San Jose State University
Electrical Engineering Department

EE283 (Section 01) **Broadband Communication Networks** **Spring 2020**

Course and Contact Information

Instructor: Nader F. Mir

Office Location: Department of Electrical Engineering, College of Engineering, E251

Telephone: (408) 924-3986

E-mail Address: nader.mir@sjsu.edu (preferred contact method: in person - office hours)

Office Hours: Mon/Wed, 12:00n-1:00pm

Instructor's Web-site: http://www.sjsu.edu/people/nader.mir/

Class Days/Time: Mon/Wed, 4:30pm - 5:45pm

Classroom: E345

Prerequisites: EE281 or equivalent

Course Description and Outcomes

Course Description: Broadband Networks Overview, Tunneling, VPNs, and Multi-Protocol Label Switching (MPLS); All-Optical Networks, Architecture of High-Speed Switches and Routers, Data Center Networks, Network Virtualization, Software-Defined Networking (SDN), Packet Delay and Network Queueing Models, and Quality of Service. **Credit Hours:** 3

Course Learning Outcomes (CLOs). Upon successful completion of this course, students will be able to:

1. Understand the Fundamentals of Broadband Networks
2. Design of Advanced Routers and Switches
3. Learn Quality of Service (QoS) in Advanced Networking Devices
4. Analyze Tunneling Technique and MPLS Networks
5. Learn All-Optical Switches and Networks
6. Understand Network Virtualization Analysis
7. Understand Software Defined Networking (SDN)
8. Understand Cloud Computing and Data Centers
9. Learn Packet Queues and Delay Analysis and Simulation

Textbook/References

Textbooks

1. Computer and Communication Networks, 2nd Edition, 2015, Nader F. Mir, ISBN: 0133814742, Publisher: Pearson Prentice-Hall.

   Note: This 2nd edition of the textbook is sold out in most online book stores such as Amazon as it is in transition to its 3rd edition and so the publisher has stopped reprinting it. You may still be able to find its original, used, or rental copy in some stores. **Do not buy the 1st edition.** In the meanwhile, for those who may have difficulty to find a copy, I may be able to provide the PDF copies of some covered chapters in the canvas.

2. Foundations of Modern Networking, SDN, NFV, WoE, IoT, and Cloud, 2016, William Stallings, ISBN: 0134175395, Publisher: Addison Wesley.

Other Periodical Readings

1. IEEE Communications Magazine
2. IEEE Communications Standards Magazine
3. IEEE Network Magazine

Course Requirements and Assignments

Class Participation: The class attendance is required and is an important factor to achieve the leaning objectives of this course.

Homework Assignments: Normally bi-weekly, hardcopies of assignments are required to be turned in class. Working on assignments is an important factor to achieve the leaning objectives of this course. Answers to homework will be given in class before each exam.

Project: A hard copy to be turned in class, and a softcopy to be uploaded to Canvas.

Exams:

- Midterm Exam: Wednesday, March 25th, (location: TBA).
- Final Exam: Tuesday, May 19th, 2:45pm, (location: TBA).

Evaluation and Grading Information

Assignments/Project: 20%

Midterm Exam: 40%

Final Exam: 40%

Standard Grading Percentage Breakdown (after possible normalizations):

Grade	*Points*	*Percentage*
A plus	*960 to 1000*	*96 to 100%*
A	*930 to 959*	*93 to 95%*
A minus	*900 to 929*	*90 to 92%*
B plus	*860 to 899*	*86 to 89 %*
B	*830 to 829*	*83 to 85%*
B minus	*800 to 829*	*80 to 82%*
C plus	*760 to 799*	*76 to 79%*
C	*730 to 759*	*73 to 75%*
C minus	*700 to 729*	*70 to 72%*
D plus	*660 to 699*	*66 to 69%*
D	*630 to 659*	*63 to 65%*
D minus	*600 to 629*	*60 to 62%*

Tentative Course Schedule

1. Overview of Broadband and Modern Computer Networks (Stallings Ch. 1)
Week 1

2. Architecture of Routers for Backbone Broadband Networks (Mir Ch. 12)
Week 2, 3

3. Quality of Service in Broadband Network Routers (Mir Ch. 13)
Weeks 4

4. Tunneling, VPNs, and Multi-Protocol Label Switching (MPLS) Networks (Mir Ch. 14)
Weeks 5, 6

5. Optical Networks and Switches (Mir Ch. 15)
Week 7

Quick Review, HW answers, and Midterm Exam
Week 8

6. Network Virtualization (Mir Ch. 16, Stallings Ch. 3, 7)
Week 9

7. Software Defined Networking (SDN) (Mir Ch. 17, Stallings Ch. 3, 4, 5)
Week 10

8. Cloud Computing and Data Center Networks (Mir Ch. 16, Stallings Ch. 13)
Week 11, 12

9. Packet Delay Models and Network of Queues in Broadband Networks (Mir Ch. 11)
Weeks 13, 14

Quick Review, HW answers, and Final Exam
Weeks 15 and 16

University Policies

Per University Policy S16-9 *(http://www.sjsu.edu/senate/docs/S16-9.pdf)*, relevant information to all courses, such as academic integrity, accommodations, dropping and adding, consent for recording of class, etc. is available on Office of Graduate and Undergraduate Programs' Syllabus Information web page at http://www.sjsu.edu/gup/syllabusinfo/" . Make sure to visit this page, review and be familiar with these university policies and resources.

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.