

Multimedia Communications

多媒體通訊 (Feb 2010)

課程編碼 **Course Code:** IEE5722; 學分數 **Credits:** 3;

教師姓名 **Instructor:** 杭學鳴 (Hsueh-Ming Hang) h nhang@mail.nctu.edu.tw (ED609)

Course hours and Classroom: Monday 3:40pm--6:30pm; ED101

英文概述: This course provides a compressive coverage of the multimedia communication systems. Various key technologies such as speech/audio compression, image/video compression, digital transmission, multimedia over networks, multimedia security, and multimedia database systems are introduced. Particularly, the international standards on multimedia representation and processing are discussed in depth. In addition, the digital broadcast TV (DVB, ATSC) and MPEG system standards are also included.

課程大綱 (Outline): (1) Introduction and System Overview

- (2) Lossless Coding and Quantization
- (3) Speech Compression Techniques and Standards
- (4) Audio Compression Techniques and Standards
- (5) Image Compression Techniques and Standards
- (6) Video Compression Techniques and Standards
- (7) Multimedia Systems Standards: MPEG-2/4 Systems
- (8) Digital TV: ATSC and DTV
- (9) Multimedia Streaming: MPEG-21
- (10) Digital Rights Management System and Watermarking
- (11) Content-based Multimedia Indexing and Retrieval (MPEG-7)

教科書 (Textbook): Class notes (<http://cwww.ee.nctu.edu.tw/course>)

Background: Signals and Systems, (Digital Image Processing)

評量標準 (Grading):

- 3 Homework: 35 % (including 2 computer assignments, 15% each)
- Midterm Examine: 30% (2 hours, open book)
- Final Project and Report: 35% (computer assignment and paper study and report)

其他 Recommended Readings:

- (1) K.R. Rao, et al., *Intr. to Multimedia Communications*, John Wiley & Sons, 2006.
- (2) J.-N. Hwang, *Multimedia Networking: From Theory to Practice*, Cambridge University Press, 2009.
- (3) 戴顯權等, 多媒體通訊, (3rd Ed.?), 滄海書局, 2008. (2nd Ed, 紳藍出版社, 2003)
- (4) K. Sayood, *Data Compression*, 3rd ed., Morgan Kaufman, 2006.

Schedule: Multimedia Communications (Spring 2010)

Week	Month(s)	Day(s)		Remark
1	Feb	22	(1) Introduction	
2	March	1	(2) Lossless Coding and Quantization	
3	March	8	(2) Quantization; (3) Speech Compression	
4	March	15	(3) Speech Compression	
5	March	22	(4) Audio Compression	
6	March	29	(4) Audio Compression	
7	April	<u>5</u>		Holidays
8	April	12	(5) Image Compression	
9	April	19	Midterm Ex (4/19)	MPEG meeting
10	April	26	(5) Image Compression	
11	May	3	(6) Video Compression	
12	May	10	(6) Video Compression	
13	May	17	(7) MPEG-2/4 Systems	
14	May	24	(8) Digital TV	
15	May	<u>31</u>	(9) Multimedia Streaming	ISCAS
16	June	7	(10) Digital Rights Management	
17	June	14	(11) Content-based Multimedia Retrieval	
18	June	21	Final Report (6/21)	

Midterm: ~ April 19; 120 mins; open-book

Final Report: ~ June 19; Oral report

Grading Policy

Hsueh-Ming Hang, Feb. 2007

- **General Requirements:** All examines and reports can be in either English or Chinese.
You may be graded on *method* and *ideas*, and the *clarity* with which you organize them, but accurate numbers are needed for full credits.
Examples: *Principles, formulas* → *plug-in* → *computational tricks* → *accurate results*
- **Projects, homework with programs:** Attach all the computer programs. No one else should write a nearly identical program as yours.
- **Class presentation:**
 - Viewgraphs (contents, organization, clarity, ...): **50%**
 - Oral report (contents, organization, clarity, ...): **50%**
- **Missing projects, homework, ...:** To claim credits, please retain a copy of your projects, homework,...
- **Grades:** (100%)
 - **Normalization:** Each examine and (major) project is adjusted separately.
 - **Mean:** ~ <78 for undergraduate courses
~ <85 for graduate courses
 - **Standard Deviation:** ~ 12 for undergraduate courses
~ 8 for graduate courses

Remark: For normal distribution,
a threshold at 1 (one) s.d. → 84% students would pass;
a threshold at 1.5 s.d. → 93% students would pass.

- **Exceptions:**
 - The total number of students is less than 10
 - Examine problems are poor
 - Abnormal distribution of grades