SUBJECT DESCRIPTION FORM

Subject title: Multimedia Computing, Systems and Applications

Subject code: COMP5422

Credit value: 3

Pre-requisite: (Subject title and code no, if any)

Nil

Recommended background knowledge:

Background in image processing software is useful but not mandatory.

Mutual exclusions: Multimedia Systems and Applications (COMP513)
Fundamental of Multimedia Computing (COMP5421)
Multimedia Systems and Applications (COMP5451)

Learning approach:

42 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable

Assessment:

Continuous Assessment	55%
Test, and Examination	45%

Objectives:

1. To provide students with knowledge in fundamentals of multimedia, e.g. compression standards, data formats, media characteristics, storage and transmission requirements
2. To provide students with knowledge of a wide spectrum of multimedia information processing techniques
3. To train students with the ability to apply the knowledge in multimedia system and application development
4. To equip students with the ability to appreciate new and innovative solutions of multimedia systems and applications

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

Learning Outcomes:

After completing the subject, students should be able to:

1. understand the various characteristics of different media;
2. understand the requirements and techniques of processing multimedia;
3. generalize the knowledge and skills in problem solving involving multimedia databases; and
4. conduct case study in multimedia applications.

Keyword syllabus:

1. **Multimedia System Primer**
   Introduction to different multimedia platforms, systems, tools and applications; characteristics of different media and current trend

2. **Data Representation, Coding and Compression:**
   Data representation, processing and analysis for Sound/Audio, Image and Graphics, Video and Animation; Coding requirements, Entropy and Hybrid Coding, Compression techniques and standards: JPEG, MPEG, DVI, ASF, etc.

3. **Multimedia Content Analysis and Information Retrieval**
   Multimedia contents: Color, shape, texture, motion, etc.
   Content analysis techniques: Color histogram, shape analysis, motion analysis, etc.
   Retrieval techniques: video segmentation, key frame selection, etc.

4. **Multimedia Indexing**
   Multidimensional data structures, K-d trees, R-trees, R^+ and R^* trees, Comparison of different data structures.

5. **Multimedia Information Networking**
   Video streaming, transmission characteristics, protocol support for multimedia networking, multicast techniques.

6. **Selected Topics in Multimedia Computing, Systems and Applications**
   e.g., New MPEG standards, Multimedia Information Hiding and Watermarking, VoiceXML.

Indicative reading list and references:

Books

Li, Ze-Nian and Drew Mark S., 2004, *Fundamentals of multimedia*, Pearson/Prentice Hall.

Lewis, Richard , 2005, *Digital media: An introduction,* Prentice Hall.

Borko Furht (ed), 1999, *Handbook of Multimedia Computing*. CRC Press.

Alberto Del Bimbo, 1999, *Visual Information Retrieval.* Morgan Kaufmann.

Raghavan S.V. and Tripathi S.K., 1998, Networked multimedia systems: Concepts, architecture, and design, Prentice Hall.

V.S. Subrahmanian, 1998, *Principles of Multimedia Database Systems*. Morgan Kaufmann.

B. Furht, S.W. Smoliar and H.J. Zhang, 1996, *Video and Image Processing in Multimedia Systems*. Kluwer Academic Pub.

Journals

IEEE Multimedia
IEEE Trans. on Multimedia
ACM SIG Multimedia
Multimedia Systems
Multimedia Tools & Applications