshark/OPNET in analyzing Internet protocols at all different 4 layers.
- Understand Application layer.
- Analyze relevant Application layer protocols such as HTTP, FTP, and SIP.
- Understand Internet security requirements.

Required Texts

Computer Networks, a System approach, 4th Edition, by Larry Peterson, MK 2007

Other Reading

- *Computer Networks*, 4rd edition, by Andrew S. Tanenbaum, PH 2002 (*highly recommended*)
- *Unix Network Programming*, Volume 1, 2nd edition, by Richard Stevens, PH 1998

Grading Policy

The overall course grades (letter-grades) will be assigned based on the overall class distribution. The weights of the homework assignments and the exams are as listed below:

Midterm Exam 1	15%
Midterm Exam 2	20%
Pop Quizzes	20%
Homework	
Project/Lab	15%
Final Exam	30%
Total	100%

Grading Percentage Breakdown

94% and above	A
93% - 90%	A-
89% - 87%	B+
86% - 80%	B
79% - 77%	C+
76% - 70%	C
69% - 67%	D+
66% - 64%	D
63% - 60%	D-
below 60%	F

Note: Curving is used only to adjust the overall average in case it is lower than 80%

Examinations:

- There will be two midterm exams and a comprehensive final examination. Exams are closed book and notes.
- Exams cover
 - assigned reading materials from the textbook
 - discussed materials in the lectures
 - class handouts and notes
 - Homework and practice problems
- Exams will be announced at least one week prior to administration.
- There will be no make-up exams (in very special circumstances, written excuse and official proofs are required for make-up exams).
- Final Exam is scheduled:

Monday, December 14	1945-2200
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Pop Quizzes

- 10 to 15 minute Pop quizzes will be given on timely fashion. They are based on the material and relevant examples discussed on the two preceding class lectures from the quiz session.
- There is no make up for the quiz- no exception!

Homework and handouts:

Homework assignments will be given periodically however they are not collected. Homework solutions will be made available in the class website.

➤ *Please refer to the class website for handout, homework solutions and announcements. You are responsible for all material posted on the class website:*
http://www.engr.sjsu.edu/jregeb/_private/EE281/EE281.htm
The password to access the material in this website will be announced in class.

Lab/project

It consists of Cisco Lab experimentation, Wireshark, and/or OPNET. Material and instructions are on outline at the web location:

<http://www.engr.sjsu.edu/ciscolab>

To have access you need to use

Username:student
 password: cisco01.

The Cisco lab is located in room E490

More specifications about the project will be given in class.

Course Outline

- I. Introduction**.....3 lectures
- * ISO, OSI reference model
 - * TCP/IP suite

II. Physical Layer	4-3 lectures
* FDM, TDM	
* Relating Metrics performance issue	
III. Direct Link Network and DDL	5-6 lectures
* Encoding, Manchester	
* Framing	
* Error Detection, CRC	
* Reliable Transmission, ARQ, Sliding Window Protocol	
* IEEE 802 project, Ethernet, FDDI	
* Switching Hardware, Crossbar, Batchier-Banyan switch	
* ATM and its layers	
..... Exam1...	
IV. Network Layer & Routing	7-9 lectures
* Static routing algorithms	
* Distance-vector routing, link-state routing	
* Tunneling, Fragmentation	
* IP protocol, Subnetting, ICMP, ARP, RARP	
* IGP, EGP, CIDR	
.... Exam2...	
V Transport Layer5-6 lectures
* UDP	
* TCP, sliding window	
* Queuing Disciplines, FCFS, WFQ	
* Congestion avoidance, RED, DECbit	
* QoS	
VI Application Layer /Network Security/SIP	5- remaining

University Policies

Academic integrity

Students should know that the University's [Academic Integrity Policy is available at http://www.sa.sjsu.edu/download/judicial_affairs/Academic_Integrity_Policy_S07-2.pdf](http://www.sa.sjsu.edu/download/judicial_affairs/Academic_Integrity_Policy_S07-2.pdf). Your own commitment to learning, as evidenced by your enrollment at San Jose State University and the University's integrity policy, require you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The website for [Student Conduct and Ethical Development is available at http://www.sa.sjsu.edu/judicial_affairs/index.html](http://www.sa.sjsu.edu/judicial_affairs/index.html).

Instances of academic dishonesty will not be tolerated. Cheating on exams or plagiarism (presenting the work of another as your own, or the use of another person's ideas without giving proper credit) will result in a failing grade and sanctions by the University. For this class, all assignments are to be completed by the individual student unless otherwise specified. If you would like to include in your assignment any material you have submitted, or plan to submit for another class, please note that SJSU's Academic Policy F06-1 requires approval of instructors.

Campus Policy in Compliance with the American Disabilities Act

If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 requires that students with disabilities requesting accommodations must register with the DRC (Disability Resource Center) to establish a record of their disability.

EE Department honor code

The Electrical Engineering Department will enforce the following Honor Code that must be read and accepted by all students.

“I have read the Honor Code and agree with its provisions. My continued enrollment in this course constitutes full acceptance of this code. I will NOT:

- Take an exam in place of someone else, or have someone take an exam in my place
- Give information or receive information from another person during an exam
- Use more reference material during an exam than is allowed by the instructor
- Obtain a copy of an exam prior to the time it is given
- Alter an exam after it has been graded and then return it to the instructor for re-grading
- Leave the exam room without returning the exam to the instructor.’’

Measures Dealing with Occurrences of Cheating

Department policy mandates that the student or students involved in cheating will receive an “F” on that evaluation instrument (paper, exam, project, homework, etc.) and will be reported to the Department and the University. A student’s second offense in any course will result in a Department recommendation of suspension from the University.