San Jose State University
College of Engineering
Electrical Engineering Department

EE284 (Section 01) **VoIP and Multimedia Networks** **Fall 2019**

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: M/W: 11:45am-1:00pm

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

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

Classroom: ENG 345

Prerequisites: EE281 or equivalent

Course Description and Outcomes

Course Description: Public-Switched Telephone Network and SS7 Protocol, Voice over IP (VoIP) Signaling Protocols, H.323, Session Initiation Protocol (SIP), Internetworking VoIP, Regular, and Wireless Cellular Networks, Media Gateways, Media Preparation and Compression, Codecs, Multimedia Networks, IPTV, VoD, Content Delivery Networks (CDNs). **Credit Hours:** 3

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

1. Analyze Overview of VoIP and Multimedia Networks
2. Specify and qualify Fundamentals of PSTN and SS7 Protocol
3. Analyze Signaling in VoIP Networks: Session Initiation Protocol (SIP)
4. Analyze Signaling in VoIP Networks: H.323 Protocols
5. Analyze Signaling in wireless cellular networks
6. Analyze Integration of VoIP and other Networks
7. Identify, formulate and solve Voice Preparation for IP Networking and Codec
8. Identify, formulate and solve Media Packet Compression and Codecs
9. Analyze Real Time and Streaming Protocols
10. Analyze Voice/Video Over IP and Multimedia Networks, SCTP Protocol
11. Analyze Multimedia Networks, IPTV, VoD, and Content Delivery Networks (CDNs)

Textbook/References

Required Textbook

1. "Carrier Grade Voice Over IP," by Richard Swale and Daniel Collins, ISBN 978-0071827713, 3rd edition, McGraw-Hill Publisher, 2013.

Other References

1. "Voice over LTE, VoLTE" by Miika Poikselka *et. al.* ISBN: 978-1-119-95168-1, 1st Ed. 2012,
2. "SIP: Understanding the Session Initiation Protocol," by Alan B. Johnston, Artech House, ISBN 1-58053-655-7, 2nd Ed. 2004.
3. Chapters 7, 18, 19, and 20 "Computer and Communication Networks," by Nader F. Mir, 2nd Edition, ISBN: 0133814742, Pearson Prentice-Hall, 2015.
4. Most IETF Request for Comments (RFCs) related to VoIP available online (consult with the instructor for any particular one),

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:

- A Midterm Exam (Wednesday, October 23rd, during normal class time, location: TBA)
- Final Exam (Monday, December 16th, starting at 2:45 – 5:00 pm, 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 VoIP and Multimedia Networks (Week 1)
2. Fundamentals of PSTN and SS7 Network Signaling Protocols (Weeks 1 and 2)
3. Signaling in VoIP Networks: SIP and MGCP (Weeks 3 and 4)
4. Signaling in VoIP Networks: H.323 Protocols (Weeks 5 and 6)
5. Signaling in Wireless LTE Networks and Integration of VoIP and SS7, and (Weeks 6 and 7)

   Quick Review, HW answers, and Midterm Exam (Week 8)
6. Voice Preparation for IP Networking and Codecs (Weeks 9 and 10)
7. Media Compression and Packetization for IP Networking (Weeks 11 and 12)
8. Real Time and Streaming Protocols (Week 13)
9. Voice/Video Over IP and Multimedia Networks, SCTP Protocol (Week 14)
10. Multimedia Applications: IPTV, Video on Demand, Content Delivery Networks (CDNs) (Week 15)

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

NOTE: No class on 9/4.

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.