PROGRAMME SPECIFICATION

Programme title:	MSc Computer Graphics, Vision and Imaging (previously Vision, Imaging and Virtual Environments)
Final award (BSc, MA etc): (where stopping off points exist they should be detailed here and defined later in the document)	MSc
UCAS code: (where applicable)	N/A
Intake cohort(s) to which this programme specification is applicable: (e.g. from 2001 intake onwards)	2009 onwards
Awarding institution/body:	University College London
Teaching institution:	University College London
Faculty:	Engineering Sciences
Parent Department: (the department responsible for the administration of the programme)	Computer Science
Departmental Web page address: (if applicable)	http://www.cs.ucl.ac.uk/teaching/cgvi/
Method of study: Full-time/Part-time/Other	Full-time
Criteria for admission to the programme:	Please see http://www.cs.ucl.ac.uk/teaching/cgvi/admissions.html
Length of the programme: (please note any periods spent away from UCL, such as study abroad or placements in industry)	One calendar year
Level on Framework for Higher Education Qualifications (FHEQ) (see Guidance notes)	M
Relevant subject benchmark statement (SBS) (see Guidance notes)	Not applicable. There is currently no Master's level benchmark statement for this subject area.
Brief outline of the structure of the programme / its assessment: (see guidance notes)	Please see http://www.cs.ucl.ac.uk/teaching/cgvi/programme_cgvi.html
Board of Examiners:	Board of Examiners for the MSc Computer Graphics, Vision and Imaging.
Professional body accreditation (if applicable):	IET Date of next scheduled accreditation visit: 2010/11

EDUCATIONAL AIMS OF THE PROGRAMME:

The aim of this MSc programme is to produce students trained in vision, image processing, and virtual environments, who:

- Understand the basic mathematical principles underlying the development and application of new research techniques in this area.
- Are aware of the range and scope of algorithms and techniques available, are able to design, develop and evaluate appropriate algorithms and methods for new problems and applications, and can appreciate their advantages and limitations.
- Are aware of the variety of software libraries and development tools available, both commercially and from other research institutions, know how to select those most suitable for new applications or for tackling new research problems, and can interface them to existing systems and produce new integrated environments.
- Are acquainted with industrial and emerging internationally recognised standards and are aware of research on the development of new standards and development environments.
- Are familiar with up to date computer technology and specialised hardware and know how to use them effectively.
- Can appreciate which areas are ripe for technical development and for industrial and commercial exploitation and can distinguish such opportunities from promising avenues for fruitful academic research.
- Are aware of the benefits and increasing opportunities for the application of these techniques in a wide variety of industrial, commercial, medical and scientific applications, and have a well developed sense of what is timely and likely to succeed in commercial, technical or scientific terms.

The Programme thus provides both rigorous theoretical development and practical skills. The intention is to produce postgraduates who have not only been trained in these techniques but, given the highly practical and experimental nature of this type of work, have had the opportunity to develop their own skills by tackling research problems related to industrial needs or are at the leading edge of academic research. The MSc provides the background knowledge and an up to date training in the skills and techniques required by postgraduate students undertaking research and/or development in computer vision, image processing, graphics and simulation.

PROGRAMME OUTCOMES:

The programme provides opportunities for students to develop and demonstrate knowledge and understanding, qualities, skills and other attributes in the following areas:

A: Knowledge and understanding

Knowledge and understanding of: 1. Fundamental principles in data acquisition and sampling and its implication in information content of images. 2. Fundamental mathematical methods and their practical implementations 3. Principles of human vision systems and the implication for computer vision. 4. Principles of graphical modelling and visualization 5. Concepts of inverse problems and the nature of ill-posedness 6. Practical skills in Matlab as a rapid algorithm development framework. 7. Increased expertise in programming in an object-oriented language.	→	**Teaching/learning methods and strategies:** Knowledge and understanding is imparted via traditional lectures, via small-group tutorials, and via personal tutors for the summer project. Throughout, students are encouraged to undertake independent reading both to supplement and consolidate what is being taught/learnt and to broaden their individual understanding and knowledge of the subject. Students are given direction for their independent reading, and lectures are often supported by laboratory work with help from demonstrators. Substantial use is made of the internet for the staging of core and supplementary course material; the Web is also used to support some coursework submission. Email is used extensively as a forum for students and course-specific emailing lists are used as a communication channel for individual course material.
	→	**Assessment:** Knowledge and understanding in all areas is assessed through a variety of courseworks, unseen examination papers and a substantial (3 month) individual project (see below).
B: Skills and other attributes		
Intellectual (thinking) skills: 1. Reason at mathematical, algorithmic, physical, and psychophysical levels simultaneously. 2. Develop precision of thought and scientific integrity 3. identify problems and apply rigorous scientific concepts to solve them 4. reason critically 5. analyse and interpret 6. demonstrate and exercise independence of mind and thought	→	**Teaching/learning methods and strategies:** Intellectual skills are developed through the teaching and learning programme outlined above and elsewhere in this document. Each course, whatever the format of teaching, involves discussion of key issues, practice in applying concepts, and feedback on submitted coursework. The individual project involves weekly supervision with an individual tutor.

	→	**Assessment:** All intellectual skills (1-6) are assessed through a variety of courseworks, unseen examination papers and a substantial (3 month) individual project. The individual project requires each students to analyse requirements and goals (skills 1 and 5), to design a solution that meets the requirements and achieves the goals (skill 2), to implement that solution (normally in the form of a computer program, which assesses skills 2 and 3) and to write a substantial dissertation (typically 60 to 80 pages plus extensive appendices) that includes an appraisal of different techniques (this dissertation assesses skills 2, 4, 5 and 6).
C: Skills and other attributes		
Practical skills (able to): Given the nature of the subject and our expected outcomes, we consider practical ability in the field to be essential. Consequently, we address this on several fronts – we require students to be able to: 1. Locate and analyse appropriate literature 2. Plan and undertake practical exercises 3. Present the results of practical work in written form 4. Construct both individual programs and systems of significant size 5. Critically evaluate their solutions	→	**Teaching/learning methods and strategies:** Practical skills are taught throughout the year, starting in induction week, and proceeding through courses that are assessed either wholly or partially on the basis of practical coursework, to the final group-based project. Students receive initial guidance on research techniques, and early formative assessment of their practical abilities, on which individually tailored remedial work is planned in order to bring students up to the required standard. The final project is one in which a practical problem, drawn either from the industrial/commercial or the research domain, is undertaken. Students meet regularly with academic supervisors and are asked to adhere to their plan, produce agreed deliverables, and present and defend their work on a weekly basis.

	→	**Assessment:** Assesment of practical skills takes place through a mixture of routes: For most courses where there is a practical element, it is assessed through coursework. Much of this coursework involves programming and/or data analysis. The project management part of the course is assessed by group presentations during the summer, the presentations being based on an application of the techniques learned to the summer project in which the students are engaged. Finally, the project is assessed by written report and by presentation involving an assessment panel of course tutors and an external examiner.
D: Skills and other attributes		
Transferable skills (able to): 1. Manage time effectively 2. Structure and communicate ideas, practical solutions, and test data in a coherent accessible way 3. Analyse data 4. Research and analyse ideas and solutions 5. Develop and deliver coherent presentations	→	**Teaching/learning methods and strategies:** The programme is (intentionally) rather pressured. Consequently, after an initial briefing on time management, and with the aid of pre-published deadlines, students are expected to organize themselves in such a way that they can complete the given work within the time available. We continuously monitor student performance, and provide support as required. Data analysis is not commonly viewed as a transferable skill. However, we assert that this is indeed the case and data analysis is a fundamental part of our programme. All courses require regular coursework, and feedback is given on this in order to develop understanding of the core material, argumentation and research skills, where appropriate, and logical and clear presentation.

	→	**Assessment:** Time management is not assessed directly; however, it is an implicit part of coursework, and explicitly a part of project work. A requirement to communicate ideas and describe the structure and efficacy of practical solutions are spread throughout the course in all forms of assessment. Data analysis is assessed through coursework and, where appropriate, through project work.

The following reference points were used in designing the programme:

- the Framework for Higher Education Qualifications (http://www.qaahe.org.uk/academicinfrastructure/FHEQ/EWNI/default.asp);
- the programme specifications for UCL degree programmes in relevant subjects (where applicable);
- UCL teaching and learning policies;
- staff research.

Please note: This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. More detailed information on the learning outcomes, content and teaching, learning and assessment methods of each course unit/module can be found in the departmental web pages. The accuracy of the information contained in this document is reviewed annually by UCL and may be checked by the Quality Assurance Agency.

Programme Organiser(s) Name(s):	Dr S Prince
Date of Production:	2002
Date of Review:	September 2009
Date approved by Head of Department:	TBA
Date approved by Chair of Departmental Teaching Committee:	TBA
Date approved by Faculty Teaching Committee	TBA