Missoula College UM  
Department of Applied Computing and Electronics

Course Number and Title .......... ITS 255 IP Telephony  
Term ..................................... Fall 2014  
Semester Credits .................... 3  
Prerequisites .......................... ITS 150 CCNA 1: Exploration, or consent of instructor

Faculty Contact Information

Faculty  
Steven (Steve) L. Stiff  
Phone: 243-7913  
Email: steven.stiff@umontana.edu

Office  
GH08-I  
MC East Campus

Office Hours  
T, W, R: 2:10 PM – 3:00 PM  
or by appointment

Class Meeting Times and Final Exam

Section 01 (CRN 74912)  
Day, Time, and Location  
Lecture M, 1:10pm – 3:00pm, HB03

Final Exam  
T, 12/09/2014, 1:10pm – 3:10pm, HB03

Course Description

This course provides an introduction to converged voice and data networks as well as challenges faced by the various technologies. It presents solutions and implementation considerations for signaling, quality of service, call control, dial plans, gateway protocols, messaging, congestion, and connecting to a PSTN network.

This course will be delivered in a hybrid format with the reading, lecture material, assignments, and tests done through Moodle. Lectures will go over concepts and include design activities. Hands-on labs will be required with students divided into teams with a posted lab schedule. There will be required discussion groups, collaborative/group projects, and presentations to entire class via web conferencing software.

Course Objectives

Upon completion of this course students will be able to:

• Analyze existing phone systems for IP capabilities
• Design internetworks using VoIP switches to create VLANs and peer groups
• Select VoIP equipment and IP phone features that ensures quality of service
• Calculate bandwidth with number of trunks and grade of service as implementation criteria
• Connect routers to phone lines and digital circuits
• Configure H.323, MGCP, and SIP
• Implement security policies and queuing for traffic priority
• Setup, configure, and oversee a web conference/web meeting

Required Materials

• E-TEXTBOOK: CCNP Voice CVOICE 642-437 Quick Reference, 3rd Edition  
• Other Supplies:  
  • Headset with microphone  
  • USB drive

Revision: 08/25/2014
Evaluation and Grading Criteria

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Grading Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments, quizzes, projects, etc.</td>
<td>100% - 90%</td>
</tr>
<tr>
<td>Exams</td>
<td>90% - 80%</td>
</tr>
<tr>
<td>Skills Final</td>
<td>80% - 70%</td>
</tr>
<tr>
<td>Case Study/Design Project</td>
<td>70% - 60%</td>
</tr>
<tr>
<td>Attendance (Bonus)</td>
<td>2.0%</td>
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</tbody>
</table>

Grading Scale

- 100% - 90% ......................... A
- 90% - 80% ........................... B
- 80% - 70% ........................... C
- 70% - 60% ........................... D

Course Policies

Online Component

Various components of the course will be delivered via UMOnline (http://umonline.umt.edu) using the Moodle Course Management Software. It is the responsibility of the student to become familiar with and work in Moodle. Moodle training is also available through UMOnline.

Attendance

- Regular classroom attendance is expected and attendance is taken.
- Students more than 10 minutes late for class will not be given credit for attendance.

Assignments and Exams

- All assigned work is due at the assigned time on the assigned date.
- All exams are to be taken at the assigned time on the assigned date.
- All late or missed work receives a score of 0. Late work is accepted only in extraordinary circumstances, and is accepted and graded at the instructor’s discretion.

Electronic Communication Devices

- All electronic communication devices must be secured, muted, or tuned off prior to the start of class.
- Any use of an electronic communication device during an exam is considered cheating and will be handled at the instructor’s discretion (refer to Student Conduct).
- Audio and/or video recording of class sessions is not permitted without prior approval of the instructor (refer to Students with Disabilities).

Email

This course uses and therefore requires you to use your student email account for all course email communication.

Student Conduct

- All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or disciplinary sanction by the University.
- Student conduct is governed by the Student Conduct Code. All students need to be familiar with the Student Conduct Code. It is available for review or can be downloaded at http://www.umt.edu/vpsa/policies/student_conduct.php.
Students with Disabilities

- Eligible students with disabilities will receive appropriate accommodations in this course when requested in a timely manner. Please be prepared to provide me a copy of your Letter of Verification supplied by your Disability Services for Students (DSS) Coordinator for my records. Refer to http://life.umt.edu/dss or call 406-243-2243 (voice/text) for information regarding your rights.
- When requesting accommodations, please contact me after class or in my office to discuss your needs. This is done in order to maintain your privacy and minimize class disruptions.
- For students requesting examination accommodations, you must supply me the completed Learning Center (LC) scheduling form for my signature at least 3 days prior to the scheduled test date (the LC requires the signed form at least two days prior to testing). LC contact information is available at http://www.mc.umt.edu/academics/learningcenter.

Policies for Dropping and Adding Courses, Changing Sections, Grading, and Credit Status

- The University Policy for dropping courses or requesting grading/credit status changes can be found in the academic catalog or on the web at http://www.umt.edu/registrar/students/dropadd.php. All students should be familiar with this policy.
- If you are having difficulty with the course for any reason and decide not to continue, please complete a drop or withdrawal form. A properly completed and approved drop or withdrawal form will prevent you from receiving a failing grade on your college transcript.
- Please note: if you are receiving financial aid, dropping or withdrawing from a course may affect your financial aid status.

Changes to Syllabus

NOTE: The instructor reserves the right to modify the syllabus and assignments as needed based on faculty, student, and/or environmental circumstances. If changes are made to the syllabus, amended copies will be dated and made available to the class.
## ITS 255 Course Outline (Tentative)

### Unit 1 Introduction to Telephony
1. Traditional Phone Basics
2. Standards
3. Protocols
4. Signaling
5. Devices/Components
6. Call Setup/control
7. Digital vs. Analog Connections
8. Multiplexing
9. Packet Telephony vs. circuit-switched

### Unit 2 Digital Encoding
1. Segmenting
2. Bandwidth
3. Trunks
4. Grade of service
5. Evaluate IP Providers
6. Packet Loss, Delay, Jitter
7. Gateways
8. Encapsulating voice in IP Packets
9. VoIP Protocols and OSI Model
10. Compression
11. Tunneling

### Unit 3 Planning for VoIP
1. Existing phone systems
2. Replacing PBX Trunks
3. Connecting Router to Phone Line
4. Connecting Router to Digital Circuit
5. VoIP in the Home
6. Installation
7. Setting up Service

### Unit 4 Cisco CallManager
1. Replace old switches
2. Configuration of CME
3. IP Phone setup/features
4. In-line power
5. Codecs
6. VLANs
7. Dial Plans
8. ePhone configuration
9. Softphone
10. Web conferencing

### Unit 5 Signaling and Call Control
1. H.323
2. MGCP
3. SIP
4. Quality of service
5. Congestion Management
6. Priority Queuing
7. Classification/marking
8. Policing and shaping
9. Link efficiency

### Unit 6 Security
1. Trust boundaries
2. Convergence
3. Compression
4. Encryption
5. Video/video conferencing
6. Cellular
7. Wireless