

**San José State University**  
**Department of Electrical Engineering**

***EE 281, Internetworking, Section 01, Spring 2017***

<b>Instructor:</b>	Jalel Rejeb
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<b>Office Hours:</b>	W. 1PM-2:30PM, Th. 12PM-1PM, by an appointment, or whenever my office door is open.
<b>Class Days/Time:</b>	T.Th. 4:30PM-5:45PM
<b>Classroom:</b>	ENG 345
<b>Prerequisites:</b>	EE 250, and basic programming skills, or instructor's permission.

**Course Objectives:**

The course provides the underlying principles of modern computer network design and implementation through detailed discussion of existing protocols and standards. TCP/IP stack architecture is presented in terms of the OSI layer model. Fundamental principles of data delivery by the Internet are examined and analyzed. Emphasis is given to IP addressing and subnetting, datagram routing mechanisms, performance evaluation, TCP congestion control, and HTTP.

**Topics Covered:**

- Layers in the OSI reference model
- Data link layer: Ethernet, Switching and Switch Fabrics
- IP layer Protocols: subnetting and routing, OSPF, RIP.
- TCP layer protocols: Congestion control and avoidance
- Application Layer: HTTP

**Outcomes Assessment:**

- Two midterm examinations and a final examination
- Project: Lab exercises, network simulators, and paper reviews
- Pop Quizzes and periodic homework assignments
- Class participation, bonus, and optional assignments

**Textbooks:**

1. Lecture Notes
2. *Computer Networks, a System approach*, 5<sup>th</sup> Edition, by Larry Peterson, MK
3. *Computer Networks: A Top-Down Approach*, 1<sup>st</sup> Edition, by Behrouz A., Forouzan, McGraw Hill, 2012

4. Computer Networking, *A Top-Down Approach*, 5<sup>th</sup> or later edition, J.F Kurose and KW Ross, PH

**References:**

- *Computer Networks*, 5<sup>th</sup> edition, by Andrew S. Tanenbaum
- *TCP/IP Protocol Suite*, 4<sup>th</sup> edition, by B. A. Forouzan, McGraw Hill 2010 (focus on the internet with nice illustration animations)
- *Unix Network Programming*, Volume 1, 2<sup>nd</sup> edition, by Richard Stevens, PH 1998
- MOOC (will also be used for optional bonus work)

**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	15%
Project/Lab	15%
Homework	10%
Final Exam	25%
<b>Total</b>	<b>100%</b>

<i>Grading Percentage Breakdown</i>	
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 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 textbooks
  - 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:

<b><i>Wednesday, May 24 1445-1700</i></b>
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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 :**

Homework assignments will be given periodically and selected problems are graded. Homework assignments are collected at the begin the class on their due dates. Late Homework are not accepted. Homework solutions will be made available in Canvas

**Lab/project**

Provides hands-on experience to reinforce and *\*extend\** network concepts discussed in class through the implementations and analysis of real-world network protocols and mechanisms. It involves the configuration of Cisco routers and usage of modern network tools, e.g., Wireshark, Packet-Tracer, GNS3, to implement, simulate and analyze relevant networks (WAN). The instructor will provide all the necessary specifications, advising and resources, however one of the project objective requires you to learn and do research in your own. The project may require a final presentation/demo/ of your work to the rest of the class.

**Course Outline**

(Tentative)

**I. Introduction.....**

- \* ISO, OSI reference model
- \* TCP/IP suite

**II. Physical Layer.....**

- \* FDM, TDM
- \* Relating Metrics performance issue

**III. Direct Link Network and DDL.....**

- \* Encoding, Manchester
- \* Framing
- \* Error Detection, CRC
- \* Reliable Transmission, ARQ, Sliding Window Protocol
- \* IEEE 802 project, Ethernet, FDDI
- \* Switching Hardware, Crossbar, Batcher-Banyan switch
- \* ATM and its layers

..... **Exam1...**

**IV. Network Layer & Routing.....**

- \* Static routing algorithms
- \* Distance-vector routing, link-state routing
- \* Tunneling, Fragmentation
- \* IP protocol, Subnetting, ICMP, ARP, RARP
- \* IGP, EGP, CIDR

.... **Exam2...**

**V. Transport Layer .....**

- \* UDP
- \* TCP, sliding window

- \* Queuing Disciplines, FCFS, WFQ
- \* Congestion avoidance, RED, DECbit
- \* QoS

**VI. Application Layer .....**

- \* Application-Layer Architecture
- \* Application-Layer Architecture
- \* Web and HTTP
- \* Peer-to-Peer Applications (as time permits )
- \* IoT (as time permits)

**University, College, or Department Policy Information:**

**a) Academic integrity statement (from Office of Judicial Affairs):**

“Your own commitment to learning, as evidenced by your enrollment at San José State University and the University’s Academic Integrity Policy requires you to be honest in all your academic course work. Faculty are required to report all infractions to the Office of Judicial Affairs. The policy on academic integrity can be found at <http://www2.sjsu.edu/senate/S04-12.pdf>

**b) Campus policy in compliance with the Americans with Disabilities Act:**

“If you need course adaptations or accommodations because of a disability, or if you need 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 register with DRC to establish a record of their disability.”

c) Department Policy



**EE@SJSU**

**Honesty and Respect for Others and Public Property**



**EE 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 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