

# PROPOSAL TO REVISE A COURSE

(formerly known as subject)

## 1. COURSE DETAILS

### 1.1 Course ID

COMP9519

### 1.2 Course name - Long

Multimedia Systems

### 1.3 Course name - Abbreviated

Multimedia Systems

### 1.4 Course Authority

Zhenghua (Jack) Yu (Co-ordinator)  
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### ext/email

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### 1.5 Organisational Unit responsible for course

#### School/Department:

Computer Science and Engineering

#### AOU Code:

E250

### 1.6 Revision of Course Summary Checklist

X to change the course name or number:

CURRENT COURSE ID/NAME COMP9519 Multimedia Authoring and Cooperative Agents

NEW COURSE ID/NAME COMP9519 Multimedia Systems

X	to amend the Handbook description	X	to vary the pre-requisites or co-requisites
No	to vary the contact hours	No	to vary the unit of credit value
No	to offer the course by alternative means eg. distance education.	No	Other (specify)

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### 1.7 Justification of Proposal

It has been more than four years since COMP9519 (also known as Multimedia Systems) was introduced. The field of multimedia technology has developed rapidly in the past few years. Multimedia compression, streaming and presentation technologies have matured, whilst multimedia annotation, archiving and retrieval technologies have made important progress. We have seen wide-spread applications of multimedia technology, from entertainment, information, education, to tele-medicine, to name just a few. It is time to update the content in order to modernise the course. The revised course addresses the key principles, techniques and applications of multimedia systems. Students will benefit from understanding multimedia technology and developing in depth and practical skills. Meanwhile, although known as "Multimedia Systems" before, formally changing the name of the course is needed to reflect the major topics covered in this course.

### 1.8 Consultation Process

No other academic unit is relevant to this course. Student feedback suggests that a revised course on multimedia systems would be most welcome.

1.9	Units of credits	Session/s offered	Hours Per Week
	6	S1	4

**1.10 Pre-requisites:** COMP2011 or COMP2711 or COMP9024. Must have completed at least 12 UOC of level 3 or above courses.

**Co-requisites:** No.

**Exclusions:** No.

### 1.11 Current Entry in the Faculty Handbook, with Proposed Revision Clearly Indicated or Proposed Entry in the Faculty Handbook

Multimedia systems covers the key principles, techniques and applications of multimedia technology. Topics include: multimedia fundamentals; audio, image and video compression; multimedia streaming; multimedia presentation; multimedia content description; video structure analysis; video summarization and representation; multimedia database indexing, browsing, search and retrieval; multimedia systems and applications.

### 1.12 Is this course replacing an existing course?

**YES** COMP9519 Multimedia Authoring and Cooperative Agents

### 1.13 Undergraduate / Postgraduate

### 1.14 Elective

### 1.15 Program stage

Usually stage 4 in undergraduate and stage 2 in postgraduate.

### 1.16 Program/s in which course is be available

BE (CE 3645; SE 3648; BioInf 3647), BSc (CS 3978), plus combined degrees involving any of these, and the following postgraduate programs: MCompIT 868?; MIT 868?; GradDipCompIT 54?; MSc 2665; ME 2765; PhD 1650;

### 1.17 Proposed teaching methods and assessment practices

Examinable (formal) and assignments

### 1.18 Assessment grades to be used

Full range of grades (HD, DN, CR, PS, FL)

### 1.19 Mode of delivery

Internal X

### 1.20 Information Technology Requirements for students

Standard for Computer Science and Engineering

### 1.21 Textbooks

Set textbooks: none

Recommended References:

- \* M. Ghanbari, Video coding: an introduction to standard codecs, 1999.
- \* Barry G. Haskell, Digital video: an introduction to MPEG-2, 1997.
- \* Yun Q. Shi, Image and video compression for multimedia engineering, 2000.
- \* B. S. Manjunath, Philippe Salembier, Thomas Sikora (ed), Introduction to MPEG-7, Multimedia Content Description Interface, John Wiley & Sons, Ltd.
- \* D. Feng, W.C.Siu and H.J.Zhang, Multimedia Information Retrieval and Management, Springer, 2003.

International Standards:

- \* RTSP **Error! Hyperlink reference not valid.**
- \* SDP **Error! Hyperlink reference not valid.**
- \* RTP **Error! Hyperlink reference not valid.**
- \* RTP for MPEG-4 **Error! Hyperlink reference not valid.**
- \* XML **Error! Hyperlink reference not valid.**
- \* SMIL **Error! Hyperlink reference not valid.**

Proposed syllabus:

Week	Description
[1] Introduction	<ul style="list-style-type: none"> <li>▪ Introduction to multimedia computing and its challenges</li> <li>▪ Current major research directions and topics</li> <li>▪ The course scope &amp; arrangement</li> <li>▪ Basic concepts in multimedia signal processing</li> </ul>
[2] Introduction to audio, video and image coding techniques (I) -- Fundamentals	<ul style="list-style-type: none"> <li>▪ Audio, image &amp; video formats</li> <li>▪ The need for digital compression</li> <li>▪ Spatial redundancy in images</li> <li>▪ Lossless &amp; predictive coding (entropy coding)</li> <li>▪ Quantization &amp; transform coding</li> <li>▪ Still Image Coding Standard JPEG</li> </ul>
[3] Introduction to audio, video and image coding techniques (II) -- Coding Techniques	<ul style="list-style-type: none"> <li>▪ Subband coding</li> <li>▪ Introduction to audio coding</li> <li>▪ Temporal redundancy &amp; temporal predictive coding for video</li> <li>▪ Motion estimation &amp; compensation</li> <li>▪ Human visual system characteristics</li> </ul>
[4] Video compression standards (part 1)	<ul style="list-style-type: none"> <li>▪ Digital video coding standards MPEG 1/2 video               <ol style="list-style-type: none"> <li>i. MPEG-1/2 introduction &amp; codec architecture</li> <li>ii. MPEG-2 profiles and levels</li> <li>iii. MPEG-2 scalable coding</li> <li>iv. MPEG-2 error resilience/error concealment</li> <li>v. MPEG-2 applications</li> </ol> </li> </ul>
[5] Video compression standards (part 2)	<ul style="list-style-type: none"> <li>▪ Introduction to MPEG-4 video standard: content based video coding</li> <li>▪ Introduction to ITU-T video standards H.261/H.263/H.264</li> <li>▪ Introduction to MPEG system: Video , Audio and Data Multiplexing</li> </ul>
[6] Internet Streaming Media	<ul style="list-style-type: none"> <li>▪ Internet streaming media architecture               <ul style="list-style-type: none"> <li>▪ Client / Server Architecture</li> <li>▪ Real Time Streaming Protocol – “internet VCR controls”</li> <li>▪ Issues of real-time delivery – delay, packet loss, error resilience, QoS</li> </ul> </li> <li>▪ Real-time data transport               <ul style="list-style-type: none"> <li>▪ Real-time Transport Protocol (RTP)</li> <li>▪ Control protocol / QoS Feedback (RTCP)</li> <li>▪ Inter-media synchronization</li> <li>▪ Example - RTP Payload format for MPEG-4</li> </ul> </li> </ul>

[7] Multimedia Presentation	<ul style="list-style-type: none"> <li>▪ File Formats <ul style="list-style-type: none"> <li>▪ Multimedia File Formats – requirements and features</li> <li>▪ Examples MP3, MP4</li> </ul> </li> <li>▪ Introduction to XML</li> <li>▪ Synchronized presentation <ul style="list-style-type: none"> <li>▪ Moving from static to dynamic presentation - Introduction to SMIL</li> <li>▪ Timing, Sequencing, Lay Out of multimedia objects</li> <li>▪ User interaction</li> </ul> </li> </ul>
[8] Multimedia Content Description (part 1)	<ul style="list-style-type: none"> <li>▪ Need for meta data to describe content</li> <li>▪ Goals of MPEG-7 - Multimedia Content Description Interface</li> <li>▪ MPEG-7 description schemes for Content Management <ul style="list-style-type: none"> <li>▪ information on creation and production of media content;</li> <li>▪ description of compression, profile, storage format of content</li> </ul> </li> </ul>
[9] Multimedia Content Description (part 2)	<ul style="list-style-type: none"> <li>▪ MPEG-7 description schemes for Content Description <ul style="list-style-type: none"> <li>▪ Images: descriptors and feature extraction for colour, shape, texture</li> <li>▪ Video : descriptors and feature extraction for motion</li> </ul> </li> <li>▪ Content Search examples based on Image/Video features</li> </ul>
[10] Fundamentals of content based image and video retrieval	<ul style="list-style-type: none"> <li>▪ content based retrieval system introduction</li> <li>▪ query specification</li> <li>▪ brief review of descriptors (linkage to annotation)</li> <li>▪ similarity measures (distances)</li> <li>▪ brief introduction of retrieval concept</li> <li>▪ performance evaluation (precision and recall)</li> </ul>
[11] Video structure analysis	<ul style="list-style-type: none"> <li>▪ shot boundary detection</li> <li>▪ key frame extraction</li> <li>▪ shot similarity</li> <li>▪ shot clustering</li> <li>▪ scene grouping</li> <li>▪ story segmentation</li> </ul>
[12] Video representation and summarization	<ul style="list-style-type: none"> <li>▪ video content representation: sequence/scene/shot/key-frame based; key frame based; shot based (temporal slice; object; perceived motion)</li> <li>▪ video summarization</li> <li>▪ video highlighting</li> <li>▪ video skimming</li> </ul>
[13] Multimedia content retrieval	<ul style="list-style-type: none"> <li>▪ video indexing; dimension reduction (PCA; KLT); indexing schemes (tree)</li> <li>▪ browsing schemes (time-line, light-table; hierarchical; graph based story-board)</li> <li>▪ search and retrieval</li> <li>▪ relevance feedback</li> </ul>
[14] Multimedia systems and applications	<ul style="list-style-type: none"> <li>▪ wireless multimedia applications</li> <li>▪ digital library</li> <li>▪ broadcasting</li> </ul>

## 1.22 Industrial experience component

No.

## **2. RESOURCE STATEMENT**

### **2.1 Enrolments**

Estimated or proposed enrolments for the next three years.

2005: 40

2006: 50

2007: 60

### **2.2 Additional Resource Requirements Resulting from Revision**

#### **Staffing Requirements:**

Hours per week

Full-time Academic Staff: 5

Part-time Teaching Staff: 1 hour per 20 students

General Staff: Covered by standard support of the Computer Support Group

**Lectures will be given by NICTA conjoint staff.**

**Field Costs:** Nil

**Studio/Laboratory Requirements:** Nil

**Materials Requirements:** Nil

**Equipment Costs:** Nil

**Computing Requirements:** Use of existing facilities in the school

**Library Requirements:** Standard textbooks for reference, journal articles and conference proceedings

**Capital funds Requirements:** Nil

### **2.3 Servicing Implications:**

N/A

### **2.4 Teaching Arrangements:**

NO X

### **2.5 Alternative Delivery Arrangements:**

N/A

## 2.6 Multi-mode Delivery Guidelines

The following issues should be addressed in proposals for Multi-mode delivery:

- parity in admission requirements to ensure that the integrity of programs at UNSW was not compromised;
- administrative processes relating to enrolments and dealing with students overseas;
- content and standard of courses and assuring comparability with on-campus courses;
- by whom and how courses were to be delivered;
- assessment procedures; and
- availability of library resources.

**Note:** The business components of off-shore proposals are considered by the International Strategies Committee (ISC) chaired by Professor Wainwright, Deputy Vice-Chancellor (Research) whilst the Academic Board approves the academic aspects of proposals for offshore delivery of existing programs. The ISC considers (i) partnership arrangements; (ii) whether the impact on the faculty of staff going overseas has been considered; and (iii) whether appropriate steps have been taken to register the program in the country concerned.

**The Postgraduate Coursework Committee has wished to ensure that the following issues have been addressed in proposals for offshore delivery:** parity in admission requirements to ensure that the integrity of programs at UNSW is not compromised; administrative processes relating to enrolments and dealing with students overseas; content and standard of courses and assuring comparability with on-campus courses; by whom and how courses are to be delivered; assessment procedures and availability of library resources.

Proponents should contact the Office of the Deputy Vice-Chancellor (Research and International) regarding this committee.

## 2.7 Details of Tuition Fees:

Proposed fee: Standard fees for Faculty of Engineering

\$ for non-award enrolment (local)

\$ for non-award enrolment (international)

\$ for course which forms part of full fee-paying course (local)

\$ for course which forms part of full fee-paying course (international)

### **3. AUTHORISATION**

#### **3.1 University Librarian's Endorsement**

I have examined the Library needs related to the above proposal and certify that existing Library holdings, staffing, services and accommodation are adequate / inadequate (delete one) to cover the demands that are inherent in it.

Appropriate arrangements for the use of digitised material to support this course have been made by the Course Authority with the University Librarian.

Further Comments:

University Librarian  
/ /2004

#### **3.2 Head of School's Approval**

I have examined the resource implications of the above proposal in regard to staff, space, materials, equipment, capital funds, and computing, and certify that the School can cover the demands that are inherent in it.

Further Comments:

Head of School  
/ /2004

#### **3.3 Dean's Approval**

I have examined the resource implications of the above proposal in regard to staff, space, materials, equipment, capital funds, and computing, and certify that:

- 3.3.1 (i) the proposal involves no additional resources. (A statement from the Head of School explaining how this can be achieved must be provided); or
- (ii) the proposal involves additional resources and it is proposed to redeploy existing resources within the faculty. (A statement from the Head of School explaining how this will be achieved must be provided); or
- (iii) the proposal involves additional resources to be obtained as set out below; or

- (iv) the additional resources essential to bring the proposal into effect cannot be found within resources available to the faculty.

3.2.2 **Fees** (delete if not applicable):

- a fee will not be charged for this program (other than HECS)
- a fee will be charged for this program for local fee-paying students
- a fee will be charged for international students

If a fee is to be charged the Dean certifies as follows:

I have ensured that the Vice-Chancellor has been advised of the proposed fee arrangements, and note that approval of fee arrangements is needed before the new program can be implemented.

3.3.3 the proposal conforms to the University's commitment to Equal Opportunity in Education.

Statement from Head of School on Source of Additional Resources and/or Further Comments:

Dean

/ /2004

Please refer to the following link for  
[DISABILITY GUIDELINES FOR ACADEMIC STAFF PREPARING COURSES](#)