San Jose State University  
College of Engineering  
Electrical Engineering Department

EE284 (Section 01)  
VoIP and Multimedia Networks  
Fall 2021

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 (do not use Canvas email)  
Office Hours:  Mon./Wed., 10:15am - 10:30am by Zoom; Mon./Wed., 8:45pm - 9:00pm in Clark222; by appointment for a Zoom session if necessary.  
Instructor’s Website:   http://www.sjsu.edu/people/nader.mir/  
Class Days/Time:   Mon./Wed., 7:30pm - 8:45pm  
Classroom:    Clark Building Room 222  
Prerequisites:  EE281 or equivalent

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 Format  
In-person

Communications with Instructor and Location of Course Materials  
All communications from/to instructor must use nader.mir@sjsu.edu (and not Canvas email). Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on Canvas. Please check Canvas regularly through MySJSU to learn of any updates. For help with using Canvas see Canvas Student Resources page.

Course Learning Outcomes (CLOs)  
Upon successful completion of this course, students will be able to:  
• understand an overview of voice over IP (VoIP) and multimedia networks  
• analyze signaling in VoIP and multimedia networks: Session Initiation Protocol (SIP)  
• analyze signaling in VoIP and multimedia networks: H.323 Protocols  
• analyze Signaling in wireless cellular networks  
• specify and qualify fundamentals of SS7 Protocol  
• analyze the integration of various multimedia networks
• identify, formulate and solve voice preparation for IP networking and Codecs
• identify, formulate and solve media packet compression and Codecs
• analyze the real time media streaming protocols
• analyze voice/video over IP and multimedia networks, and SCTP Protocol
• analyze multimedia network practical examples: IPTV, VoD, and content delivery networks (CDNs)

**Required Textbook**

**Other Readings**
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**
“Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally three hours per unit per week) for instruction, preparation/studying, or course related activities, including but not limited to internships, labs, and clinical practica. Other course structures will have equivalent workload expectations as described in the syllabus.” *(University Policy S16-9)*

**Grading Information**
The class attendance is required and is an important factor to achieve the leaning objectives of this course.

The total grade (100%) breakdown is as follows:

• Assignments/Project(s): 20%
  Assignments are in the form of homework and projects. Softcopies of assignments are required to be uploaded onto Canvas. Working on assignments is an important factor to achieve the leaning objectives of this course. Answers to homework will be provided before each exam.
• Midterm Exam: 40%
  A midterm Exam (Wednesday, October 27th, during normal class time, in-person, in class)

• Final Exam: 40%
  Final exam (According to the University final exams schedule: Wednesday December 8th, starting at 7:45pm, in-person, in campus, location TBA)

Standard Grading Percentage Breakdown (after possible normalizations):

<table>
<thead>
<tr>
<th>Grade</th>
<th>Points</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A plus</td>
<td>960 to 1000</td>
<td>96 to 100%</td>
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<tr>
<td>A</td>
<td>930 to 959</td>
<td>93 to 95%</td>
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<tr>
<td>A minus</td>
<td>900 to 929</td>
<td>90 to 92%</td>
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<tr>
<td>B plus</td>
<td>860 to 899</td>
<td>86 to 89%</td>
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<tr>
<td>B</td>
<td>830 to 829</td>
<td>83 to 85%</td>
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<tr>
<td>B minus</td>
<td>800 to 829</td>
<td>80 to 82%</td>
</tr>
<tr>
<td>C plus</td>
<td>760 to 799</td>
<td>76 to 79%</td>
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<td>C</td>
<td>730 to 759</td>
<td>73 to 75%</td>
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<tr>
<td>C minus</td>
<td>700 to 729</td>
<td>70 to 72%</td>
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<tr>
<td>D plus</td>
<td>660 to 699</td>
<td>66 to 69%</td>
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<tr>
<td>D</td>
<td>630 to 659</td>
<td>63 to 65%</td>
</tr>
<tr>
<td>D minus</td>
<td>600 to 629</td>
<td>60 to 62%</td>
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University Policies
Per University Policy S16-9 (http://www.sjsu.edu/senate/docs/S16-9.pdf), relevant university policy concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance, counseling, and other resources) are listed on Syllabus Information web page (http://www.sjsu.edu/gup/syllabusinfo), which is hosted by the Office of Undergraduate Education. Make sure to visit this page to review and be aware of 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.

**Tentative Course Schedule**
1. Overview of VoIP and Multimedia Networks
   Week 1

2. Signaling in VoIP and Multimedia Networks: SIP
   Weeks 2 and 3

3. Signaling in VoIP and Multimedia Networks: H.323 Protocols
   Weeks 4 and 5

4. Fundamentals of SS7 Network Signaling Protocols
   Week 6

5. Signaling in Wireless 4G/5G Cellular Phone Networks
   Week 7

6. Signaling in Integrated Networks
   Weeks 7 and 8

   *Quick Review, HW answers, and Midterm Exam*
   Week 8

7. Voice Preparation for IP Networking and Codecs
   Weeks 9 and 10

8. Media Compression and Packetization for IP Networking
   Weeks 11 and 12

9. Real Time and Streaming Protocols
   Week 13
(Note: no classes on Nov. 10 and 15)

10. Voice/Video Over IP and Multimedia Networks, SCTP Protocol  
    Week 14

11. Multimedia Applications: IPTV, Video on Demand, Content Delivery Networks (CDNs)  
    Week 15

*Quick Review, HW answers, and Final Exam*  
Week 16