

Multimedia Communications

多媒體通訊 (Feb 2010)

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

教師姓名: 杭學鳴 hmhang@mail.nctu.edu.tw (hmhang@mail.nctu.edu.tw)

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

中文概述: 本課程將概述多媒通訊系統所用到的各項技術，包括語音與樂音壓縮，影像與視訊壓縮，數位傳輸，網路多媒體，多媒體安全，多媒體資料庫等。我們特別以國際標準為例來解說各項技術的原理和應用。最後，我們也介紹完整的系統規格，如數位電視和 MPEG 系統。

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)

課程進度 (Tentative Schedule): Week 1 -- (1) Introduction and System Overview

Weeks 2,3 -- (2) Lossless Coding (Huffman, ...) and Quantization

Week 4 -- (3) Speech Compression Techniques and Standards

Weeks 5,6 -- (4) Audio Compression Techniques and Standards

Weeks 7,8 -- (5) Image Compression Techniques and Standards

Week 9 -- Midterm examine

Weeks 10, 11, 12 -- (6) (7) Video Compression Techniques and Standards

Week 13 -- (8) Multimedia Systems Standards: MPEG-2/4 Systems

Week 14 -- (9) MPEG Digital Rights Management and MPEG-21

Weeks 15,16 -- (10) Digital TV: ATSC and DTV

Week 17 -- (11) Watermarking and Content-based Multimedia Retrieval
(MPEG-7)

Week 18 – Term project report

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)