

LOUGHBOROUGH UNIVERSITY

Programme Specification

Digital Imaging, Computer Graphics and Vision

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 full advantage is taken of the learning opportunities that are provided. More detailed information on the learning outcomes, content and teaching, learning and assessment methods of each module can be found in Module Specifications and other programme documentation and online at <http://www.lboro.ac.uk/> The accuracy of the information in this document is reviewed by the University and may be checked by the Quality Assurance Agency for Higher Education.

Awarding body/Institution	Loughborough University
Department	Computer Science
Teaching Institution (if different)	
Details of accreditation by a professional/statutory body	None, but will be put to the BCS for retrospective accreditation once the required first cohort has graduated
Name of final award	MSc, PGCert, PGDip
Programme title	Digital Imaging, Computer Graphics and Vision
UCAS code	N/A
Date at which the programme specification was written or revised	December 2008

1 Aims of the Programme

Students admitted to this degree programme will possess a first degree, which will normally include a substantial element of Computing. The degree is designed to advance students' understanding of the following specialist areas:

- Digital Imaging
- Computer Graphics
- Computer Vision.

It enables students graduating at Masters level to:

- immediately make a significant contribution to a business or organisation making use of digital imaging, computer graphics and computer vision or
- move on immediately, if they wish, into postgraduate research.

2. Relevant subject benchmark statements and other external and internal reference points used to inform programme outcomes:

- QAA Computing Benchmark
- The National Framework for Higher Education Qualifications
- Loughborough University's Learning and Teaching Strategy
- Departmental Assessment Policy and Assessment Strategy
- Annual and Periodic Programme Review
- External Examiners' reports
- Staff/student committees
- BCS accreditation documents
- The particular specialisms of the staff of the Department of Computer Science.

3 Intended Learning Outcomes

This programme is a specialist MSc programme, which takes its students almost exclusively from Computer Science first degrees. The stipulation of the main intake requirement ensures that all entrants to the programme will have at least attained the threshold level stated in the benchmark relevant to Computer Science first degrees, namely the Computing benchmark.

Knowledge and understanding

Students will gain knowledge and understanding in the following areas:

- principles of digital imaging
- advanced principles of computer graphics
- principles of computer vision
- theory and programming methods for the construction of multimedia systems
- theory and methods of computer vision systems
- theory and methods of visualisation
- issues of human-computer interaction considering, especially, the ethical, legal and professional matters of concern

Teaching, learning and assessment methods used to enable outcomes to be achieved and demonstrated

Most modules are delivered over a two or three week period, within which all lectures and tutorials are given and any continuous assessment is undertaken. Lecturing styles vary from one module to another or, indeed, from one lecture to another. Some lectures are well served by classic *chalk and talk* model, whilst others make use of complete presentations using data projection facilities. In some cases, tutorial groups are smaller than the lecture classes particularly when the aim is to discuss *problem sheets* related to recently presented material. Staffed practical sessions in the department's own laboratories are sometimes timetabled but it is more common to expect the students to organise their own visits to the laboratories, especially after completion of the taught element of the module. Some modules require students to work in groups on well-

structured assignments which may involve interviewing the "customer". Each group of students is given the opportunity to submit evidence of the relative work per group member.

Students are expected to attend all contact hours for their modules. For the duration of the module's delivery, they have almost full-time access to the teaching staff. Outside of these times, they have access by email, which they can also use to arrange personal visits. Teaching materials on the departmental Intranet supports students' personal study. Rooms have been provided in which they can arrange meetings and discussion forums and email provides electronic communication within the groups. Quantitative and qualitative feedback relating to assessment is made available to students as soon as possible.

Computing-related cognitive skills

Students will gain the ability to:

- model, design and build digital imaging, computer graphics and computer vision systems as a route to understanding their operational characteristics
- analyse the requirements for digital imaging, computer graphics and computer vision systems with a view to specifying solution strategies
- critically evaluate and test digital imaging, computer graphics and computer vision systems
- deploy appropriate methods and tools for the design, implementation and evaluation of digital imaging, computer graphics and computer vision systems
- reflect and communicate reasoned arguments to a range of audiences.

Teaching, learning and assessment methods used to enable outcomes to be achieved and demonstrated

Having completed the taught part of the programme in two semesters, students go on to undertake a project during the summer. The project, worth one-third of the student's assessment, requires students to understand and contribute to the building of complex computer solutions to realistic problems. Indeed, some of the projects are drawn from industrial and business contacts that the department has established. Successful completion of the project will require research and development, which students will undertake with guidance mainly from their project supervisor but also from the project co-ordinator in the form of information posted on the Intranet. In most cases the project will build on a foundation of knowledge obtained from other modules taken. In modules with a coursework content, students are expected to investigate and learn possible solutions to problems with help being available from laboratory supervisors as required. In other modules the students are required to solve a variety of problems building on the knowledge acquired during the module and supporting modules. In many cases, students have the opportunity to increase their marks by displaying additional information they have researched.

Computing-related practical skills

Students will gain the ability to:

- specify, design and implement digital imaging, computer graphics and computer vision systems
- evaluate such systems in terms of their quality and possible trade-offs
- recognise risks or safety aspects involved in the operation of digital imaging, computer graphics and computer vision systems
- effectively deploy tools for the implementation and documentation of digital imaging, computer graphics and computer vision systems
- work as part of a development team and to recognise the different roles of its members
- operate computing equipment efficiently, taking into account its logical and physical properties

Teaching, learning and assessment methods used to enable outcomes to be achieved and demonstrated

These issues concern the application of a broad gamut of computer science theory and practice to the digital imaging, computer graphics and computer vision environment. The student brings much of what is required here from first degree studies, but some areas, specific to the digital imaging, computer graphics and computer vision environment, are discussed in this programme. The main area to benefit from this is the human-computer interaction field and its impact on usability. The project allows students to consolidate their knowledge by practical application and allows them to research and develop new knowledge and skills. In the light of the above, considerations of structure, reliability and usability are formally taken into account when assessing these projects.

Additional transferable skills

Students will gain the ability to:

- effectively employ research and information-retrieval skills
- employ numeracy in understanding cases involving a quantitative dimension
- make effective use of general IT facilities
- manage one's own learning and development, including time management and organisational skills
- work effectively on their own or as part of a team
- communicate effectively with team members, managers and customers
- plan and manage a project to complete within budget and schedule
- present their work in the form of reports, oral presentations or an internet web site

Teaching, learning and assessment methods used to enable outcomes to be achieved and demonstrated

Assessment of individual modules is at the discretion of the module organiser and is published in the relevant module specifications. Modules may be assessed by coursework or formal examination or some combination of the two. For this purpose, *in-class tests* are considered as coursework. Where coursework is undertaken in groups,

students are usually given the opportunity to give details of individual performance within the group and to express an opinion of how marks should be distributed amongst the group members. Lecturers may use this to allocate different marks to group members if appropriate.

The knowledge and investigative skills are covered above. Students are required to undertake a substantial project on their own upon completion of the taught part of the programme. Other modules require work to be undertaken as individuals or as part of a team. During the Research Methods module, emphasis is placed on both research and communication, with students being given guidance on how to be more effective in both respects. Some modules impart formal knowledge of the subject and then move on to allow students to experience major packages, offering a mix of both formal education and up-to-the-minute training.

4 Programme structure, modules, credits and award

Students may study this programme on a full-time or part-time basis. When studied full-time, students must follow the programme as described in the programme regulations. Every student studies the four modules (with a weight of 60 credits) in the first semester and is assessed in those modules before the end of the semester. Students then proceed to study the four modules (with a weight of a further 60 credits) prescribed for semester 2. Following completion of semester 2 and occupying the time up to the end of the academic session, students will undertake a dissertation project.

Students wishing to study the programme on a part-time basis must complete the programme within eight years. Given the frequency of changes in the computing industry, it is recommended that students aim to complete the taught part of the programme within a maximum of three years.

Full details can be found in the Programme Regulations.

5 Criteria for admission

Candidates wishing to enter this programme should normally possess a minimum of a second-class honours degree in Computer Science or some other computer-related discipline. Certain concessions can be made to applicants outside this catchment who can demonstrate extensive relevant experience in the field of Computing, following degree-level studies in another discipline.

6 Assessment Regulations

Students who have, over a period of not more than eight years, studied modules with a total rating of 180 credits and accumulated 150 credits by achieving 50% or better and attained 40%, or better, in other modules with a total weight of 30 are eligible for consideration for the award of MSc. Those who have, over a period of not more than five years, studied modules with a total rating of not less than 120 credits and accumulated 105 credits by achieving 50% or better and attained 40%, or better, in other modules with a total weight of 15 credits are eligible for consideration for the award of Postgraduate Diploma (PGDip). Candidates who have, over a period of not more than three years, studied modules with a total rating of not less than 60 credits and accumulated 60 credits by achieving 50% or better are eligible for consideration for the award of Postgraduate Certificate (PGCert).

Students who fail the assessment at their first attempt are allowed the opportunity for reassessment. This may take place at the Special Assessment Period (if available) or when the module is offered in the following year.

7. What makes the programme distinctive

The mix of topics chosen for this programme gives it a distinctive flavour. In particular, the union of Computer Graphics, Visualisation and Image Processing produces what we believe to be a unique combination of topics.

The quality of the Programme is endorsed by the external examiners who are consulted at each stage of the examination process who view and comment on papers, coursework and undertake viva voce examinations during their summer visit.

All new members of Staff in the Computer Science Department participate in the University Probation system, which has been accredited by the Higher Education Academy (HEA, formerly ILT).

In the last 4 years that the National Student Survey has run, the Department of Computer Science has consistently been at or near the top of the tables.

Three labs of around 50 computers each, provide support for student work. We are one of the first universities to adopt a triple-booting Windows/Linux/MacOSx environment providing experience of all major platforms. The department maintains two student study rooms and is located very close to other amenities on campus. An Intranet provides access to all learning resources for our students, together with other information. Lectures and other sessions are presented in University supported pool rooms, all equipped to high standards, many with data projection facilities. All students are supported by a comprehensive support structure including Personal Tutors, Year Tutors, Programme Tutors and a Senior Tutor.

8. Particular support for learning

8.1 Departmental Support

The department has an integrated structure for the management, appraisal and planning of teaching and learning. This is comprised of the Teaching Coordinator (who manages the Learning and Teaching Committee and has overall responsibility for teaching matters); the Senior Tutor who is responsible for student welfare and arranges social events for the students to take part in; Programme Directors who have responsibility for the academic content and the general organisation of the course, and the academic welfare of the students); Year Tutors who monitor students performance and attendance; and Personal Tutors who are responsible for matters relating to academic welfare.

On the first day of their academic studies, students receive information from the department directing them towards the departmental Intranet site which contains important information including the management structure of the department, programme and module specifications and general points relating to coursework and examination. The students are also assigned a personal tutor who is responsible for their personal welfare who arranges to see them during the first semester. Thereafter the personal tutor arranges to see their tutees at important times, such as after examinations, at the start of a new year or when problems have been raised in respect to the tutees by Year Coordinator, Programme Director or Teaching Coordinator.

The department runs its own computer labs specifically for the use of students on its own programmes. All material related to programme learning and administration is available on the departmental intranet. In addition, the department provides several study areas for student use during the semester.

8.2 University Support

For further information please see:

- <http://www.lboro.ac.uk/admin/ar/templates/notes/lps/>

9. Methods for evaluating and improving the quality and standards of learning

For information please see:

- <http://www.lboro.ac.uk/admin/ar/templates/notes/lps/>