MODULE / COURSE-UNIT PROPOSAL FORM (revised Aug04)

Registry use only:

Module/course-unit code	Received	DC approval

N.B: In developing the module/course-unit, account should be taken of relevant QAA Benchmarking Statements and, where appropriate, the requirements of Professional and Statutory Bodies.

1. Title (*see footnote[1]*)	2. Value	3. Level	4. Duration
Image Based Information Processing	e.g. 0.5, 1.0, 2.0 cu 0.5	Please see footnote [2] M	Number of terms 1

5. School responsible for this module/course-unit	6. Programme(s) of which the module/course-unit forms part (insert * by the title for a new programme). Please indicate the total number of modules/ course-units for each programme and specify to which programmes it is a core and to which programmes it is an option and in which year(s) of the programme it is offered.
School of Computer Science and Information Systems	MSc in Advanced Information Systems (8 modules), option, both years Masters in Research in Computer Science (4 modules), option, both years

7. Date module/course-unit will commence	8. Maximum/minimum number of students per intake
2005/06 Academic Year	10 to 30

9. Pre-requisites and/or Restrictions

Restrictions may include modules/course-units only being available to students studying a particular programme or modules/course-units which cannot be taken in conjunction with this one.
Prerequisites: first courses in mathematical foundations, programming and algorithms (e.g. as taught in a typical undergraduate degree or general MSc in Computer Science or equivalent).

10. Teaching and Learning Methods

Indicate the total contact hours* the student will spend in:

Lectures: 27 hours

Seminars:

Tutorials:

Project Work:

Field Work:
(Please also state here: number of trips; group or independent; location and duration of; resources/equipment required)

Practical Classes: 6 hours
(labs, computers, languages)

Other (please specify):

Typically one module/course-unit should involve between 24 and 36 contact hours per term, depending on subject and on learning and teaching methods.

[1] ***Where a module/course-unit is being developed as part of a new programme, this form should be submitted with the Programme Proposal/Programme Specification Form.***

[2] This section should detail the level of the module/course-unit in accordance with the qualification levels which are described in the *Framework for Higher Education Qualifications*, which can be found at: http://www.qaa.ac.uk/crntwork/nqf/ewni2001/contents.htm. Modules/course-units on Masters degrees, Postgraduate Certificates and Postgraduate Diplomas should be designated as level M (Masters). Modules/course-units on Foundation degrees should be identified as either level C (Certificate) or level I (Intermediate) and those on Bachelors degrees with Honours should be designated as level I (Intermediate) for introductory modules/course-units (usually years 1 and 2) and level H (Honours) for work in the final two years of the programme.

11. Main aims, special features and rationale

Main Aims

The main aims in this course are to cover a wide range of methods in computer vision and to give practical experience in implementing computer vision algorithms in laboratory classes and through project work. The computer vision methods include image smoothing, linear filtering, the extraction of image structures such as points and lines, matching between images, colour images, image compression, geometry of image formation and stereo.

Special Features

Computer vision is an exciting combination of information processing, geometry, statistics and cognitive science. It has undergone rapid development since the 1970s, in step with the astonishing increases in the sizes of computer memories and in processor speeds.

Rationale for introducing the module/course-unit in the context of existing provision including statement of how this proposal meets student needs.

[a. If the proposal supersedes an existing module/course-unit please give the title and code of the superseded module(s)/course unit(s) and the reason for replacement.]

[b. If the proposal relates to an existing module/course-unit please give the title and code of the related module(s)/course unit(s) together with an explanation of how this relationship will work.]

Computer vision is an example of advanced information processing strongly relevant to a number of advanced information systems in present day use, for example the Central London Congestion Charging Scheme. Computer vision is also a very active research area.

12. Learning Outcomes

Please note: The learning outcomes should relate to the overall aims of the programme(s) to which the module/course-unit forms part.

Students who have taken the module/course-unit should be able to demonstrate the following knowledge, skills and understanding:

Subject Specific

Understand and use a range of methods in computer vision, especially with regard to image processing.

Practical

Be able to implement algorithms for image processing.

Intellectual

Understand the aims, achievements and limitations of a range of computer vision. Understand the scientific background and rationale for the methods.

Personal and Social

Be aware of the applications of computer vision, including visual surveillance, personal identification and vehicle identification for example as in the London Congestion Charge.

13. Syllabus

Please itemise the main topics of study.

1. Basic concepts for digital images, e.g. pixel, grey level, histogram, frame.
2. Digital geometry.
3. Linear filtering, including smoothing, sharpening and edge detection.
4. Detection of image structures such as points and lines.
5. Image matching
6. Image processing in MatLab
7. Texture analysis, classification and synthesis.
8. Image coding and compression
9. JPEG, GIF.
10. Video coding and compression, MPEG 1, MPEG 2, MPEG 4, H.26.
11. Multimedia content description interface, MPEG 7.
12. Colour images and colour spaces, e.g. RGB, HSV, LUV, YUV(PAL), YIQ(NTSC).
13. Geometry of image formation
14. Stereo vision
15. Biometrics, e.g. face, fingerprint, iris and gait recognition.

Background reading

1. D.A. Forsyth and J. Ponce. Computer Vision: a modern approach. Prentice Hall 2003.

2. RC Gonzalez and RE Woods. Digital Image Processing. Second Edition, Prentice Hall 2002.

14. Scheme of Assessment

Assessment methods which enable the student to demonstrate the learning outcomes for the module.

Elements of assessment include: Coursework (essay, report, classroom exercises), Dissertation, Project, Written Paper (seen, unseen, take away, multiple choice, other), Presentation, Practical, Orals, Fieldwork.

Element of assessment	Weighting	Characteristics (eg, word count, duration, date)
Coursework, comprising programming project and report	20%	The programming project is expected to require18 hours laboratory work. The report is to be about 4000 words.
Written examination	80%	
Total:	**100%**	

Rationale:

The practical work will broaden and deepen the students' understanding of what can be achieved in computer vision. The project and the report provide opportunities for studying more deeply those aspects of computer vision that especially interest the students.

Pass requirements (i.e. all elements have to be passed, some elements must be passed as well as a pass overall, or just a pass overall must be obtained?)

Pass overall.

Will there be any special arrangements for re-assessment?

No.

15. Teaching Staff

Name	FT or PT	School

Module/Course-Unit Coordinator	Professor S.J. Maybank	FT	CS and IS
Birkbeck teaching staff	Professor S.J. Maybank	FT	CS and IS
	Dr X. Li	FT	CS and IS

Sessional teaching staff None
(Please supply an up to date c.v.
of all sessional teaching staff)

Include details of any technical staff required None

16. Additional Resources Required*

Please identify any additional resources required. Please note that the teaching and learning must be sufficiently flexible to enable all reasonable adjustments to be made in accordance with the Disability Discrimination Act (DDA).

*** If new module/course-unit can be managed with existing resources, write 'NIL' against the appropriate headings.**

Accommodation NIL

Library (Please attach a list of the core texts and a short indicative reading list as a guide (max. half a page)

Have you discussed library provision for the module/course-unit with your subject librarian? **No**

1. D.A. Forsyth and J. Ponce. Computer Vision: a modern approach. Prentice Hall 2003.
2. RC Gonzalez and RE Woods. Digital Image Processing. Second Edition, Prentice Hall 2002.

Computing
Have you discussed any requirements for the use of specific software packages with CCS technical support staff?

CCS No

School Yes

Please state requirements for any other resources. None

17. Agreement

	Name	Signature	Date
Author of this proposal	Prof. SJ Maybank		
Module/Course-Unit Coordinator	Prof. SJ Maybank		
Head of School	Prof A Poulovassilis		
Dean of Faculty	Dr RG Johnson		
Librarian			
Comments			
CCS Manager			

CLOSING DATE: **1 MARCH** PRECEDING THE SESSION IN WHICH TEACHING WOULD BEGIN. YOU MUST ALSO OBTAIN **ALL** OF THE ABOVE SIGNATURES BEFORE YOU SUBMIT THE FORM.

Please return the form to the Assistant Registrar (Registration and Regulations).