



*Faculty of Computing, Engineering and Technology*

# Computing Degree Scheme

## *Level H Award Structures and Module Handbook*

*CertHE, DipHE, BSc, BSc (Hons), BEng, BEng (Hons), MEng Computing Science*  
*CertHE, DipHE, BSc, BSc (Hons), BEng, BEng (Hons), MEng Computer Science*  
*CertHE, DipHE, BSc, BSc (Hons), BEng, BEng (Hons), MEng Software Engineering*  
*CertHE, DipHE, BSc, BSc (Hons), BEng, BEng (Hons), MEng Information Systems*  
*CertHE, DipHE, BSc, BSc (Hons), BEng, BEng (Hons), MEng Computer Graphics, Imaging and Visualisation*  
*CertHE, DipHE, BSc, BSc (Hons), BEng, BEng (Hons), MEng Computer Systems*  
*CertHE, DipHE, BSc, BSc (Hons), BEng, BEng (Hons), MEng Computing with Applicable Mathematics*  
*CertHE, DipHE, BSc, BSc (Hons), BEng, BEng (Hons), MEng Intelligent Systems*  
*CertHE, DipHE, BSc, BSc (Hons), BEng, BEng (Hons), MEng Internet Technology*  
*CertHE, DipHE, BSc, BSc (Hons), BEng, BEng (Hons), MEng Multimedia Computing*  
*CertHE, DipHE, BSc, BSc (Hons), BEng, BEng (Hons), MEng Mobile Computing*  
*CertHE, DipHE, BSc, BSc (Hons), BEng, BEng (Hons), MEng Network Computing*  
*CertHE, DipHE, BSc, BSc (Hons), BEng, BEng (Hons), MEng Forensic Computing*  
*CertHE, DipHE, BSc, BSc (Hons), BEng, BEng (Hons), MEng Computer Games Programming*

## 1.0 GENERAL INFORMATION

### 1.1 Contact Details

Theme Leaders to be announced

### 1.2 Enrolling for Level H

The University is currently introducing Electronic Registration, the details of this have not yet been finalised. We will be in contact nearer the time regarding what you need to do to enrol onto level 3 of your studies.

### 1.3 Start of Teaching

Teaching starts on Monday 24<sup>th</sup> September 2007.

### 1.4 Staying in touch

Please check your student email regularly over the summer period and when you return. If there are any changes to enrolment arrangements you will be notified by email. Please make sure that your email account is not over-quota by deleting unwanted emails.

If you change any of your personal details during the course of the year, you must inform the Faculty Reception so that your records are kept up to date.

### 1.5 Level H

At level H all awards, except the ordinary degree, have a 45 Credit major project, which for best fit with the Undergraduate Modular Framework Regulations is organised into three 15 Credit modules. Students registered on a focused award title are required to complete a project within the academic area of that award title. No Honours student can achieve an Honours award without passing the project modules.

Except Computing Science, all the other awards carry forward their focus into level H through the specification of award cores or award option groups. The ordinary degree only requires 60 level H credits, and those 60 credits will not normally include the Honours project.

## HOW TO ENROL ON YOUR LEVEL H MODULES

Download and print a Level H Module Enrolment Form from the Faculty web site ([http://www.fcet.staffs.ac.uk/current\\_students/level3\\_modenrol.htm](http://www.fcet.staffs.ac.uk/current_students/level3_modenrol.htm)) ensuring that you select the correct form. If you experience any problems with this, please contact the Computing Degree Scheme Administrator, Julie Perkins by telephone on 01785 353432.

Please note that there is a different module enrolment form for each award so make sure that you are completing the correct form. If you plan to change award for your final year you will need to complete the appropriate module enrolment form for the award you wish to change to and then request a change of award form from the administrator.

While choosing your modules please make frequent reference to the module at the back of this booklet..

### Action required by you:

After consideration of the enclosed information, you must complete a module enrolment form and return it by

Friday 20<sup>th</sup> April 2007

to Julie Perkins, Award Support Office, Faculty of Computing, Engineering and Technology, Staffordshire University, The Octagon, Beaconside, Stafford, ST16 9DG.

It is very important that we receive this information by the due date, as we need to know how many students wish to pursue the various modules in order to be able to make proper timetabling and resourcing decisions.

If some modules attract insufficient interest by the due date, we will cancel them. Thus, it is in your best interests to let us know which modules you want to study this coming year. A sudden surge in interest for some modules at the start of the year will not mean that we will run a cancelled module. It will, then, be too late because the resources needed to run that module will have been committed elsewhere.

Completing the module enrolment form now will also mean that you have less paperwork to complete when you register in September. You will not be registered for the final year modules unless you have completed a valid module registration form.

However, it is important for you to note that the module choices that you make now are not irrevocable. You will have an opportunity to change your mind and select different modules during the first 2 weeks of Semester 1.

### PLEASE NOTE:

- 1) All non-core modules run only if there are a sufficient number of students enrolled on them.
- 2) The information sent in this pack is as correct as possible at the time of printing. Circumstances beyond our control might necessitate a change of modules offered. We will notify you of any such changes when you enrol.
- 3) Modules in the University Information Technology Programme are **NOT AVAILABLE** to students on the Computing Degree Scheme, because they are not sufficiently challenging to specialist computing students.

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- 4) It is your responsibility to ensure that you satisfy the entry requirements for a module before choosing it. So, please check the pre-requisites and special admissions requirements on the module specifications which are available at the back of this booklet and on the web.

## GENERAL OPTION MODULES

The University General Option Program includes a number of Information Technology modules. Computing Degree Scheme students CANNOT choose modules from the University Information Technology Program but can choose any other General Option module.

To see the list of available modules, go to

<http://www.staffs.ac.uk/modules/options/>

## FINAL YEAR PROJECT

During your studies, you will be introduced to several new skills, many of which are designed to help you with your final year project. You will also find that your work experience is invaluable. Your project will be one of the most important assessments of your degree. To start with, it is yours, often conceived by you, certainly developed and progressed by you. It is nothing to fear as it will become something you will be very proud of and eager to demonstrate and present to prospective employers. Full details of the requirements and assessment of the project are contained in a separate handbook. The project is Award specific, in other words you will have to do a Computer Science type project if you are studying Computer Science - each award has a somewhat different emphasis, which must be included in your project.

The final year project is seen as a very significant component of your final year studies. As such the Award Board tends to treat the project modules differently from other modules at level H. There are programme specific regulations governing the project. In particular, these programme specific regulations mean that Award Boards will limit the maximum degree classification that you can achieve on a resit if you were to fail some of your project modules and will apply compensation to project modules less generously than it might do elsewhere. You should read the regulations that relate to the project and you need to bear this in mind when allocating your effort between your final year modules.

All information regarding the Final Year Project can be found on the intranet site <http://fyp.soc.staffs.ac.uk/>

The project manager will implement project development policy and will co-ordinate the selection and supervision of Level 3 projects within your chosen Award.

You are able to choose your project and wherever possible an appropriate supervisor, with whom you will arrange regular (normally weekly) progress meetings. Projects are second assessed by another academic to ensure consistency. The project manager will provide advice and guidance should problems arise that cannot be solved between yourself and your project supervisor or second assessor.

## COURSEWORK SUBMISSION

Assessment takes many forms, e.g. a piece of coursework, an essay, a multi-choice test, an examination, a presentation, a demonstration etc. To discover what type of assessment is planned for a particular module, you will find the detail in the module description. It will also tell you the weighting of coursework and examination. Assessments are timetabled and the hand-in date is not normally negotiable. Strict hand-in procedures exist for any coursework which has to be submitted to a lecturer.

Late submission is not allowed. If you hand-in a piece of coursework late, it will automatically be given 0. Should you feel that you have a valid reason for not being able to hand your work in on time, you should inform your module and level tutors, complete and submit an extenuating circumstances form available from the General Office and submit your assignment if appropriate, as soon as possible.

You will need to fill in a standard assessment hand-in/feedback sheet which you will need to sign to indicate that the assignment does not breach the University regulations on plagiarism and academic dishonesty. This will be handed in with your assignment. You must hand-in a hard copy of the assignment in a specified folder and an electronic copy (this will be retained by the University for audit purposes). The standard assessment hand-in/feedback sheet will also normally be used by staff to return feedback on your work to you. Your actual assignment work (not normally tests or exams) will either be handed back to you during normal classes (where the work is submitted during the first 9 weeks of a teaching block) or at a special hand-back event organised after the end of the relevant teaching block and any associated assessment processing period. You will be given information about the organisation of these events by the Faculty staff at the appropriate time.

Due to the flexibility of choice of modules at each level, it is not always possible to balance the hand-in dates of all assessments; however, the level tutor may have some control particularly with core modules. If you have a problem, inform your Level Tutor as soon as you can.

Not all modules require examinations, so make sure you are aware of those that do. It is your responsibility to be aware of where and when they occur.

<b>Faculty Office (K266)</b> <b>Assignment Submission Times</b>	
<b>Monday – Friday</b>	<b>8.30am – 3.30pm</b>

## ASSESSMENT MATTERS

The Computing Degree Scheme is a modular award within Staffordshire University's modular award structure. It is thus governed by Staffordshire Universities Undergraduate Modular Framework Regulations (available at [www.staffs.ac.uk/current/regulations/academic/index.php](http://www.staffs.ac.uk/current/regulations/academic/index.php)).

However, there are one or two issues which need to be highlighted.

### 1.1 Extenuating circumstances.

If you have completed your prescribed programme of study, but for reasons of illness or other incapacity which is supported by medical evidence, or because of other authenticated good cause, miss or fail the whole or part of an assessment, or where your preparation for an assessment is hindered by the extenuating circumstance then you should complete an extenuating circumstances claim form. These forms are available from the General Office. They allow you to make a claim for extenuating circumstances. The claim will be considered by a Panel, but your claim will be dealt with anonymously to ensure fairness in the treatment of students. You will be informed in writing of the decision of the Panel.

Please note that there are deadlines associated with the submission of claims for extenuating circumstances. These should be available from the Faculty Reception on the 2<sup>nd</sup> floor of the Octagon.

If your claim for extenuating circumstances is rejected, then the results from the assessment will stand on the basis of whatever work you actually handed-in by the hand-in date or the work produced during the test or exam, etc.

If your claim for extenuating circumstances is upheld, then that information will be given to the appropriate Assessment or Award Board when they consider your results. These Boards may make various decisions as a result of your extenuating circumstances being upheld. These may include you having the opportunity to re-take the assessment again as if you had not failed/missed the earlier attempt. The Board may make an estimate of the result you might otherwise have attained and they may offer you that as your result rather than re-taking the assessment. You would be informed in writing of any outcome following a claim.

### 1.2 Plagiarism and academic dishonesty

Academic dishonesty, in plain terms 'cheating', is taken very seriously at Staffordshire University.

The penalties for academic dishonesty are severe, reflecting the seriousness of the offence. Students in this faculty have failed their awards and/or been expelled from the University. Others who committed less serious offences have been referred causing delays in graduating and then gaining a lower classification of degree.

Academic dishonesty includes

- plagiarism
- misconduct in examinations, e.g. use of crib sheets, copying from or communicating with a neighbour
- collusion (as opposed to collaboration)
- bribery
- commissioning
- any other form of cheating to gain an unfair advantage

Plagiarism, the most common form of academic dishonesty, means presenting someone else's work, without acknowledgement of the source, as if it were your own work, whether intentionally or not.

Examples of plagiarism are:

- use of more than a single phrase from another person's work,
- summarising another person's work by simply changing a few words,
- copying diagrams, photographs, pictures, graphs, tables etc.
- copying work from the internet
- copying work from books, journals, etc.
- copying computer programs
- copying work from other students

without proper referencing.

Plagiarism also includes:

- allowing your work to be copied by another student,
- submitting a piece of work which has previously been assessed at this university or any other institution as if it were new work.

By committing plagiarism or other form of academic dishonesty you are not cheating Staffordshire University, you are cheating your fellow students and ultimately yourself! If you gain your degree by cheating you will have to continue cheating afterwards to maintain your credibility, possibly for the rest of your life.

Your aim in attending university must be to learn and gain knowledge, skills and understanding, not just to gain a piece of paper.

To avoid committing plagiarism you will need to learn how to reference work correctly. The following website gives information and examples on how to avoid unintentional plagiarism and how to reference properly.

[http://ec.hku.hk/plagiarism/content\\_brief.htm](http://ec.hku.hk/plagiarism/content_brief.htm)

### 1.3 Appeals.

You have the right of appeal against the decisions of the Award Boards in accordance with those regulations; there is a time limit of 5 working days after the publication of the results within which to lodge your intent to appeal. If you wish to make an appeal, then you should consult with your level tutor who will give you more advice and any relevant documentation.

## ATTENDANCE AND AUTHORISED ABSENCE.

Your attention is drawn to the General Regulations for Students, requiring you to formally notify the University of absences due to sickness, and to attend all lectures, tutorials, practical sessions and seminars and at any other time required by the University.

In particular, you should study the regulations which give the University the right to withdraw you from your Award for reasons of poor attendance.

## INDIVIDUAL AWARD STRUCTURE AND CONTENT

Each Award has its own individual structure. In the following pages details will be given of the individual award structures. You can obtain details of all modules referred to in the following diagrams by logging into the Faculty of Computing, Engineering and Technology home page on the Internet - [www.fcet.staffs.ac.uk](http://www.fcet.staffs.ac.uk)

Please note that the availability of some modules may be constrained by lack of resources and insufficient student numbers (your level tutor will be able to let you know which may not be available).

### 1.4 Computing Science.

#### LEVEL H

For award options, computing options and general options the number of each type of module in each semester shown in the diagram is only meant as an example and could occur differently in practice, subject to the constraint that the total number of each type remains the same – see option lists below for specific details.

<b>LEVEL H</b>	Computing Project: Research & Planning	Computing Option	Computing Option	Computing Option
	Computing Project: Analysis & Design	Computing Project: Implementation, Testing & Evaluation	Computing Option	General Option

#### COMPUTING OPTION:

Choose **four** modules from the Level H modules listed at the back of this handbook, provided the modules have not already been taken and any module specific admission requirements are met. Please ensure that you choose the correct Semester. Please note that the availability of modules may be constrained by lack of resources and insufficient student numbers (your level tutor will be able to let you know which may not be available).

#### GENERAL OPTION:

The general option can be chosen from the following, although please note that the availability of some modules may be constrained by lack of resources and insufficient student numbers (your level tutor will be able to let you know which may not be available):

a) the full list of Computing Degrees Scheme modules at level H or level I (see Section 20), provided the modules have not already been taken and any module specific admission requirements are met;

Or

b) the modules on the University General Option list, excepting modules from the University IT Programme – again provided the module has not already been taken and any module specific admission requirements are met.

## 1.5 Computer Science.

### LEVEL H

For award options, computing options and general options the number of each type of module in each semester shown in the diagram is only meant as an example and could occur differently in practice, subject to the constraint that the total number of each type remains the same – see option lists below for specific details.

<b>LEVEL H</b>	Computing Project: Research & Planning	Real-time Systems 1	Computer Science Option	Computer Science Option
	Computing Project: Analysis & Design	Computing Project: Implementation, Testing & Evaluation	Computer Science Option	General Option

LEVEL H COMPUTER SCIENCE OPTIONS [taken in either semester depending on module choice] three from:

Please refer to the back of this booklet to see whether the modules run in Semester 1 or Semester 2.

Real-time Systems 2  
 Distributed Computer Systems  
 Computing & Concurrent Systems Design  
 Computer Systems Security  
 Forensic Data Gathering, Reconstruction & Analysis  
 Malicious Software and Security Programming

#### GENERAL OPTION:

The general option can be chosen from the following, although please note that the availability of some modules may be constrained by lack of resources and insufficient student numbers (your level tutor will be able to let you know which may not be available):

a) the full list of Computing Degrees Scheme modules at level H or level I, provided the modules have not already been taken and any module specific admission requirements are met;

Or

b) the modules on the University General Option list, excepting modules from the University IT Programme – again provided the module has not already been taken and any module specific admission requirements are met.

## 1.6 Software Engineering.

### LEVEL H

For award options, computing options and general options the number of each type of module in each semester shown in the diagram is only meant as an example and could occur differently in practice, subject to the constraint that the total number of each type remains the same – see option lists below for specific details.

<b>LEVEL H</b>	Computing Project: Research & Planning	Algorithmics	Advanced Programming Language Concepts OR Design Patterns	Software Engineering Option
	Computing Project: Analysis & Design	Computing Project: Implementation, Testing & Evaluation	Software Engineering Option	General Option

**LEVEL H SOFTWARE ENGINEERING OPTIONS** [taken in either semester depending on module choice] two from:

Please refer to the back of this booklet to see whether the modules run in Semester 1 or Semester 2.

Real-time Systems 1  
 Real-time Systems 2  
 Computing & Concurrent Systems Design  
 Advanced Programming Language Concepts [if not already taken]  
 Design Patterns [if not already taken]  
 Project Management  
 Information System Development Trends  
 Further Programming for Mobile Devices  
 Enterprise Programming for Distributed Applications

#### **GENERAL OPTION:**

The general option can be chosen from the following, although please note that the availability of some modules may be constrained by lack of resources and insufficient student numbers (your level tutor will be able to let you know which may not be available):

a) the full list of Computing Degrees Scheme modules at level H or level I, provided the modules have not already been taken and any module specific admission requirements are met;

Or

b) the modules on the University General Option list, excepting modules from the University IT Programme – again provided the module has not already been taken and any module specific admission requirements are met.

## 1.7 Information Systems.

### LEVEL H

For award options, computing options and general options the number of each type of module in each semester shown in the diagram is only meant as an example and could occur differently in practice, subject to the constraint that the total number of each type remains the same – see option lists below for specific details.

<b>LEVEL H</b>	Computing Project: Research & Planning	Advanced Database Systems	Strategic Information Management	Computing Option
	Computing Project: Analysis & Design	Computing Project: Implementation, Testing & Evaluation	Information Systems Option	General Option

LEVEL H INFORMATION SYSTEMS OPTION [taken in either semester depending on module choice] one from:

Please refer to the back of this booklet to see whether the modules run in Semester 1 or Semester 2.

Information Systems Development Trends  
 Project Management  
 Advanced HCI and Usability [only if taken level I HCI and Usability]  
 E-Commerce/M-Commerce Systems: Strategy & Management

#### COMPUTING OPTION:

Choose one module from the Level H modules listed at the back of this handbook, provided the modules have not already been taken and any module specific admission requirements are met. Please ensure that you choose the correct Semester. Please note that the availability of modules may be constrained by lack of resources and insufficient student numbers (your level tutor will be able to let you know which may not be available).

#### GENERAL OPTION:

The general option can be chosen from the following, although please note that the availability of some modules may be constrained by lack of resources and insufficient student numbers (your level tutor will be able to let you know which may not be available):

a) the full list of Computing Degrees Scheme modules at level H or level I (see Section 20), provided the modules have not already been taken and any module specific admission requirements are met;

Or

b) the modules on the University General Option list, excepting modules from the University IT Programme – again provided the module has not already been taken and any module specific admission requirements are met.

## 1.8 Multimedia Computing.

### LEVEL H

For award options, computing options and general options the number of each type of module in each semester shown in the diagram is only meant as an example and could occur differently in practice, subject to the constraint that the total number of each type remains the same – see option lists below for specific details.

<b>LEVEL H</b>	Computing Project: Research & Planning	Advanced Multimedia	Advanced HCI & Usability OR Ubiquitous Computing	Computing Science: Multimedia Option
	Computing Project: Analysis & Design	Computing Project: Implementation, Testing & Evaluation	Computing Science: Multimedia Option	General Option

LEVEL H MULTIMEDIA COMPUTING OPTIONS [taken in either semester depending on module choice] two from:

Please refer to the back of this booklet to see whether the modules run in Semester 1 or Semester 2.

Advanced HCI & Usability [if not already taken]

Ubiquitous Computing [if not already taken]

Advanced Web Multimedia

Computer Animation and Games

TV and Film Computing

On-Line Gaming

Mobile Web and Multimedia

Advanced Database Systems

#### GENERAL OPTION:

The general option can be chosen from the following, although please note that the availability of some modules may be constrained by lack of resources and insufficient student numbers (your level tutor will be able to let you know which may not be available):

a) the full list of Computing Degrees Scheme modules at level H or level I, provided the modules have not already been taken and any module specific admission requirements are met;

Or

b) the modules on the University General Option list, excepting modules from the University IT Programme – again provided the module has not already been taken and any module specific admission requirements are met.

## 1.9 Internet Technology.

### LEVEL H

For award options, computing options and general options the number of each type of module in each semester shown in the diagram is only meant as an example and could occur differently in practice, subject to the constraint that the total number of each type remains the same – see option lists below for specific details.

<b>LEVEL H</b>	Computing Project: Research & Planning	Enterprise Web Applications	Advanced HCI and Usability OR Ubiquitous Computing	Computing Science: Web Development Option
	Computing Project: Analysis & Design	Computing Project: Implementation, Testing & Evaluation	Computing Science: Web Development Option	General Option

LEVEL H INTERNET TECHNOLOGY OPTIONS [taken in either semester depending on module choice] two from:

Please refer to the back of this booklet to see whether the modules run in Semester 1 or Semester 2.

Advanced HCI and Usability [if not already taken]  
 Ubiquitous Computing [if not already taken]  
 Advanced Multimedia [only if taken level I Multimedia Applications]  
 Advanced Web Multimedia  
 XML and Web Services  
 E-Commerce/M-Commerce Systems: Strategy & Management  
 Computer Animation and Games [not yet available]  
 TV and Film Game Computing  
 On-Line Gaming  
 Mobile Web and Multimedia  
 Fundamentals of Wireless LANs  
 Advanced Database Systems

#### GENERAL OPTION:

The general option can be chosen from the following, although please note that the availability of some modules may be constrained by lack of resources and insufficient student numbers (your level tutor will be able to let you know which may not be available):

- a) the full list of Computing Degrees Scheme modules at level H or level I, provided the modules have not already been taken and any module specific admission requirements are met;  
 Or  
 b) the modules on the University General Option list, excepting modules from the University IT Programme – again provided the module has not already been taken and any module specific admission requirements are met.

## 1.10 Mobile Computing.

### LEVEL H

For award options, computing options and general options the number of each type of module in each semester shown in the diagram is only meant as an example and could occur differently in practice, subject to the constraint that the total number of each type remains the same – see option lists below for specific details.

<b>LEVEL H</b>	Computing Project: Research & Planning	Advanced HCI & Usability	Ubiquitous Computing	Mobile Computing Option
	Computing Project: Analysis & Design	Computer Project: Implementation, Testing & Evaluation	Mobile Computing Option	General Option

LEVEL H MOBILE COMPUTING OPTIONS [taken in either semester depending on module choice] two from:

Please refer to the back of this booklet to see whether the modules run in Semester 1 or Semester 2.

Distributed Computer Systems  
XML and Web Services  
Mobile Web and Multimedia  
Further Programming for Mobile Devices  
E-Commerce/M-Commerce Systems: Strategy & Management  
Enterprise Programming for Distributed Applications

#### GENERAL OPTION:

The general option can be chosen from the following, although please note that the availability of some modules may be constrained by lack of resources and insufficient student numbers (your level tutor will be able to let you know which may not be available):

a) the full list of Computing Degrees Scheme modules at level H or level I, provided the modules have not already been taken and any module specific admission requirements are met;

Or

b) the modules on the University General Option list, excepting modules from the University IT Programme – again provided the module has not already been taken and any module specific admission requirements are met.

## 1.11 Computer Systems.

### LEVEL H

For award options, computing options and general options the number of each type of module in each semester shown in the diagram is only meant as an example and could occur differently in practice, subject to the constraint that the total number of each type remains the same – see option lists below for specific details.

<b>LEVEL H</b>	Computing Project: Research & Planning	Real Time Systems 1	Computing Option	General Option
	Computing Project: Analysis & Design	Computing Project: Implementation, Testing & Evaluation	Real Time Systems 2	Distributed Computer Systems

#### COMPUTING OPTION:

Choose one module from the Level H modules listed at the back of this handbook, provided the modules have not already been taken and any module specific admission requirements are met. Please ensure that you choose the correct Semester. Please note that the availability of modules may be constrained by lack of resources and insufficient student numbers (your level tutor will be able to let you know which may not be available).

#### GENERAL OPTION:

The general option can be chosen from the following, although please note that the availability of some modules may be constrained by lack of resources and insufficient student numbers (your level tutor will be able to let you know which may not be available):

a) the full list of Computing Degrees Scheme modules at level H or level I, provided the modules have not already been taken and any module specific admission requirements are met;

Or

b) the modules on the University General Option list, excepting modules from the University IT Programme – again provided the module has not already been taken and any module specific admission requirements are met.

## 1.12 Computer Graphics, Imaging and Visualisation.

### LEVEL H

For award options, computing options and general options the number of each type of module in each semester shown in the diagram is only meant as an example and could occur differently in practice, subject to the constraint that the total number of each type remains the same – see option lists below for specific details.

<b>LEVEL H</b>	Computing Project: Research & Planning	3D Computer Graphics	Image Processing, Computer Vision & Pattern Recognition	Computing Science: Graphics Option*
	Computing Project: Analysis & Design	Computing Project: Implementation, Testing & Evaluation	Real-Time Rendering and Animation	General Option

LEVEL H COMPUTER GRAPHICS, IMAGING AND VISUALISATION OPTION [taken in either semester depending on module choice] one from:\*

Please refer to the back of this booklet to see whether the modules run in Semester 1 or Semester 2.

Simulation, Visualisation & Virtual Reality

Chaos and Fractals

Believable Models for Games and Virtual Reality [only if taken in level I – it will not be available to be taken as a new module after 2004-2005)

Programming Physics Engines for Games [if not taken in level I]

Advanced Programming for 3D Applications [only if taken level I Further Programming for 3D Applications]

\*Where one of the Computing Science: Graphics option modules has already been passed by a student prior to level H then the Computing Science: Graphics Option becomes a Computing Option for such a student.

#### GENERAL OPTION:

The general option can be chosen from the following, although please note that the availability of some modules may be constrained by lack of resources and insufficient student numbers (your level tutor will be able to let you know which may not be available):

a) the full list of Computing Degrees Scheme modules at level H or level I, provided the modules have not already been taken and any module specific admission requirements are met;

Or

b) the modules on the University General Option list, excepting modules from the University IT Programme – again provided the module has not already been taken and any module specific admission requirements are met.

## 1.13 Intelligent Systems.

### LEVEL H

For award options, computing options and general options the number of each type of module in each semester shown in the diagram is only meant as an example and could occur differently in practice, subject to the constraint that the total number of each type remains the same – see option lists below for specific details.

<b>LEVEL H</b>	Computing Project: Research & Planning	Further AI	Computing Science: Artificial Intelligence Option	Computing Option
	Computing Project: Analysis & Design	Computing Project: Implementation, Testing & Evaluation	Knowledge Discovery and Data Mining	General Option

LEVEL H Intelligent Systems [taken in either semester depending on module choice] one from:

Please refer to the back of this booklet to see whether the modules run in Semester 1 or Semester 2.

Image Processing, Computer Vision & Pattern Recognition  
Cognitive Science  
AI Engines for Games

#### COMPUTING OPTION:

Choose one module from the Level H modules listed at the back of this handbook, provided the modules have not already been taken and any module specific admission requirements are met. Please ensure that you choose the correct Semester. Please note that the availability of modules may be constrained by lack of resources and insufficient student numbers (your level tutor will be able to let you know which may not be available).

#### GENERAL OPTION:

The general option can be chosen from the following, although please note that the availability of some modules may be constrained by lack of resources and insufficient student numbers (your level tutor will be able to let you know which may not be available):

a) the full list of Computing Degrees Scheme modules at level H or level I, provided the modules have not already been taken and any module specific admission requirements are met;

Or

b) the modules on the University General Option list, excepting modules from the University IT Programme – again provided the module has not already been taken and any module specific admission requirements are met.

## 1.14 Computing with Applicable Mathematics.

### LEVEL H

For award options, computing options and general options the number of each type of module in each semester shown in the diagram is only meant as an example and could occur differently in practice, subject to the constraint that the total number of each type remains the same – see option lists below for specific details.

<b>LEVEL H</b>	Computing Project: Research & Planning	Operational Research	Survey Design & Analysis	General Option
	Computing Project: Analysis & Design	Computing Project: Implementation, Testing & Evaluation	Mathematical Modelling	Financial Modelling with Decision Making

#### GENERAL OPTION:

The general option can be chosen from the following, although please note that the availability of some modules may be constrained by lack of resources and insufficient student numbers (your level tutor will be able to let you know which may not be available):

a) the full list of Computing Degrees Scheme modules at level H or level I, provided the modules have not already been taken and any module specific admission requirements are met;

Or

b) the modules on the University General Option list, excepting modules from the University IT Programme – again provided the module has not already been taken and any module specific admission requirements are met.

## 1.15 Network Computing.

### LEVEL H

For award options, computing options and general options the number of each type of module in each semester shown in the diagram is only meant as an example and could occur differently in practice, subject to the constraint that the total number of each type remains the same – see option lists below for specific details.

<b>LEVEL H</b>	Computing Project: Research & Planning	Computer Systems Security	Fundamentals of Wireless LAN's	Enterprise Web Applications
	Computing Project: Analysis & Design	Computing Project: Implementation, Testing & Evaluation	Network Computing Option	General Option

LEVEL H NETWORK COMPUTING OPTION [taken in either semester depending on module choice] one from:

Please refer to the back of this booklet to see whether the modules run in Semester 1 or Semester 2.

Distributed Computer Systems

XML and Web Services

Mobile Web and Multimedia

E-Commerce/M-Commerce Systems: Strategy & Management

Enterprise Programming for Distributed Applications

Further Programming for Mobile Devices

Ubiquitous Computing [currently runs in teaching block 1 thus cannot really choose this at the moment]

#### GENERAL OPTION:

The general option can be chosen from the following, although please note that the availability of some modules may be constrained by lack of resources and insufficient student numbers (your level tutor will be able to let you know which may not be available):

a) the full list of Computing Degrees Scheme modules at level H or level I, provided the modules have not already been taken and any module specific admission requirements are met;

Or

b) the modules on the University General Option list, excepting modules from the University IT Programme – again provided the module has not already been taken and any module specific admission requirements are met.

## 1.16 Computer Games Programming.

### LEVEL H

For award options, computing options and general options the number of each type of module in each semester shown in the diagram is only meant as an example and could occur differently in practice, subject to the constraint that the total number of each type remains the same – see option lists below for specific details.

<b>LEVEL H</b>	Computing Project: Research & Planning	3D Computer Graphics	AI Engines for Games	Computing Option
	Computing Project: Analysis and Design	Computing Project: Implementation, Testing & Evaluation	Real-Time Rendering and Animation	General Option

#### COMPUTING OPTION:

Choose one module from the Level H modules listed at the back of this handbook, provided the modules have not already been taken and any module specific admission requirements are met. Please ensure that you choose the correct Semester. Please note that the availability of modules may be constrained by lack of resources and insufficient student numbers (your level tutor will be able to let you know which may not be available).

#### GENERAL OPTION:

The general option can be chosen from the following, although please note that the availability of some modules may be constrained by lack of resources and insufficient student numbers (your level tutor will be able to let you know which may not be available):

a) the full list of Computing Degrees Scheme modules at level H or level I, provided the modules have not already been taken and any module specific admission requirements are met;

Or

b) the modules on the University General Option list, excepting modules from the University IT Programme – again provided the module has not already been taken and any module specific admission requirements are met.

## 1.17 Forensic Computing.

### LEVEL H

For award options, computing options and general options the number of each type of module in each semester shown in the diagram is only meant as an example and could occur differently in practice, subject to the constraint that the total number of each type remains the same – see option lists below for specific details.

<b>LEVEL H</b>	Computing Project: Research & Planning	Computer Systems Security	Forensic Data Gathering, Reconstruction and Analysis	General Option
	Computing Project: Analysis & Design	Computing Project: Implementation, Testing & Evaluation	Legal & Evidentiary Aspects of Forensic Computing	Distributed Computer Systems

#### COMPUTING OPTION:

Choose one module from the Level H modules listed at the back of this handbook, provided the modules have not already been taken and any module specific admission requirements are met. Please ensure that you choose the correct Semester. Please note that the availability of modules may be constrained by lack of resources and insufficient student numbers (your level tutor will be able to let you know which may not be available).

#### GENERAL OPTION:

The general option can be chosen from the following, although please note that the availability of some modules may be constrained by lack of resources and insufficient student numbers (your level tutor will be able to let you know which may not be available):

a) the full list of Computing Degrees Scheme modules at level H or level I, provided the modules have not already been taken and any module specific admission requirements are met;

Or

b) the modules on the University General Option list, excepting modules from the University IT Programme – again provided the module has not already been taken and any module specific admission requirements are met.

## 1.18 Computing Science - Ordinary Degree.

This award is intermediate between the Diploma in Higher Education and a BSc(Honours) degree. It is intended to enable students who have difficulty in completing the Honours degree due to a variety of academic or other problems, to be successful in completing a degree. However, if a student is awarded the Ordinary degree, they may at a later date apply to return as direct entrants onto level H of the Computing Degree Scheme to complete an Honours degree.

The learning outcomes for the Ordinary degree in Computing Science are the same as to content as the Scheme generic learning outcomes i.e. those of Computing Science Honours degree. However the level at which those learning outcomes are achieved conform to a level intermediate between a Diploma in Higher Education and an Honours degree (see Section 4.2.4 for a specification of these learning outcomes).

The criteria for transfer from an Honours degree to the Ordinary degree and for direct entry onto the Ordinary degree are given in Section 19 of the full Computing Degree Scheme Handbook which is found at [http://www.fcet.staffs.ac.uk/current\\_students/award\\_handbooks/cds2.pdf](http://www.fcet.staffs.ac.uk/current_students/award_handbooks/cds2.pdf)

An Ordinary degree student will normally study 60 credits at level H. However, those 60 credits will not normally include the level H Honours project. In full-time mode an Ordinary degree students will normally study 60 level H credits over a single teaching block.

The Ordinary degree is unclassified. It is not a sandwich award i.e. the successful completion of an industrial placement period is not required.

### LEVEL 3

Computing Option	Computing Option	Computing Option	Computing Option	Computing Option	General Option
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#### **COMPUTING OPTION:**

Choose five modules from the Level H modules listed in Section 20 of this handbook, provided the modules have not already been taken and any module specific admission requirements are met. Please ensure that you choose the correct Semester. Please note that the availability of modules may be constrained by lack of resources and insufficient student numbers (your level tutor will be able to let you know which may not be available).

#### **GENERAL OPTION:**

The general option can be chosen from the following, although please note that the availability of some modules may be constrained by lack of resources and insufficient student numbers (your level tutor will be able to let you know which may not be available):

a) the full list of Computing Degrees Scheme modules at level H or level I (see Section 20), provided the modules have not already been taken and any module specific admission requirements are met;

Or

b) the modules on the University General Option list, excepting modules from the University IT Programme – again provided the module has not already been taken and any module specific admission requirements are met.

## 2.0 COMPUTING MODULES

Full list of modules including all cores and computing option modules for this Scheme.

### Level H (level 3) Modules

#### Project modules

CE00901-3	Computing Project: Research and Planning (15 Credits)
CE00902-3	Computing Project: Analysis and Design (15 Credits)
CE00903-3	Computing Project: Implementation, Testing and Evaluation (15 Credits)

#### Semester 1

CE00345-3	Real-Time Systems 1 (15 Credits)
CE00360-3	Computer Systems Security (15 Credits)
CE00331-3	Advanced Programming Language Concepts (15 Credits)
CE00333-3	Algorithmics (15 Credits)
CE00362-3	Design Patterns (15 Credits)
CE00364-3	3D Computer Graphics (15 Credits)
CE00336-3	Image Processing, Computer Vision and Pattern Recognition (15 Credits)
CE00332-3	Advanced Database Systems (15 Credits)
CE00346-3	Strategic Information Management (15 Credits)
CE00307-3	Simulation, Visualisation and Virtual Reality (15 Credits)
CE00334-3	Further AI (15 Credits)
CE63033-3	Operational Research (15 Credits)
CE00358-3	Cognitive Science (15 Credits)
CE00124-3	Fundamentals of Wireless LANs (15 Credits)
CE00355-3	Advanced HCI and Usability (15 Credits)
CE63025-3	Spreadsheet Automation with VBA (15 Credits)
CE00313-3	Ubiquitous Computing (15 Credits)
CE00304-3	Advanced Multimedia (15 Credits)
CE00365-3	Enterprise Web Applications (15 Credits)
CE63024-3	Survey Design and Analysis (15 Credits)
CE00337-3	Learning Technology through Project-Based Learning (15 Credits)
CE00171-3	Advanced VR Concepts (15 Credits) <i>(subject to approval)</i>
CE00385-3	AI Engines for Games (15 Credits)
CE00xxx-3	Advanced Web Design and Development (15 Credits)
CE00xxx-3	Advanced Multimedia Design (15 Credits)
CE00383-3	Advanced Programming for 3D Applications (15 Credits)
CE00303-3	Critical Issues in Managing Information Systems (15 Credits)
CE00408-3	Advanced Mobile Computer Based Communications (15 Credits)
CE00459-3	Mobile Web and Multimedia (15 Credits)
CE00461-3	Online Gaming (15 Credits) <i>(Subject to approval)</i>
CE00122-3	Advanced Switching (15 Credits) [CCNP 3]
CE00397-3	Forensic Data Gathering, Reconstruction and Analysis (15 Credits)
CE00403-3	Biometrics 2 (15 Credits) – Not yet Available

## Semester 2

CE00347-3	Real-Time Systems 2 (15 Credits)
CE00329-3	Distributed Computer Systems (15 Credits)
CE00361-3	Computing and Concurrent Systems Design (15 Credits)
CE63030-3	Chaos and Fractals (15 Credits)
CE00339-3	Information Systems Development Trends (15 Credits)
CE00389-3	Real-Time Rendering and Animation (15 Credits)
CE00428-3	Knowledge Discovery and Data Mining (15 Credits)
CE63032-3	Mathematical Modelling (15 Credits)
CE63031-3	Financial Modelling with Decision Making (15 Credits)
CE00349-3	E-Commerce/M-Commerce Systems: Strategy and Management (15 Credits)
CE00340-3	Legal and Evidentiary Aspects of Forensic Computing (15 Credits)
CE00348-3	Project Management (15 Credits)
CE00356-3	Advanced Web Multimedia (15 Credits)
CE00316-3	XML and Web Services (15 Credits)
CE00363-3	Further Programming for Mobile Devices (15 Credits)
CE00330-3	Enterprise Programming for Distributed Applications (15 Credits)
CE00169-3	Implementation of Advanced VR Concepts (15 Credits) ( <i>subject to approval</i> )
CE00460-3	TV and Film Computing (15 Credits)
CE00128-3	Network Troubleshooting (15 Credits) [CCNP 4]
CE00404-3	Malicious Software and Security Programming (15 Credits)
CE00XXX-3	Computer Animation (15 Credits) – Not available yet.
CE00420-3	Advanced Mobile Computing Devices and Technologies (15 Credits)
CE00XXX-3	Management of Database Systems (15 Credits) (new module)

# PROJECT MODULES

**CE00901-3 Computing Project: Research and Planning**

Contact: Robert Kinmond                      Room K336                      x3305

**Module Details**

Practical project management; literature searching; research tools and techniques; data gathering and analysis; documentation and presentation.

This module covers four areas of investigative work: context and domain analysis, domain investigation, technical investigation and the critical appraisal of these.

This module covers the definition, specification and planning of the project as well as the communication of the project process to a critical reader.

A REPORT weighted at 80%

An VIVA weighted at 20%

Pre-requisites: Student must be registered on the final year of an award in computing or a related area.

**CE00902-3 Computing Project: Analysis and Design**

Contact: Robert Kinmond                      Room K336                      x3305

**Module Details**

This module deals with the selection and application of analysis and design methods and the monitoring and controlling of the project.

Hybrid Award projects must also contain an appropriate amount of relevant business analysis e.g. a market analysis, cost-benefit analysis, SWOT / PEST analysis.

ASSIGNMENT weighted at 90%

A PRESENTATION weighted at 10%

Pre-requisites: Student must be registered on the final year of an award in computing or a related area.

**CE00903-3 Computing Project: Implementation, Testing & Evaluation**

Contact: Robert Kinmond                      Room K336                      x3305

**Module Details**

The overall aim of the three project modules is to provide an opportunity for you to undertake a significant task on an individual basis.

This module covers: the development of an effective and feasible technological implementation; the testing of its functionality; the critical appraisal of it as an appropriate solution to an identified problem monitoring and controlling.

ASSIGNMENT weighted at 90%

DEMONSTRATION weighted at 10%

Pre-requisites: Student must be registered on the final year of an award in computing or a related area.

# SEMESTER 1 MODULES

**CE00345-3 Real Time Systems 1**

Contact: Ian Sunley

Room K218

x3418

**Module Details**

Classification of real-time systems. Safety-critical embedded and distributed real-time systems. Hard/soft taxonomy. Periodic / Aperiodic demands. Process synchronisation, mutual exclusion, process communication. Safety and liveness properties. Reliability, redundancy, performance and other non-functional requirements. Scheduling strategies.

Review of concurrent methods, methodologies, operating systems and languages used, analysing their strengths and weaknesses. HCI considerations. Systematic approach to conceptualisation, specification and design of real-time systems using structured & object-oriented approaches; comparison of approaches.

Assignment 50%

Examination 50% (1.5 hours)

Pre-requisites: Prior study of Fundamentals of Software Development or equivalent.

**CE00360-3 Computer Systems Security**

Contact: Martin Slade

Room K356

x3554

**Module Details**

Types of threat and types of system. Protection and detection. Operating System protection mechanisms. Database security. Network configuration and security. Data integrity. Access control and authentication protocols. Principles of encryption and decryption. Common encryption standards. Malicious software. Securing e-business. Security models. Human factors in security. Security policies and planning. Legal and ethical issues.

Assignment 50%

Exam 1.5 hours 50%

Pre-requisites: Prior study of Fundamentals of Software Development or equivalent; Introduction to C Programming or equivalent; Hardware, Software Systems and Networks or equivalent.

**CE00331-3 Advanced Programming Language Concepts**

Contact: Nick Dyson

Room K332

x3452

**Module Details**

Comparison of imperative, logic and functional languages, especially with respect to types, classes, generics, lists, pattern matching and recursion. Queries, facts, rules in a logic language. Fundamental functional programming language paradigm characteristics: referential transparency, higher-order functions, functional composition. Modern functional programming language characteristics: Curried functions, lazy evaluation, polymorphism, algebraic types, list comprehension, and the notion of state and super-combinators, input/output, error handling.

50% 2 hour exam (learning outcomes 1 and 4)  
 50% practical assignment (learning outcomes 2 and 3)

Pre-requisites: Prior study of Further Programming in C++ or equivalent.

### CE00333-3 Algorithmics

Contact: Fred Pratt                      Room K346                      x3271

#### Module Details

Pseudo-Code standard. B-trees, hashing techniques, heaps, graph algorithms, greedy algorithms, Matroids. Matching. Measures of performance, big-Oh notation. Complexity Classes P and NP. Easy versus Hard NP properties. Characterisation of good algorithmics.

One 50% comparative essay  
 One 50% examination (1.5 hr)

Pre-requisites: Prior study of Mathematics and Algorithmics.

### CE00362-3 Design Patterns

Contact: Dave Gillibrand    Room K222                      x3419

#### Module Details

Different Design Patterns:  
     Delegation vs inheritance  
     O-O design patterns, GOF type - managing behaviour, other O-O patterns  
 Applying patterns to application domains  
     Integrating frameworks e.g. .NET, J2EE, CORBA  
     Enterprise architectures, web based architectures 2 & 3 tier architectures  
     Databases- decoupling databases from applications, saving & restoring state  
     Networks  
 Designing Internal & External Interfaces  
     Issues surrounding internal & external Interfaces  
     Surrogates, object trees,  
 Exploiting libraries for connectivity  
     RPC's, RMI CORBA  
 Event Driven Applications  
     MVC (Model View Control) architecture & Event handling  
     e.g. Java Swing, JFC, C++ MFC

Examination 100% - length 3 hours (learning outcomes 1-4)

Pre-requisites: Prior study of Fundamentals of Software Development or equivalent.

**CE00364-3 3D Computer Graphics**

Contact: Claude Chibelushi                      Room K220                      x3802

**Module Details**

Data structures  
Representation of 3D curves and surfaces  
3D transformations  
Three-dimensional viewing  
Hidden surface removal  
Illumination models  
Shading techniques  
Texture mapping  
Ray tracing and radiosity

ASSIGNMENT weighted at 50%.  
EXAMINATION length 1.5 hours weighted at 50%.

Pre-requisites: Prior study of Level 2 Computer Graphics or equivalent.

**CE00336-3 Image Processing, Computer Vision and Pattern Recognition**

Contact: Len Noriega                      Room K325                      x3502

**Module Details**

Further Image Processing (Morphological operations, Region Analysis), Frequency Domain analysis of signals (Fourier/Wavelet/Cosine Transforms). Image Compression. Introductory Pattern Recognition (Feature extraction, feature spaces), Statistical PR (Distance functions, clustering, discriminant functions). Neural Correlates of Statistical PR. Introductory Computer Vision. Colour Physics.

50% Assignment  
50% Examination length 2 hours

Pre-requisites: Prior study of Imaging and Special Effects or equivalent.

**CE00332-3 Advanced Database Systems**

Contact: Clare Stanier                      Room K340                      x3643

**Module Details**

Critically assess the main DBMS systems in commercial use (sql-server, oracle, MySql, DB2)  
Database administration and the position of the database administrator  
Data Dictionaries and their role in operational systems  
Client/Server systems and distributed database technologies  
Web and mobile database interfaces  
XML and related technologies  
Server side programming  
Advanced Sql  
Security and validation techniques, including site security, backups, data recovery, system recovery, Concurrency control  
Performance issues; Database tuning and query optimisation techniques and facilities, clustering, indexing diagnostic tools  
Decision support systems ?olap; data-warehousing, data mining

Group Assignment weighted at 50%.  
Time constrained examination weighted at 50%.

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Pre-requisites: Prior study of Database and web database systems or equivalent.

### CE00346-3 Strategic Information Management

Contact: Alan Eardley

Room K330

x3456

#### Module Details

1. The changing 'eras' and roles of IT and the strategic impact of IS/IT on businesses and organisations. Applications portfolio planning and management techniques;
2. Techniques for identifying business opportunities to deploy IS/IT resources. Value, competition and collaborative models of IS/IT use. Frameworks for categorising, assessing and applying techniques for maximising business benefits from IS/IT. Business transformation through IS/IT;
3. IS/IT architectures and strategies for flexibility, competitiveness and collaboration. Methods for achieving and sustaining competitive advantage from IS/IT;
4. Methods for managing IT infrastructures, configurations and architectures, client/server models and intranets. Hardware/software migration and re-engineering. Techniques for budgeting, cost recovery/charge-back and producing service level agreements;
5. Operations and facilities management techniques. Hardware and software acquisition and contracts. Outsourcing, facilities management and service level agreements. Legal and contractual obligations and responsibilities;
6. Security and risk management factors. Risk analysis and prevention. Contingency planning, back-up and recovery. Data protection and system security issues.

Coursework 30%

Examination 70%

Pre-requisites: Prior study of Systems Analysis and Design or equivalent.

### CE00307-3 Simulation, Visualisation & Virtual Reality

Contact: Len Noriega

Room K325

x3502

#### Module Details

Modelling and Simulation techniques and tools, Visualisation techniques and tools for mathematics, engineering and science. Introductory world representation in Graphics and Virtual reality systems.

Examination (50%) length 2 hours

Assignment (50%)

Pre-requisites: None.

**CE00334-3 Further Artificial Intelligence**

Contact: Len Noriega

Room K325

x3502

**Module Details**

Search, Autonomous Robotics(Navigation, Planning), Machine Learning, Neural Networks, Syntactical Pattern Recognition, Symbolic Manipulation with Neural Networks, Weightless Neural Networks.

50% Assignment

50% Examination length 2 hours

Pre-requisites: Prior study of AI Methods (CE00341-2) or equivalent.

**CE63033-3 Operational Research**

Contact: David Noble

Room LC27

x4158

**Module Details**

Linear Programming (LP): Formulation and graphical solution. Infeasibility and Unboundedness. Sensitivity analysis. Computer solution and interpretation of results.

Transportation and Assignment problems. Application to problems arising in business and finance.

Network Models. Shortest path and maximum flow algorithms,

Project management problems - critical path analysis, time/cost analysis.

Simple Inventory Control models

Application of simulation to problems involving uncertainty

Manual solution of problems and using computer packages.

Test 1 40%

Test 2 60%

Pre-requisites: Prior study of CE61002-1 Mathematics and Statistics for Computing Students, or CE61007-1 Quantitative Techniques for Computing, or BLB10000-1 Business and Accounting Skills, or equivalent.

**CE00358-3 Cognitive Science**

Contact: Diane Bishton

Room K229

x3272

**Module Details**

This module will introduce issues in Cognitive Science, including: the computational metaphor, perception and memory, knowledge and representation, logic, reasoning and thinking, natural language processing, learning and concept formation, decision making and hypothesis testing and connectionist and normative models.

50 % exam - length 1.5 hours

50 % assessment

Pre-requisites: None

<b>CE00124-3 Fundamentals of Wireless LAN's</b>
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Contact: Chris Howard

Room K213

x3304

**Module Details**

Design a logical wireless LAN architecture for mobile wireless users in compliance with 802.11 IEEE standards. Demonstrate knowledge in WLAN applications as they relate to EM spectrum, radio wave propagation, modulation techniques, and frequency and channel usage in wireless technologies.

Installation of in-building and building-to-building wireless LANs with Cisco devices that meet mobility and throughput specifications including the site survey and documentation.

Perform hardware setup and software configuration of Cisco Aironet APs and antennas for Ethernet/Radio ports, and services.

Perform hardware setup and software configuration of Cisco Aironet equipment for Ethernet/Radio ports and services specific to the WLAN needs for Access Points, Bridges, Repeater, and Site Survey Client functionality.

Upgrade and distribute firmware on Cisco wireless products throughout a WLAN.

Identify, define features of, and install, directional and omnidirectional antennas in both building-to-building and in-building WLANs.

Design and setup of WLAN security using WEP, Cisco LEAP and 802.1x protocols.

Troubleshoot WLAN performance issues using event loggings, command line utilities, and diagnostic tools.

A written MCQ examination, length 2 hour weighted at 70%.

A practical not in examination conditions weighted at 30%.

Pre-requisites: To have completed level 1 module Introduction to Networking with LAN's and WAN's and the level 2 module LAN Switching and WAN Networks or followed CNAP program 1 to 4 or hold CCNA or CCNP.

<b>CE00355-3 Advanced HCI &amp; Usability</b>
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Contact: Clive Chandler

Room K332

x3508

**Module Details**

Principles and techniques of HCI

Principles and techniques of Usability

Usability for different devices such as handheld, tablet pc, kiosk

Designing for different target audiences

Designing for children

Web Usability

Accessibility

Global Effects

Assignment (50%)

Exam (50%) duration 1.5 hours

Pre-requisites: Prior study of Fundamentals of Software Development or equivalent.

**CE63025-3 Spreadsheet Automation with VBA**

Contact: David Noble                      Room LC27                      x4158

**Module Details**

VBA is the programming language behind most Microsoft applications. It can be used to automate series of spreadsheet tasks and to customise them for use by non-specialists.

VBA macro programming techniques for automating spreadsheet calculations:  
objects, properties and methods: Ranges, Charts, PivotTables; procedures and functions, variables, control structures, input and output, debugging tools.

VBA user interface design:  
customizing Userforms, ActiveX controls, WorkSheet and WorkBook events, toolbars and menus.

Quantitative applications:  
e.g. data analysis, financial modelling, simulation, production planning, budgeting, forecasting, stock control, statistical analysis, performance review, quality control.

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Assignment 65% (Learning outcomes 1,2, and 3)  
Test 35% (Learning outcomes 1,2, and 3)

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Pre-requisites: Prior study of CE62025-2 Spreadsheet Modelling Techniques, or equivalent.

**CE00313-3 Ubiquitous Computing**

Contact: Fiona Knight                      Room K235                      x3771

**Module Details**

Anytime, anyplace, anywhere computing  
Wearables  
Network appliances  
Mobile Devices  
Networking for ubiquitous computing  
Content aware applications  
Location based services  
Calm computing  
Factors effecting ubiquitous computing  
Ubiquitous applications e.g. health screeners, emergency etc.  
Interaction (e.g. voice and handwriting)

An Assignment weighted at 100%

Assignment (110%) groupwork, Learning outcomes 1,2,3, and 4

Pre-requisites: Prior study of Software Development or equivalent

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**CE00304-3 Advanced Multimedia**

Contact: Russell Campion Room K348 x3464

**Module Details**

Students will look at all elements of advanced multimedia CD or DVD. This will include the following:-

Advanced multimedia for CD, DVD, and kiosks  
Multimedia databases  
Advanced scripting for multimedia environments  
Games  
Multimedia applications and their resources  
3D  
Virtual Reality  
Multimedia Learning

Assignment (100%)

Pre-requisites: Prior study of Multimedia Applications or equivalent.

**CE00365-3 Enterprise Web Applications**

Contact: Fiona Knight Room K235 x3771

**Module Details**

Scaling web applications to enterprise level  
Comparison of different technologies available e.g .net compared to enterprise java  
Deployment and maintenance  
Web Application domain areas  
Web Methods  
Business implications / technical implications  
Globalisation / Accessibility

Assignment (50%)

Exam (50%) length 1.5 hours

Pre-requisites: Prior study of Web Design and Development or equivalent or; prior study of Web Applications or equivalent.

**CE63024-3 Survey Design and Analysis**

Contact: Mike Fletcher

Room LC025

x4022

**Module Details**

You will study a variety of aspects connected with the design, operation and analysis of a survey including:

Defining survey objectives- what are the aims of this survey?

Sampling strategies-who to ask, how many to ask, how to ask.

Questionnaire design (to include OMR and web based) and the use of various attitude scales to measure opinions and attitudes including reliability measures.

Data entry, exploratory data analysis and the presentation and interpretation of tables, percentages and descriptive statistics using a statistics package e.g. SPSS

Introduction to sampling theory. Confidence intervals for means and proportions. Hypothesis testing, including non-parametric statistics.

Using graphical output to display results and relationships.

Report writing and presentation.

A single project involving a small scale survey on a topic of your choice, approved by the module leader, resulting in the submission of a written report. (100%). This report is to be of about 5000 words equivalent, or 15 sides of A4, including tables and charts.

Pre-requisites: A knowledge of introductory statistics.

**CE00337-3 Learning Technology Through Project Based Learning**

Contact: Lorna Uden

Room K321

x3276

**Module Details**

Instructional design and learning theories, types of technology-based learning, authoring tools, design models for developing learning technology, e-learning and standards, learning objects, applying criteria for evaluating learning technology, collaborative learning, e-learning and virtual learning environments.

Coursework (50%)

There will be continual assessment using Problem- Based Learning in the coursework.

Examination (50%)

Pre-requisites: None

**CE00171-3 Advanced VR Concepts**

Contact:

**Module Details**

Further maths for virtual reality

concepts of artificial intelligence for virtual reality

- physics for virtual reality

- realism

- navigation

- collision detection

- bounce mechanics

Simulation v Animation

Concepts of forward and inverse kinematics

Biomechanics and human movement

Development criteria for drivers of virtual reality peripheral devices

Components of motion base platform and robotic control

Examination weighted at 100%.

Pre-requisites: CE00170-2, Integration of Virtual Reality Hardware and Software or equivalent.

### CE00385-3 AI Engines for Games

Contact: Len Noreiga

#### Module Details

The Artificial Intelligence Engines for Games module examines the practicalities of the subject matter, concentrating on the programming techniques and data structures used in contemporary computer games. Game Artificial Intelligence tends to be more pragmatic in its approach than "pure" AI.

Examination – 50%

Assignment – 50%

Pre-requisites: Prior study of CE00371-1, Introduction to Software Development and CE00396-1, Object Oriented and Event Driven Programming or equivalent.

### CE00XXX-3 Advanced Web Design and Development

Contact:

Module Details No Module Details available yet

### CE00XXX-3 Advanced Multimedia Design

Contact:

Module Details No Module Details available yet

### CE00383-3 Advanced Programming for 3D Graphic Applications

Contact: Bob Hobbs

#### Module Details

Aspects of artificial intelligence, physics and bio-mechanics for the development of engines for 3D graphics. Virtual Reality systems and computer games. Motion capture and other 3D interaction devices. Real-time data acquisition and consideration of device drivers and filters. Data structures to support human movement. Direct and indirect motion capture of grasping and similar bio-mechanical functions. Elements of robotics.

Examination – 50%

Assignment – 50%

Pre-requisites: Study of CE00299-2, Further Programming for 3D Graphics Applications or equivalent.

### CE00303-3 Critical Issues in Managing Information Systems

Contact: Tony Bowers

#### Module Details

The module aims to identify the main areas where problems can arise in IT organisations and in the development of projects. This will cover the issues of:

- project initiation and financial justification
- the impact of rapid technological developments
- project management issues over the development lifecycle and management issues in the implementation and maintenance of IT projects
- operational management of IT in organisations including the problems of security, service level agreements, specifications
- procurement, contracts and negotiation strategies
- managing IT in a global environment
- outsourcing, impact of offshore and business processes
- ethical and social issues, which impact on the organisation
- issues in relation to aligning IT within the organisation
- budgetary issues - quantifying benefits, identifying costs,
- using information economics to capture strategic benefits and business imperatives.

Examination – 70%

Group Coursework – 30%

Pre-requisites: None

### CE00408-3 Advanced Mobile Computer Based Communications

Contact: Justin Champion

#### Module Details

This course will continue from the Fundamentals of Mobile Computing course, looking at the mobile computing and positioning systems in detail.

- Bearer services within 2G, 2.5G, 3G and 3.5G
- Push and Pull services, within the cellular environment
- Positioning services (Cellular, Local and Satellite based)
- Data transfer within Personal Area Networks and Local Area Networks
- Architecture of current and near future devices
- Operating system design for devices and current technology
- Context of use for the particular technologies

Examination – 50%

Assignment – 50%

Pre-requisites: Prior study of CE00375-2 Fundamentals of Mobile Computing or any of the mobile technology modules

### CE00403-3 Biometrics 2 (not yet available)

Contact: David Hodgkiss

#### Module Details

Consideration of the wider reaching aspects associated with biometrics.

Physiology; psychology; legal and ethical issues; socio-political issues; weaknesses and strengths of biometric techniques; countermeasures; cost / risk considerations; fraud detection and deterrence; multiple biometrics.

Assignment – 100%

Pre-requisites: Prior study of CE00399-2, Biometrics 1 or equivalent

**CE00459-3 Mobile Web and Multimedia**

Contact: RUSSELL CAMPION      Room K348      Ext: 3464

**Module Details**

*Mobile web development*  
*Categories of Mobile Multimedia*  
*EMS and MMS*  
*Streaming Mobile*  
*3G and beyond*  
*Mobile Gaming*

An assignment weighted at 50% assessing learning outcomes 1 and 2. The assignment will be to produce a small practical artefact, coupled to a written report of 2,500 words documenting design of the solution.  
An exam 50% assessing learning outcomes 1 and 3.

Pre-requisites: None

**CE00461-3 Online Gaming**

Contact:      **Fiona Knight**      **Room k235**      **x3771**

**Module Details**

*Use of games on the web*  
*Advanced Scripting for web games*  
*Development of games with tools such as Director or Flash and 3D studio Max*  
*Different genres of games for the web*  
*Connection of web games to other devices such as mobile*  
*Online Game Interactivity such as Xbox Live*  
*On Line Game Communities*

Assessment Details      An ASSIGMT weighted at 100%.

Pre-requisites: Prior study of CE00309-2 Multimedia Applications or CE00354-2 Web Multimedia or CE00085-2 Time Based Multimedia or equivalent.  
This module cannot be studied by students currently enrolled on the BSc (Hons) Computer Games Design / BSc (Hons) Computer Games Programming awards.

## CE00122-3 Advanced Switching

**Contact:** Frank Dudek Room K224 x3421

### Module Details

*Key characteristics of various switching technologies*

*LAN Switching and the hierarchical model of network design*

*Media Types: Legacy Ethernet, CSMA/CD, Ethernet Addressing, Fast Ethernet, Gigabit*

*Ethernet*

*VLANs and network security, VLANs and broadcast distribution, configuring VLANs,*

*VLAN Identification (ISL, IEEE 802.1q)*

*Spanning tree protocol (STP)*

*VLAN routing*

*Multicasting: IGMP and CGMP: Advanced traffic management, multicast addressing, routing multicast traffic, multicast routing protocols, configuring IP multicast routing*

*Restricting network access, Access policy overview, controlling privilege levels, policy configuration*

**Assessment Details** An EXAM length 2 HOURS weighted at 70%. A PRACT EXAM length 1 HOURS weighted at 30%.

**Pre-requisites:** To have studied the level 1 module, Introduction to Networking with LAN's and WAN's and the level 2 module LAN Switching and WAN Networks.

## CE00397-3 Forensic Data Gathering, Reconstruction and Analysis

**Contact:**

### Module Details

*Operating system functionality and its impact upon evidence gathering*

*Digital media and data storage*

*Access controls and encryption*

*Analysis of digital media*

*Tools for investigation and data recovery*

*Recovery of digital evidence*

*Standards for evidence handling e.g. ISO 17799*

*Network activity monitoring and tracing*

*Risk analysis*

*Evaluation and reporting of evidence*

**Assessment Details** An EXAM length 2 HOURS weighted at 50%. An ASSIGMT weighted at 50%.

**Pre-requisites:** Prior study of Data Recovery, Tracing and Evidence Gathering in Computer Systems, CE00384-2 or equivalent and CE00326-1, Computer Systems and System Software or equivalent.

# SEMESTER 2 MODULES

<b>CE00347-3 Real Time Systems 2</b>
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Contact: Ian Sunley                      Room K218                      x3418

**Module Details**

Categorisation and impact of formal approaches; role of proof; model checking.  
 Characterisation of safety; safety culture; risk and its management; cost of failure. Standards and safety life-cycle.  
 Fault tolerance.  
 Hardware interfacing; interrupts and polling; transformers and transducers.  
 Testing techniques and environment modelling.

Assignment 50%

Examination 1.5 hours 50%

Pre-requisites: Prior study of Fundamentals of Software Development or equivalent high level language module  
 AND prior study of Real Time Systems 1.

<b>CE00329-3 Distributed Computer Systems</b>
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Contact: Pirooz Saeidi                      Room K244                      x3270

**Module Details**

- Internetworking with TCP/IP: Concepts Architectures and Protocols
- Internet Protocol Addresses
- The structure of the Internet & Client\_Server Paradigm
- Naming with Domain Name Systems and Programming
- The Socket Interface & Network Programming
- Applications of networking
- Characterisation of Distributed Systems and design goals
- Interposes Communication: communication primitives, semantics and supporting services and fault tolerance.
- Remote Procedure Calling
- Distributed systems management and services.
- Distributed file system.
- Time and Coordination
- Distributed mutual exclusion
- Concurrency Control
- Transaction Processing
- Replication

100% in course assessment.

In-course Test (30%) - Duration 45 minutes

Practical assignment: continual tutorial-based practical work (70%)

Pre-requisites: Prior study of Introduction to C Programming or equivalent AND prior study of Hardware and Software Systems and Networks 2 or equivalent.

### CE00361-3 Computing and Concurrent Systems

Contact: Fred Pratt                      Room K346                      x3271

#### Module Details

A structured approach to understanding, designing and building concurrent systems.

- Design of concurrent systems via communicating sequential processes.
- Classical concurrency problems e.g. starvation, deadlock, deadlock detection and avoidance
- A sugared view of CSP.
- Structured concurrent design methods e.g. JSD.
- Approaches to correctness, strengths and weaknesses.
- Concurrent System generators.

An ASSIGNMENT weighted at 50%. An EXAM length 1.5 HOURS weighted at 50%.

One 50% concurrent system design

One 50% examination (1.5 hrs)

Pre-requisites: Prior study of Fundamentals of Software Development or equivalent.

### CE63030-3 Chaos and Fractals

Contact: Brian Burrows                      Room K221                      x3420

#### Module Details

The basic definitions of Chaos and fractals and an appreciation of the applications. The analysis of Chaos through simple iterative models. Algorithms for generating fractals. The analysis of fractal dimension.

A report on some aspect of Chaos and fractals, including software, analysis and historical aspects. This will be weighted 50% of the total assessment and cover learning outcomes 1,2.

A final 2-hour examination weighted 50% covering the learning outcomes 1,2.

Pre-requisites: Prior study of CE61002-1 Mathematics and Statistics for Computing Students, or equivalent

### CE00339-3 Information Systems Development Trends

Contact: Euan Wilson                      Room K319                      x3467

#### Module Details

This module examines trends in information systems development. Potential areas will be:

Themes and issues in information systems development methods

Current trends in IS technologies (eg distributed systems, web based systems, multimedia technologies) and their impact on information systems development

Metamodelling concepts and generic frameworks for evaluating, comparing, contrasting and selecting methods and tools

IS development tools, IS development tool architecture, levels of complexity, advantages and limitations

IS development research methods including action research and learning

ASSIGNMENT weighted at 50%.

EXAMINATION weighted at 50% - length 1.5 hours

Pre-requisites: Prior study of Systems Analysis and Design or equivalent.

**CE00344-3 Real-Time Rendering and Animation**

Contact: Claude Chibelushi

Room K220

x3802

**Module Details**

Game design and development: tools and methodologies, game software architectures, game genres and perspectives.

Data structures for spatial subdivision.

Algorithms and techniques for: modelling shape, surface appearance, and motion; real-time rendering; programmable shaders; collision detection; multi-player (distributed) games; mobile games.

Algorithms and techniques for animation: character and shape animation (vertex animation, skeletal animation - skins and bones), motion capture.

Performance or rendering or animation systems: bottlenecks, profiling, optimisation, caching, multithreading.

Hardware platforms (general-purpose computer, game console): features and programming constraints.

Assignment (50%)

Exam 2 hours (50%)

Pre-requisites: Prior study of Introductory Computer Graphics or equivalent.

**CE00389-3 Knowledge Discovery and Data Mining**

Contact: Bernadette Sharp

Room K252

x3468

**Module Details**

The characterisation of knowledge discovery, data mining and text mining.

Methodology of data mining.

Data mining algorithms.

Information extraction systems.

Data mining and data privacy.

Social and ethical issues.

An EXAM length 2 HOURS weighted at 50%. An ASSIGMT weighted at 50%.

Pre-requisites: Prior study of CE00341-2, Artificial Intelligence Methods or equivalent.

**CE63032-3 Mathematical Modelling**

Contact: David Emery

Room K223

x3303

**Module Details**

Modelling methodology and the modelling process.

Deterministic and stochastic models.

Simulation modelling.

Modelling with differential equations.

Use of a computer algebra package.

A group project weighted 40% assessed by a group demonstration and individual reports.

An individual project weighted 60% assessed by an individual report

Pre-requisites: Prior study of CE61002-1 Mathematics and Statistics for Computing Students, or equivalent.

### CE63031-3 Financial Modelling with Decision Making

Contact: David Emery

Room K223

x3303

#### Module Details

Financial Markets - FTSE, shares, options, financial press.

Investment Appraisal - use of EXCEL to evaluate investment decisions (NPV, IRR, Payback, annuities).

Portfolio analysis - statistical analysis (expectation, covariance) involved with portfolio analysis.

Mean-variance portfolio theory, portfolio optimisation.

Modelling and solving investment decisions using LP techniques in EXCEL.

Options and option pricing using the binomial model.

One Fund Theorem and Capital Asset Pricing Model

An assignment, involving the creation and management of a virtual portfolio of shares listed in the Financial Times, will be carried out. All transactions will be recorded and processed using EXCEL. The assignment will be assessed through a written report (1000 words) and weighted 50%.

A written examination, in which the students will have access to EXCEL, will be taken at the end of the module. (2 hours) This is also weighted 50%.

Pre-requisites: Prior study of CE61002-1 Mathematics and Statistics for Computing Students, or CE61007-1 Quantitative Tools for Computing, or BLB10000-1 Business and Accounting Skills, or equivalent.

### CE00349-3 E-Commerce/M-Commerce Systems: Strategy and Management

Contact: Sandra Begley

Room K237

x3568

#### Module Details

This module will explore the theory and practice of both the business and technical domains of electronic and mobile commerce to acquire the necessary knowledge and skills for developing and implementing strategies for e-commerce and m-commerce business.

The starting point therefore, is the development of an understanding of the theories that underpin the subject, for example strategy, business models and infrastructure types for electronic and mobile commerce and value chains. The module will then focus on aligning electronic/mobile application priorities with business goals in order to plan effectively and strategically, identifying opportunities to exploit electronic/mobile commerce for sustained competitiveness.

This will include an opportunity to explore the potential impact of deploying electronic/mobile commerce strategies in business activities through the analysis of case studies, before putting theory into practice.

The module will examine the technologies, approaches, applications, design and usability/ globalisation aspects of e-commerce issues to enable the student to implement a practical artefact that meets the appropriate e-commerce or m-commerce strategy and business plan. This will include an appreciation of the ethical and legal implications of e-commerce and m-commerce solutions

60% Coursework. Group based coursework, based on a case study which will include the design and implementation of a prototype.

40% Examination - Closed Book. Duration 1.5 hours

Pre-requisites: Study of a systems analysis and design module.

<b>CE00340-3 Legal and Evidentiary Aspects of Forensic Computing</b>
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Contact: Bill Fone            Room K213            x3304

**Module Details**

Legal context and structures.  
Forensic laboratory set up.  
Digital evidence controls.  
Processing crime and incident scenes.  
Writing investigation reports.  
Expert testimony.

PC fundamentals and component handling  
Operating systems  
Data storage  
Access controls and encryption  
Data recovery  
Forensic investigation and evidence handling

Exam 50% - length 1.5 hours  
Task based assignments 50%

Pre-requisites: Prior study of Fundamentals of Software Development or equivalent and prior study of Professional and Enterprise Development or equivalent.

<b>CE00348-3 Project Management</b>
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Contact: Alan Eardley

Room K330

x3456

#### Module Details

1. Project context and scope. The IT project initiation phase and the project charter. Environmental analysis and stakeholder involvement. Agreeing goals and deliverables and establishing terms of reference. Identifying and analysing critical success factors. Negotiating for resources. Producing a project charter that is agreeable to all stakeholders;
2. Project management tools. Choosing and using a project management package (e.g. MS Project ?). Overcoming the problems of integrating a project management package into a typical organisation. Producing project reports and maintaining the project plan;
3. Project framework. Work breakdown structures and outlines. Delegation, team building and human resource factors. Task contracts and resource allocation. Organising and motivating the project team. Setting up a project in a project management package;
4. Project estimating. Evaluation and choice of estimating method. Manipulating effort and duration. Ways of overcoming estimating problems and improving estimating accuracy. Interpreting resource data in a project management package;
5. Project scheduling. Producing and issuing a baseline plan. Entering schedule data into a project management package. Use of bar charts, resource histograms and precedence networks. Adjusting the plan and manipulating resources and tasks. Scheduling 'non-linear?' project models (e.g. RAD, web site and prototyping projects);
6. Project management processes. Risk, change and quality management policies. Project management methods (e.g. PRINCE2, PMBOK), documentation and reporting standards. Risk analysis and contingency planning. Monitoring risk and change in the project plan.

#### Coursework 30%

A business/technical report based on a case study taking about 30 hours per student to produce. The work will normally be done in pairs, with a section that provides an individual to shared mark component in the ratio 60:40. The work will include the analysis of an existing situation, the application of project management techniques (introduced in lectures and developed in tutorials) and the presentation of a proposal or solution using techniques acquired in a similar manner. It is intended to promote and assess practical skills.

#### Examination 70%

An individual closed-book, time-constrained examination of 2 hours duration. The examination may be based on the same case study as the course work. A choice of questions will be offered, with a compulsory section if considered appropriate.

Pre-requisites: Prior study of Systems Analysis and Design or equivalent.

**CE00356-3 Advanced Web Multimedia**

Contact: Fiona Knight                      Room K235                      x3771

**Module Details**

Students will look at advanced areas of web multimedia including the following:-

SVG - production and practice  
SMIL - production and practice  
Streaming Media - setup and reasoning  
Web Accessibility  
Advanced scripting for web multimedia - Action Script  
Multiuser distributed multimedia  
Web TV applications  
Mobile Multimedia applications.

Assignment (100%), Learning Outcome 1-4

Pre-requisites: Prior study of WebMultimedia or equivalent.

**CE00316-3 XML and Web Services**

Contact: Fiona Knight                      Room K235                      x3771

**Module Details**

The progression of HTML to XHTML  
Web Standards  
XML and XSLT  
Xpath, Xforms, Xlink, XQuery  
XML family such as SVG, SMIL, MathML, GML, RDF  
Web Services and SOAP  
XML Encryption, Key management, signature and security  
Web Ontology  
Semantic Web  
DOM / SAX  
EbXML  
.NET and J2EE

Assignment 50%

Exam 50% - length 1.5 hours

Pre-requisites: Prior study of Fundamentals of Software Development or equivalent.

**CE00363-3 Further Programming for Mobile Devices**

Contact: John Byrne                      Room K244                      x3270

**Module Details**

Techniques for compression and encryption over mobile networks.

Games Programming for Mobile Devices.

Optimisation.

Databases and persistence.

Over The Air Technologies.

Synchronization strategies

Over The Air Provisioning (OTPA)

100% in course assessment.

In course test (30%) duration 0.75 hours.

Practical Assignment: continual tutorial based practical work (70%)

Pre-requisites: Prior study of Software Development for Mobile Computing Applications or equivalent and Further Programming Concepts in C++ or equivalent.

**CE00330-3 Enterprise Programming for Distributed Applications**

Contact: Pirooz Saeidi                      Room K244                      x3270

**Module Details**

- Basic Web Concepts & Network Programming in Java
- Introduction to Computer Networks and the Internet Applications
- The Client-Server model and introduction to Java socket Programming
- Programming for Electronic Email applications using MIME Protocol (Multi Purpose Internet Message Exchange)
- Introduction to Servlets
- Java Data Base Connectivity (JDBC) for database connection
- Java and XML (Extension Markup Language)
- Java and DOM (Distributed Object Model)
- Java and SAX (Sample API for XML)
- Introduction to EJB (Enterprise JAVA Beans) Architecture
- Java Servlet Programming
- Java Server Pages (JSP)
- RMI (Remote Method Invocation)
- Introduction to Enterprise Java Beans (EJBs), exploring:
  - Component-based and EJB Architecture
  - Client-side component model
  - Server-side component model
- Related Technologies for Building EJBs (JNDI (Java Naming and Directory Interface), JDBC,..)
- Deploying EJBs
- Session Beans- Stateful and Stateless
- Entity EJBs
- Message Driven EJBs

100% coursework:-  
In-course Test (30%) Duration 45 minutes  
Practical Assignment: continual tutorial-based practical work (70%)

Pre-requisites: Prior study of Fundamentals of Software Development or equivalent AND prior study of Hardware and Software Systems and Networks 2 or equivalent.

### CE00169-3 Implementation of Advanced Virtual Reality Concepts

Contact: Bob Hobbs                      Room: K325              Ext:4365

#### Module Details

Students will learn the advanced concepts of virtual reality systems by:  
Implementation of inverse and forward kinematics  
Implementation of artificial intelligence for virtual reality  
Development of integrated advanced virtual reality applications by employing virtual reality peripherals such as:  
- HMD  
- motion tracking  
- force feedback systems  
and by the production of calibration routines for virtual reality devices

Practical assignment weighted at 100% which will assess Learning Outcomes 1, 2 and 3.

Pre-requisites: CE00171-3, Integration of Virtual Reality Hardware and Software or equivalent.

### CE00460-3 TV and Film Computing

Contact: Russell Campion              Room: K348              Ext:3464

#### Module Details

Special Effects for TV and film  
Animation for TV and film and games  
TV and Film Standards  
Interactive TV  
Content convergence  
Streaming Media  
Introduction to games / genres  
Game genre / Game design  
Stop Motion Animation / 2D Computer Animation / 3D computer animation  
100% assignment assessing all learning outcomes.  
The assignment will use a given practical case study for which the student is to design for. This will involve aspects of TV/Film and games. The practical work will be documented in a written report.

Pre-requisites: Prior study of CE00020-2 Visual Media Applications or equivalent.

This module cannot be studied by students currently enrolled on the BSc (Hons) Computer Games Design / BSc (Hons) Computer Games Programming awards.

**CE00128-3 Network Troubleshooting****Contact:** Frank Dudek Room K224 x3421**Module Details**

Support resources for network analysis

Workgroup discovery and CCO

Strategies for documenting symptoms, actions and results

Tracking log-ins and connections

Diagnosing and correcting campus TCP/IP and switching problems

Troubleshooting Virtual local Area Networks (VLANs) on routers and switches

Diagnosing and correcting frame relay and ISDN BRI problems

**Assessment Details** An EXAM length 2 HOURS weighted at 50%. A PRACT EXAM length 2 HOURS weighted at 50%.**Pre-requisites:** To have studied level 1 module Introduction to Networking with LANs and WANs and the level 2 module LAN Switching and WAN Networks**CE00404-3 Malicious Software & Security Programming****Contact:** Martin Slade Room K356 x3554**Module Details**

Common security structures/procedures e.g. from UNIX, Windows, Internet.

Self-replicating and infecting software - structure/operation and techniques for attack, detection prevention and damage limitation.

Attack patterns and strategies for breaking code. Reconnaissance, scanning, unauthorised access through application software, operating system and network attacks and exploits, denial of service attacks, Backdoors and RootKits. Reverse engineering.

Software security testing. Secure initialisation, validation, limit and error handling. Defences and tools - e.g. security scanners, file integrity checkers, applications of cryptography, antivirus tools and techniques. Social engineering factors. Ethical and legal consideration

**Assessment Details:** An ASSIGMT weighted at 50%. An EXAM length 2 HOURS weighted at 50%.**Pre-requisites:** Prior study of: Introduction to C Programming or equivalent; AND Hardware and Software Systems 1 or equivalent**CE00XXX-3 Computer Animation – (Not yet available)**

