

Course	TLEN 5440 Multimedia Networking Spring 2007
Time	Presentations uploaded to WebCT for viewing: Tuesday & Thursday No classes March 26-30
Instructor	Timothy Barker Email: timothy.barker@colorado.edu Phone: (919) 699-1861 Office Hours: Tuesday, 4:30-5:30 Phone Appointment Only
Location	WebCT / Distance Learning
Topic	Technical discussion and analysis of protocols used to transport media (Voice & Video) over a common VoIP network infrastructure. Technical discussion and analysis of the IP Multimedia Subsystem (IMS) architecture. Key technologies covered are: SIP, RTP, Codec, Compression, Security, quality of service (QOS), and IMS Services.
Goals	<ul style="list-style-type: none"> • <i>Content:</i> Develop a basic understanding of Media Transport technologies in a VoIP network and the evolution of networking technologies and protocols to support them. Gain a greater technical, political and economic understanding of the Cellular Industry-wide implementation of the IP Multimedia Subsystem (IMS) Architecture. • <i>Process:</i> Lecturing, Critical Thinking discussion questions, diverse reading, laboratory, research papers, and homework exercises. • <i>Skills:</i> life skills in learning cutting edge technology (how to effectively aggregate book, academic journal, magazine, trade press, and web research), how to set technology learning in an economic, social, and business context.

**Topical
Outline**

- 1. Context - Media Transport Protocols
 - 1.1 Session Initiation Protocol (SIP)
 - 1.2 Real-Time Transport Protocol (RTP)
 - 1.3 Session Description Protocol (SDP)
 - 1.4 Other Media Transport Protocols
- 2. Media - Codec Operation & Selection
 - 2.1 Generics - digitization, compression primitives
 - 2.2 Audio
 - 2.3 Speech
 - 2.5 Video
 - 2.6 Types of Codecs
- 3. Media Transport – Security Issues/Techniques and Compression
 - 3.1 Firewalls, NATs
 - 3.2 IPSec
 - 3.3 Secure RTP
 - 3.4 Header Compression
- 4. IP Multimedia Subsystem (IMS) architecture
 - 4.1 Standards Bodies, and Requirements
 - 4.2 IMS IP Core Network Nodes
 - 4.3 IMS SIP Protocol modifications & implementations
 - 4.4 Other Key IMS Protocols (DIAMETER, COPS, QOS, etc)
 - 4.5 IMS Security & Compression
 - 4.6 IMS Services

Prerequisites TLEN 5330 (Data Communications 1), or consent of instructor.

Grading

- 5% Discussion Questions
- 45% Assignments
- 20% Midterm
- 30% Final

Grading Scale			
100-95	A	76-74	C
94-90	A-	73-70	C-
89-87	B+	69-67	D+
86-84	B	66-64	D
83-80	B-	63-60	D-
79-77	C+	59 or <	F

**Course
Delivery and
Management**

The entire course is taught remotely. The course will be administered extensively by WebCT and email. The professor will record the presentations and post them to the course website on WebCT. Internet and e-mail access is mandatory. Students will access course materials using WebCT. Go to webct.colorado.edu for logon information and browser settings.

Assignments There are three types of assignments.

Homeworks – These are problem sets that are submitted via WebCT, and count as one assignment each. There are 10 homeworks, each counts as a single assignment equivalent.

Laboratory Exercises – there are four laboratory exercises. These are performed in the ITP teaching laboratory. Each counts as 1 assignment equivalents.

Paper – There is a short paper exercise. This counts as 2 assignment equivalents.

The Assignments Grade is calculated by:

- a) Grading everything submitted
- b) Sorting the assignments in descending order.
- c) Calculating the average grade over the top 10 assignment equivalents and dropping the rest. This is the Assignments Grade.

On-Campus ITP Students

1. Homework
2. Laboratory Exercises
3. Discussion Questions (DQs)

Distance ITP Students

1. Homework
2. Research Paper: 2 Papers (2 assignment equivalents each)
3. Discussion Questions (DQ)

If you are an ITP on Campus student, any laboratory exercise with a grade of “C” or below will automatically be included in “top 10 assignment equivalents.” (This means that failing to do a passing job on a laboratory has a strong penalty effect.)

If you are an ITP Distance ED student, a paper with a grade of “C” or below will automatically be included in “top 10 assignment equivalents.”

**Late
Assignment
Policy**

Late homework assignments, lab exercises, and papers are penalized 5% for each 24 hour period they are late (as measured by WebCT timestamp), up to a maximum of one week, with the first 5% penalty exacted if they are late by more than 10 minutes. Don’t anticipate any exceptions to the late policy.

Attendance Policy/Grade	Attendance Grades are received by completing the following: Discussion Questions (DQ): Via WebCT Course website. Weekly critical thinking discussion questions related to lecture topic. Count as attendance points. Detail instructions will be provided to explain acceptable responses
Online	Course materials, homework assignments, homework submission, discussion, etc., will be online using WebCT (http://www.colorado.edu/webct/).
Midterm and Final	The tests will be focused on mastery of the content of the course with a higher emphasis on relating and organizing the information than on memorizing specific details. Both Midterm and Final exams will be administered Online (WebCT)
Textbooks	<ul style="list-style-type: none"> • Perkins, RTP: Audio and Video for the Internet, Addison-Wesley, 2003, ISBN 0-672-32249-8. • The 3G IP Multimedia Subsystem (IMS) Merging the Internet and the Cellular Worlds, 2nd Edition, John Wiley & Sons, ISBN: 0-470-01818-6 • Recommended/Optional: <ul style="list-style-type: none"> ➤ Sinnreich, Internet Communications Using SIP: Delivering VoIP and Multimedia Services with Session Initiation Protocol, 2nd ed., Wiley, 2006, ISBN: 0-471-77657-2 ➤ Collins, Carrier Grade Voice Over IP, 2nd ed., Mc-Graw Hill, 2003, ISBN 0-07-140634-4. ➤ Any other text book specifically focused on the SIP Protocol. • All Books can be purchased at Amazon.com Website
Readings	We will read articles from the electronic libraries of the ACM and IEEE (available via Chinook http://libraries.colorado.edu/) and from trade press and other sources on the web. Readings will be posted on WebCT.

Disability

If you qualify for accommodations because of a disability, please submit a letter to me from Disability Services in a timely manner so that your needs may be addressed. Disability Services determines accommodations based on documented disabilities. Contact: 303-492-8671, Willard 322, or

www.Colorado.EDU/disabilityservices

Disability Services' letters for students with disabilities indicate legally-mandated, reasonable accommodations. Other letters/requests you may receive from agencies such as the Wardenburg Student Health Center, or other health providers, such as physicians or counselors, are recommendations you may choose to follow to assist students but are not necessarily legal mandates. The syllabus statements and answers to Frequently Asked Questions can be found at

www.colorado.edu/disabilityservices

**Religious
Observances**

Campus policy regarding religious observances requires that faculty make every effort to reasonably and fairly deal with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. See policy details at

http://www.colorado.edu/policies/fac_relig.html

Behavior

Students and faculty each have responsibility for maintaining an appropriate learning environment. Students who fail to adhere to behavioral standards may be subject to discipline. Faculty have the professional responsibility to treat students with understanding, dignity and respect, to guide classroom and online discussion and to set reasonable limits on the manner in which students express opinions.

See policies at

<http://www.colorado.edu/policies/classbehavior.html> and at
http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student_code

Honor Code

All students of the University of Colorado at Boulder are responsible for knowing and adhering to the academic integrity policy of this institution. Violations of this policy may include: cheating, plagiarism, aid of academic dishonesty, fabrication, lying, bribery, and threatening behavior. All incidents of academic misconduct shall be reported to the Honor Code Council (honor@colorado.edu; 303-725-2273). Students who are found to be in violation of the academic integrity policy will be subject to both academic sanctions from the faculty member and non-academic sanctions (including but not limited to university probation, suspension, or expulsion). Additional information on the Honor Code can be found at

<http://www.colorado.edu/policies/honor.html> and at
<http://www.colorado.edu/academics/honorcode/>