School of Mathematical & Computer Sciences
Dept of Computer Science

BSc Computer Systems

Programme Handbook
2014

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PART A – SCHOOL INFORMATION

Welcome and Introduction

The term 'Flexible, Distributed and Independent Learning' is used to refer to educational provision leading to an award of Heriot-Watt University as the awarding institution, but delivered, supported or assessed through means which do not require the student to attend on-campus. This includes distributed learning delivered through an Approved Learning Partner, individual distance learning in which there may be little direct contact with staff and students on campus, and e-learning supported and, where relevant, accessed via the internet. Students may study using a mixture of on-and off-campus mechanisms.

Students in receipt of this handbook are studying through an Approved Learning Partner (an organisation/institution with which Heriot-Watt University has entered into agreement and which is charged with delivery of and learner support for a Heriot-Watt University programme of study to students) and should contact the Partner in the first instance for any academic query or assistance.

This handbook contains information on the programme structure, notes, description and the courses offered on the Computer Systems programme.

Welcome from the Principal

I am delighted to welcome you as a student of Heriot-Watt University!

Heriot-Watt University has a well-earned reputation as Scotland's most international and outward-looking University. With three campuses in Scotland (attended by a high percentage of students from across the world), a Campus in Dubai, a new Campus in Malaysia and Learning Partner institutions across the world, we have a vibrant and diverse learning culture which is unique and unmatched by other universities in the United Kingdom. We are keen to give our students the opportunity to develop an international dimension to their studies which will enhance their opportunities for future growth.

You are an important part of this global community and I very much hope you enjoy your time with us.

Professor Steve Chapman
Principal and Vice-Chancellor

Welcome from Head of School

We have produced this handbook in order to answer many of the questions that students may have during their studies here, including administrative procedures relating to the running of their degree programme and the support services available to them. We hope students will find this information useful.

"MACS is a flagship School of Heriot-Watt University, leading in research and research-led teaching. Its departments cover three areas - mathematics, actuarial mathematics and statistics,

and computer science. For our students, MACS offers strong research and postgraduate courses and a wide range of high quality undergraduate courses. It has top research and excellent teaching ratings and is a lively international centre for leading-edge developments and exciting new courses".

Professor Philippe De Wilde, Head of School.

General Information about Heriot-Watt University and School

Heriot-Watt University
Heriot-Watt University has four campuses, a parent campus in Edinburgh, the capital of Scotland in the UK, two campuses in the north and south of Scotland, a Campus in Dubai, a new Campus in Malaysia, as well as a number of overseas centres running University programmes. Heriot-Watt University's mission is to provide students with the opportunity to study programmes which will enable them to contribute immediately to the economy and wellbeing of the region in which they choose to work. This ethos of "doing things that matter" stretches right back to the origins of Heriot-Watt in 1821, when programmes were run to suit the needs of developing industries in Scotland.

The web address is www.hw.ac.uk

School of Mathematical and Computer Sciences
The School of Mathematical and Computer Sciences (MACS) at Heriot-Watt is at the forefront of education in these fundamentally important disciplines. It brings together the departments of Actuarial Mathematics and Statistics, Computer Science and Mathematics, within which are offered a wide variety of taught courses and an array of relevant and innovative research options.

MACS has an excellent reputation and is highly rated for the quality of its research and teaching. In addition, the School has myriad links to international industry and offers excellent pathways into the many fascinating careers open to Mathematics and Computer Science specialists. Computer Science lies at the heart of our technologically driven society, supporting everything from the largest corporate systems to the individual mobile device. Consequently, the range of career specialisms within the broad IT industry is quite staggering. At the same time, the technology is evolving so quickly that there is always a new challenge. Heriot-Watt ensures that graduates of the Computer Science department are armed with fundamental technical and business skills, allied to strong links with industry, to take full advantage of the career opportunities available.

Approved Learning Partners
Approved Learning Partners (ALPs) are educational institutions established in various countries around the world.

The main task of an ALP is to provide the necessary face-face teaching to complement the written course materials and ensure that their students are adequately prepared to sit the examinations successfully. Additionally, ALPs must also provide adequate learning facilities such

as tutorial rooms, study areas, library and computing access, to a level approved by Heriot-Watt University.

ALPs are responsible for ensuring that students have a supported learning experience through access to tutorial support, representation, counselling and advice.

As ALPs are in direct contact with students, it is expected that students use their ALP to deal with all first level enquiries. However, the CS DL team aims to support ALPs as much as possible and will assist with queries as requested. Students can also contact the CS DL team by emailing the DL Administrator at dlenquiries@macs.hw.ac.uk

ALPs are monitored through a variety of methods, including the examination performances of their students and also from feedback received from their students (via anonymous Heriot-Watt University questionnaires, via Heriot-Watt University appointed student ambassadors at each ALP, or from comments received whilst Heriot-Watt University are visiting students at the ALP).

Key Staff and Contact Details

Key Contacts

The Computer Science Distributed Learning team (hereafter referred to as the CS DL team) are responsible for the provision of the Computer Systems programme.

Head of School	Philippe De Wilde	P.De_Wilde@hw.ac.uk
Head of Computer Science	Nick Taylor	N.K.Taylor@hw.ac.uk
DL Director	Jennifer Coady	J.Coady@hw.ac.uk
BSc Computer Systems Course Director	Peter King	P.J.B.King@hw.ac.uk
DL Manager	Lisa Scott	L.J.Scott@hw.ac.uk
DL Administrator	Rodi Amiridou	dlenquiries@macs.hw.ac.uk

Student queries should be addressed to the ALP in the first instance. If a query cannot be resolved at a campus level; the academic coordinators can contact the Head Office or the DL Team for further assistance. If a query cannot be resolved at a campus level or by the Head Office, students and academic coordinators are welcome to email the DL team at dlenquires@macs.hw.ac.uk

Enrolment

All new students must enrol by the start of the new Academic year in August or in January for the mid-year intake students.

All continuing students should also enrol on-line by the start of the new Academic year in August.

Enrolment involves logging in to our online system here https://myhwu.hw.ac.uk/HWSAS8/twbkwbis.P_ValLogin to check and update personal details and agree to the University's terms and conditions. This needs to be done annually in September regardless of when a student first enrolled.

Enrolment for students will include the following,

- Confirmation of Personal and Statistical information
- Confirmation of Contact Details
- Upload a passport-style photo for student card (for new students only)
- Confirmation of Programme Details
- Contact information for enquiries regarding tuition fees
- Acceptance of University terms and condition

To login to the online enrolment system you will need your Registration Number (continuing students) or HW Person ID (new students) and Date of Birth in DDMMYY format.

Please note that you have three opportunities to enter your details for the on-line enrolment correctly before your account gets disabled. There is also the facility to reset your own PIN, guidelines can be found on the enrolment web page here https://myhwu.hw.ac.uk/HWSAS8/twbkwbis.P_ValLogin

If you have problems with on-line enrolment, please contact the DL Administrator at dlenquiries@macs.hw.ac.uk in the first instance.

Communication

It is essential that the University is kept informed of any changes to student's personal details and it is the responsibility of the student to notify the CS DL team.

Contact Details

Students should submit a completed *Change of Details* form, in order to inform the CS DL team of any change to their address or contact details. This form is available from their ALP.

VISION

Students are given access to the VISION, Heriot-Watt University's Virtual Learning Environment. Here students can access course information, learning materials, administration forms as well as two diets of past examination papers. At the end of the online enrolment process, students are able to print off a confirmation letter with Vision access details. Please note that it can take up to 72hrs before your Vision account gets activated.

VISION can be accessed after on-line enrolment at https://vision.hw.ac.uk using the username and password which is provided on your confirmation letter. If you have difficulty accessing VISION please contact the DL Manager Lisa Scott L.J.Scott@hw.ac.uk in the first instance.

Heriot-Watt University E-mail Address

All students of Heriot-Watt University are assigned a personal HWU email address, which uses the same login details as VISION.

To access their emails, students must go to www.hw.ac.uk and in the search box type "Webmail", and then select the first option: "Webmail-Heriot-Watt University"

It is very important that students check their HWU email on a regular basis as this is the email used to make students aware of important information being posted onto VISION (e.g. changes to the programme which may affect your studies). Students cannot, therefore, claim to not know of changes, if they do not access VISION on a regular basis.

Heriot-Watt University/ CTI Agreement (Teach Out Arrangement)

The partnership agreement between CTI Education Group and Heriot-Watt University is due to expire in June 2015. The last student intake will be in January 2014 for full time students only. All students need to meet the academic requirements until November 2014 when the final third year exams will be taken. There will be a final resit exam diet in June 2015. During the teach out period students are advised not defer their examinations as they risk limiting the number of opportunities and not to delay submitting outstanding coursework.

The School of Management and Languages will be aligning their external degree programmes with the on-campus degree programmes, therefore all students are advised:

January 2014 intake students:

All full time students who register in the January 2014 intake will be able to sit C89OM/OP exam in the June 2014 diet and resit –if required- the exam in the December 2014 diet.

The June 2015 exam diet will only be for resit students who failed in the December 2014 diet.

Current (continuing) students:

MACS students who failed Operations Management already will be able to resit the course in December 2013 and /or June 2014 and/or December 2014.

We recommend all MACS students to take the Operations Management course before June 2014 exam diet.

In January 2013 the School of Mathematical and Computer Sciences implemented changes to the BSc Computer Systems programme:

All students who commenced the programme from July 2012 onwards would study F27EM Emerging Technologies and F28IN Interaction Design instead of F29OC Operating Systems and Concurrency and F29AI Artificial Intelligence and Intelligent Agents.

As a result HWU will be offering only one further examination opportunities for the students who commenced the programme prior to July 2012 in the following two courses:
* F29OC Operating Systems and Concurrency
* F29AI Artificial Intelligence and Intelligent Agents

Therefore students who require resits for the F29AI and/or F29OC examinations can only do so in June 2014 diet.

Students who require resits in F29AI and/or F29OC also have the option of changing to the F27EM and/or F28IN courses and should discuss this option with their Academic Coordinators at their local CTI campus.

Students who still have coursework outstanding for F29AI and/or F29OC will have one final opportunity to resubmit the coursework in the current semester.

Programme Structure

Our academic year is divided into 2 semesters corresponding to 30 weeks. There will be 12 weeks teaching in each semester. You are expected to study 4 courses each semester, giving a total of 8courses in a full year. Each course is worth 15 credits. Courses may be mandatory or optional.

Mandatory courses: These courses are compulsory

Optional courses: Students are required to choose from a specified list of courses relevant to the subject area of their degree discipline. **Please note** not all optional courses are available at all campuses.

All undergraduate courses are designed to be of equal length in terms of student effort. The average student is expected to put in a total effort of 150 hours per course. These 150 hours includes all lectures, tutorials, computing labs, workshops, background reading, writing up notes, coursework, revision and examinations for the course.

How to Use This Catalogue

The course information, which appears in the format below, is designed to provide you with sufficient details about courses, their content and assessment methods and will help you choose your optional courses.

Course Code:	Course Title:		Course Co-ordinator:
Pre-requisites:			
Aims:			
Syllabus:			
Learning Outcomes: Subject Mastery	*Understanding, Knowledge and Subject-Specific Skills*		
Learning Outcomes: Personal Abilities	*Cognitive skills, Core Skills and Professional Awareness*		
Assessment Methods	Assessment:	Re-assessment:	

Many of the courses have on-line material available at the University's Virtual Learning Environment (VISION) which can be found at: http://vision.hw.ac.uk/

Terminology

Course Code   The first character identifies the School (F = MACS)

The second digit identifies the discipline area (2=Computer Science).

The next digit is the SCQF level of the course:

SCQF Level 7 normally studied in Year 1

SCQF Level 8 normally studied in Year 2

SCQF Level 9 normally studied in Year 3

SCQF Level 10 normally studied in Year 4 (A zero in course codes)

SCQF Level 11 normally studied in Year 5/Postgraduate (A one in course codes)

The next 2 letters identify the topic.

The last digit identifies the semester in which the course is taught.

Courses coded Care delivered by the School of Management and Languages.

Course Co-ordinator:	The name of the member of staff who is responsible for delivery of the course
Pre-requisites:	Students must have gained Grade D or above in the courses listed here in order to gain entry to the course.
Aims:	A brief statement of what the course aims to do
Syllabus:	A brief summary of what is included in the course
Learning Outcomes: Subject Mastery	These will include Understanding, Knowledge and Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)
Learning Outcomes: Personal Abilities:	Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT
Assessment Methods:	Details of the weighting and type of assessment(s) and re-assessment (if any) for the course

Examinations

It is the student's responsibility to check all relevant examination timetables (including re-sits).

	IMPORTANT DATES-Available on VISION			
DIET	Examination Dates	Examination Application Deadline	Examination Deferral Deadline	Examination Results Released
May/June 2014	To be confirmed	1st March	1st May	August 2014
December 2014	To be confirmed	1st September	1st November	February 2015

Only three types of calculator are allowed in examinations: Casio fx-85WA, Casio fx-85MS and Casio fx-85ES. Students must provide their own calculators. Students are not allowed to have mobile phones or other communication devices on or about their person during examinations. Phones may be left at the front of the examination room but must be switched off.

Coursework

Each course comprises elements of formative and summative coursework, details of which will be made available through the respective course in VISION.

Feedback on formative coursework, such as exercises, lab work, group discussion, textbook questions, will be provided to you by your Approved Learning Partner.

Summative coursework will be assessed by your ALP and moderated by Heriot-Watt University. All summative coursework should be completed to a satisfactory standard (Grade D) for a student to pass the course but will not form part of your final grade. If you do not complete the summative coursework to a satisfactory standard you will not be awarded credits for the course, progress to the next stage of the programme or be eligible graduate.

All summative coursework should be submitted both to HWU via VISION and to your local tutor via e-mail. Please follow the submission procedures specified for each assignment on VISION.

The exception will be the Third Year Group Project which will account for 50% of the grade for F29SO Software Engineering and F29PD Professional Development Synoptic pair.

Coursework Resubmission Policy

Students who fail the coursework 3 times may be allowed a 4th opportunity for the coursework if they have mitigating circumstances. If they have such circumstances, then the 4th attempt will be their final one.

Students who have failed their coursework 3 (or exceptionally4) times must repeat the entire course i.e. Resubmit the coursework and resit the exams.

Plagiarism& Cheating

Cheating in examination and plagiarism, which is, the presentation of another person's ideas or work as one's own, are very serious offences and are dealt with severely. They carry a range of penalties up to and including expulsion from the University.

Students are responsible for familiarising themselves with University policy on these matters. For more details on Plagiarism see here http://www.hw.ac.uk/registry/resources/plagiarismguide.pdf

Turnitin scores of 50% or more will automatically get a mark of 0. Turnitin scores between 25-49% marks may be reduced accordingly.

Grades & Assessments

Grades for each course are awarded as follows:

Grade A	Excellent	Overall mark of approximately 70% or more
Grade B	Very Good	Overall mark of approximately 60% to 69%
Grade C	Good	Overall mark of approximately 50% to 59%
Grade D	Satisfactory	Overall mark of approximately 40% to 49%
Grade E	Adequate	Minimum required for the award of credits but at least a grade D is needed for progression to subsequent courses
Grade F	Inadequate	Fail

If you do not pass a course at the first attempt, you have one opportunity to resit the course at the next examination diet.

Notification of Special Circumstances

It is **very important** that you notify your mentor **as soon as possible** of any special circumstances, such as illness or bereavement, which could adversely affect your assessment performance. In the case of illness, a medical certificate must be supplied. The Examiners will always take such circumstances into account where appropriate, but the later the notification, the less scope there is to do so.

In particular, notification should be before the examination diet concerned, and certainly no later than the Examiners Meeting. Late notification will mean that either no account can be taken, or that formal procedures have to be invoked. In the latter case, final year students will not be permitted to graduate until these procedures have been completed. For further details, see the University Regulations in PART B of this handbook.

BSc Computer Systems Programme Structure

2013/14

Programme Code	Programme Title		School	Type	Awards
F2CD-CSE	**Computer Systems**		Mathematical & Computer Sciences		BSc (Ord), Diploma of Higher Education, Certificate of Higher Education

Programme Accredited by	UCAS Code	QAA Subject Benchmarking Group(s) Computing	Date of Production/Revision June 2013/2014

Stage Composition		Arrangement of Courses: (Themes and Subject Streams)						Awards, Credits & Levels
		Mandatory Courses		**Optional Courses**		**Elective Courses**		
		Semester 1	Semester 2	Semester 1	Semester 2	Semester 1	Semester 2	
Stage 1	8 courses: All mandatory	F27SA Software Development 1	F27SB Software Development 2					**Certificate of Higher Education** Requires 120 SCQF credits at level 7
		F27PX Praxis	F27CS Introduction to Computer Systems					
		F27IS Interactive Systems	F27WD Web Design and Databases					
		F17LP Logic & Proof	F27SG Software Development 3					
Stage 2	8 courses: All Mandatory	F28IN Interaction Design	F28SD Software Design					**Diploma of Higher Education** Requires 240 SCQF credits incl. 90 at level 8 or higher
		F28WP Web Programming	F28FS Formal Specification					
		F28DA Data Structures & Algorithms	F28DM Database Management Systems					
		F28PL Programming Languages	F17SC Discrete Mathematics					

Programme Code F2CD	Programme Title **Computer Systems**		School Mathematical & Computer Sciences	Type	Awards BSc (Ord), Diploma of Higher Education, Certificate of Higher Education
Programme Accredited by	**UCAS Code**		**QAA Subject Benchmarking Group(s)** Computing		**Date of Production/Revision** June 2013/2014
Stage Composition	**Arrangement of Courses: (Themes and Subject Streams)**				**Awards, Credits & Levels**
	Mandatory courses		**Optional Courses**	**Elective Courses**	

Stage 3	8 courses: 6 Mandatory 2 Optional	Semester 1 F29SO Software Engineering F29GR Computer Graphics C89OM Operations Management 1 C89OP Operations Management 2	Semester 2 F29PD Professional Development F29KM Knowledge Management		Choose 2 of: F27EM Emerging Technologies **(Direct Entrants Only)** F28IN Interaction Design **(Direct Entrants Only)** F29AI Artificial Intelligence & Intelligent Agents F29OC Operating Systems & Concurrency	Semester 1	Semester 2	Ordinary or General Degree Requires 360 SCQF credits incl 60 at level 9

Stage Notes

Stage Two:
♦   Direct entrants to Stage 2 and internal transfers from other degrees will be expected have an appropriate background in programming and database technology.

Stage Three:
♦   Direct entrants to Stage 3 and internal transfers from other degrees will be expected have appropriate programming experience and background knowledge.
♦   Candidates shall pursue a group project throughout the year, which shall be synoptically assessed in conjunction with material from the associated courses (F29SO and F29PD)

	Educational Aims of the Course
	The educational aim is to provide students with a theoretical foundation and applied skills in Computer Science in addition to other professional skills which will enable graduates to communicate clearly, work independently and co-operate effectively. The balance of skills will enable graduates to work effectively and efficiently in industry and commerce and prepare them for postgraduate study.
	The Course provides opportunities for learners to achieve the following outcomes:
Subject Mastery	*Understanding, Knowledge and Cognitive Skills* ♦ To develop knowledge and skills in the elicitation and analysis of user requirements, design and evaluation of solutions, and the implementation and quality assurance of the chosen solution. ♦ To be able to develop well-structured, efficient, usable and well-documented programs. ♦ To know what general classes of problems are amenable to computer solution and be able to select the appropriate tools required for particular problems. ♦ To be able to develop an abstract model for a given problem and devise appropriate mechanized techniques to solve the problem. ♦ To develop the knowledge and skills required to meet the challenges of emerging technologies and methodologies. *Scholarship, Enquiry and Research* ♦ To gain an in depth understanding of the theoretical foundations of computation and its relevance to everyday computing. ♦ To be able to design, implement, document, verify and validate relatively large heterogeneous software systems. ♦ To be able to assess the quality of software systems, both in terms of their functional and non-functional properties.

<table>
<tr><td rowspan="1">Personal Abilities</td><td>

Industrial, Commercial and Professional Practice
- ♦ To maintain and update technical knowledge; to take responsibility for personal and professional development.
- ♦ To appraise the impact of computers on society and the influence of society on the development of the technology and use of computers.
- ♦ To assess aspects of the law related to computer-based information or the role of standards in safety, quality and security, of security issues and of the BCS Codes of Practice and Conduct.

Autonomy, Accountability and Working with Others

- ♦ To undertake self-directed work; to assimilate information from multiple sources; to examine results and generate conclusions; to impart ideas effectively in visual, verbal or written form.
- ♦ To work effectively either individually or as part of a team.
- ♦ To apply subject-mastery outcomes to monitor, analyse, model, specify, design, communicate, implement, evaluate, control and plan.
- ♦ To be aware of, and be able to respond to, the social and legal implications and consequences of the use of computers.
- ♦ To be able to analyse problem spaces; develop and work with abstractions; appraise material and ideas; to apply a methodical and innovative approach to problem solving; to integrate theory and practice

Communication, Numeracy and ICT

- ♦ To be able to communicate with peers, more senior colleagues and specialists. In addition, communicate using appropriate methods to a range of audiences, i.e. specialists and non-specialists.
- ♦ To be able to undertake critical evaluation/analysis of a wide range of numerical and graphical data.

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Approaches to Teaching and Learning:

Lectures, Tutorials (practicals, laboratories), Coursework, (assignments, individual projects, group projects, essays, reports, presentations, log/journals, dissertation), Self-study are linked to *lecture-based, resource-based and problem-based* teaching styles, to relate with *motivational, assimilative, consolidative and evaluative* phases of learning.

Approaches to teaching and learning are continually reviewed and developed with the aim of matching them to the abilities and experiences of students, with regard also for the subject area. Specific details about teaching and learning methods are provided in the appropriate course descriptors.

Assessment Policies:

The following assessment methods are used:

Understanding, knowledge and subject specific skills are assessed through the range of methods reflected by written examinations, coursework assignments, software artefacts, group and individual projects, written reports and oral presentations.   Diagnostic, formative, continuous and summative types of assessment aim to correlate with methods of assessment.

Approaches to assessment are continually reviewed. Specific details about methods of assessment are provided in the appropriate course descriptors

BSc Computer Systems

Course Descriptors

Year 1, Semester 1

Course Code: **F27SA**	Course Title: **Software Development 1**	Course Co-ordinator: **V Rieser/R Pooley**
Pre-requisites:		
Aims:	**To introduce the object-oriented paradigm and the use of an object-oriented language**	
Syllabus:	♦ Objects and classes ♦ Class definitions: fields, constructors, methods, parameters ♦ Selection and iteration ♦ Object interaction: abstraction, modularisation, types ♦ Grouping objects: collection classes, iterators, arrays ♦ Library classes, documentation ♦ Testing and debugging ♦ Designing classes: coupling, cohesion, main method	
Learning Outcomes: **Subject Mastery**	*Understanding, Knowledge and Subject-Specific Skills* ♦ Understanding the object-oriented paradigm ♦ Awareness of the contrast with other programming paradigms ♦ Manipulating objects in an IDE ♦ Understanding and using documentation in an API ♦ Reading, understanding, adapting, creating, and documenting object-oriented code	
Learning Outcomes: **Personal Abilities:**	*Cognitive skills, Core skills and Professional Awareness* ♦ Sharing work with random partners in laboratories (pair programming) ♦ Deriving and creating own solutions to problems (PDP) ♦ Competence in the use of a command-line shell (PDP) ♦ Reading and evaluating code, and modifying it.	
Assessment Methods:	Assessment: Examination: (weighting – 100%)	Re-assessment: Examination: (weighting – 100%)

Course Code: F27PX	Course Title: Praxis	Course Co-ordinator: H Hastie, R Pooley
Pre-requisites:		
Aims:	♦ To instruct students in undertaking self-directed study ♦ To instruct students in presenting their findings ♦ To acquaint students with the work of the department ♦ To deepen students' understanding of the degree courses for which they are registered ♦ To familiarise students with the computer systems used by the department	
Syllabus:	♦ Writing reports; sources and referencing; group presentation; the matter of plagiarism ♦ Personal development planning ♦ History of information and computing ♦ Current departmental research ♦ Exploration of the departmental computer system	
Learning Outcomes: Subject Mastery	*Understanding, Knowledge and Subject-Specific Skills* ♦ Knowledge of relevant historical developments ♦ Understanding of the human issues – moral, economic, social, political – arising from the use of computing technology ♦ Acquaintance with new research in computing ♦ Consideration of difficult and even perplexing ideas in their chosen field of study ♦ Knowledge of and ability to use departmental computer systems	
Learning Outcomes: Personal Abilities:	*Cognitive skills, Core skills and Professional Awareness* ♦ Personal development planning (PDP) ♦ Undertaking responsibility for self-directed research (PDP) ♦ Assimilating information from multiple sources (PDP) ♦ Analysing results to formulate conclusions (PDP) ♦ Writing reports to professional standards (PDP) ♦ Constructively evaluating the work of peers (PDP) ♦ Reacting sensibly to peer evaluation (PDP) ♦ Re-writing work in response to criticism (PDP) ♦ Co-operating in a group to investigate a complex topic (PDP) ♦ Making spoken and visual presentations (PDP) ♦ Using a chatboard as a means of learning, contributing and discussing (PDP)	
Assessment Methods:	Assessment: Examination: (weighting – 100%)	Re-assessment: Examination: (weighting – 100%)

Course Code: F27IS	Course Title: Interactive Systems	Course Co-ordinator: J Robertson, G Grov
Pre-requisites:	None	
Aims:	**To give students an opportunity to explore current technological media and creative approaches**	
Syllabus:	♦ Basic comparison and evaluation of designs and prototypes ♦ Reflecting on one's own learning and progress ♦ Development of Interactive Systems, for example - Web site development: page layout, navigation, graphics, animation/interaction - Game development using a current game authoring tool: level design, storyline, game mechanics	
Learning Outcomes: Subject Mastery	*Understanding, Knowledge and Subject-Specific Skills* ♦ To give students experience of designing and developing an interactive system. ♦ To give students experience of evaluating and critiquing interactive systems.	
Learning Outcomes: Personal Abilities:	*Cognitive skills, Core skills and Professional Awareness* ♦ To gain an awareness of the benefits and pitfalls of different approaches to multimedia project work ♦ To raise awareness of the legal and ethical responsibilities within the discipline ♦ To appreciate and enjoy the challenges of creative work (PDP) ♦ To take responsibility for one's own learning and managing workload (PDP) ♦ For students to appreciate their own strengths and weaknesses, and what is possible within time constraints (PDP) ♦ To develop skills in written, oral and media based communication (PDP) ♦ To present solutions to design challenges in the subject area (PDP) ♦ To develop experience and skills in giving and receiving constructive criticism (PDP)	
Assessment Methods:	Assessment: Examination: (weighting – 100%)	Re-assessment: Examination: (weighting – 100%)

Course Code: F17LP	Course Title: Logic and Proof	Course Co-ordinator: M Lawson
Pre-requisites:	None	
Aims:	This is an introduction to first order logic for mathematicians and Computer scientists. There are three components to this course: proofs, propositional logic and predicate logic. Proofs are the basis of mathematics — how do we know what we say is true? — and also of computer science — how do I know this program will do what I think it will do? Propositional logic and predicate logic are the two ingredients of first-order logic. Propositional logic deals with proofs that can be analysed in terms of the words and, or, not, implies whereas predicate logic extends this to encompass the use of the words there existsandfor all	
Syllabus:	Introduction: An overview of the sorts of questions we shall be dealing with and, In particular, why mathematics is such an important ingredient in computer science. The notion of an algorithm and its relation to the notion of a program. Some history of computing. (1 lecture) Propositional logic: Definition of the connectives by means of truth tables; truth tables of compound propositions; graphs for propositional formulae; order of precedence rules and brackets; contradictions, satisfiable formulae, tautologies; valid arguments; equivalence relations and logical equivalence; disjunctive and conjunctiveve normal forms and adequate sets of connectives; truth-trees; P = NP?(12 lectures) Boolean algebras: Definition of Boolean algebras; the Boolean algebra of sets; theBoolean algebra of propositions; proving results about Boolean algebras; an introduction to circuit design. (6 lectures) First-order logic: relations; names and predicates; quantification; syntax; semantic Truth-trees.(9 lectures) Functions and counting: Sets and functions; countable and uncountable sets; how many programs are there?(3 lectures)	
Learning Outcomes: **Subject Mastery**	*Understanding, Knowledge and Subject-Specific Skills* By the end of the course, students should be able to: ♦ Construct truth tables of compound propositions ♦ Determine whether a proposition is a contradiction, satisfiable or a tautology. ♦ Convert between different forms. ♦ Convert an argument into symbolic form and determine whether it is valid. ♦ Solve problems in propositional logic using truth-trees. ♦ Solve problems using Boolean algebras. ♦ Design simple circuits. ♦ Be able to interpret first order formulae. ♦ Solve problems in first order logic using truth-trees. ♦ Understand and use sets, functions and relations to express ideas	
Assessment Methods:	Assessment: Examination: (weighting – 100%)	Re-assessment: Examination: (weighting – 100%)

BSc Computer Systems

Year 1, Semester 2

Course Code: **F27SB**	Course Title: **Software Development 2**	Course Co-ordinator: **V Reiser, G Michaelson**
Pre-requisites:		
Aims:	♦ **To impart further techniques of object orientation** ♦ **To introduce Graphical User Interface techniques**	
Syllabus:	♦ Inheritance and Generics: hierarchies, subclasses, polymorphism, static and dynamic type, overriding, dynamic method lookup. ♦ Designing classes: coupling, cohesion, abstraction, modularisation, types ♦ Abstract classes, abstract methods, interfaces ♦ State machines & state diagrams GUIs: components, layout, event handling ♦ Code refactoring and regression testing using Unit testing	
Learning Outcomes: Subject Mastery	*Understanding, Knowledge and Subject-Specific Skills* ♦ Understanding and application/ mastery of the object-oriented paradigm ♦ Understanding of inheritance and generics. ♦ Understand how to produce well designed, i.e. extendable and maintainable, code. ♦ Ability to critically evaluate and improve the quality of code. ♦ Ability to develop simple state diagrams ♦ Ability to design and implement simple graphic user interfaces	
Learning Outcomes: Personal Abilities:	*Cognitive skills, Core skills and Professional Awareness* ♦ Possession of fundamental skills in computer science, applicable throughout the remainder of the degree ♦ Understanding of the importance of regular working habits (PDP) ♦ Understanding of the use of chat boards and other devices to learn from and instruct others in the class (PDP) ♦ Ability to compare and evaluate the applicability of simple data structures to relevant problems (PDP)	
Assessment Methods:	Assessment: Examination: (weighting – 100%)	Re-assessment: Examination: (weighting – 100%)

Course Code: **F27CS**	Course Title: **Introduction to Computer Systems**	Course Co-ordinator: **Peter King**

Pre-requisites:	
Aims:	♦ **To introduce students to modern computer systems architecture** ♦ **To give students an appreciation of logical design and data representation**
Syllabus:	♦ Overview. ♦ Hardware components - peripherals, memory & CPU. ♦ Boolean algebra. ♦ Low-level information representation. ♦ CPU organisation. ♦ Introductory assembly language programming. ♦ Operating system: I/O; interrupts; scheduler; virtual memory; file system. ♦ Concurrency: processes; threads; synchronisation; shared & distributed memory; distributed & parallel architectures. ♦ Language processors: compiler; interpreter; assembler; loader. ♦ Linux shell scripting
Learning Outcomes: **Subject Mastery**	*Understanding, Knowledge and Subject-Specific Skills* ♦ Overview of hardware/software hierarchy in contemporary computer systems; ♦ Understanding of purpose and function of major system hardware and software components; ♦ Understanding of information representation in computer systems; ♦ Ability to write Linux shell scripting
Learning Outcomes: **Personal Abilities:**	*Cognitive skills, Core skills and Professional Awareness* ♦ To be able to express arguments/problems in propositional and predicate calculus. ♦ To be able to communicate in using formal notations

Assessment Methods:	Assessment: Examination: (weighting – 100%)	Re-assessment: Examination: (weighting – 100%)

Course Code: F27WD	Course Title: Web Design and Databases	Course Co-ordinator: Helen Hastie, Albert Burger

Pre-requisites:	
Aims:	**To develop knowledge and understanding of fundamental web design concepts and combine these with database structuring and querying techniques applying this knowledge by implementing an easy-to-use website.**
Syllabus:	♦ Introduction to database systems. ♦ Modelling of data/entity-relationship modelling. ♦ The relational data model. ♦ The relational algebra. ♦ Redesigning a relational database/normalisation. ♦ The Structured Query Language (SQL). ♦ Introduction to Transactions. ♦ Databases and Information Systems. ♦ Database applications - including databases and the web interaction including php
Learning Outcomes: Subject Mastery	*Understanding, Knowledge and Subject-Specific Skills* ♦ To explain fundamental web design concepts including usability. ♦ To implement a simple web site which satisfies current standards and uses a database. ♦ To describe the use of CSS and mark-up within a web site and the advantage this gives the developer. ♦ To describe the need for standard XHTML and how this aids cross browser compatibility. ♦ To have knowledge and understanding of data analysis and structuring techniques. ♦ To design database structures as a relational data model. ♦ To implement and query a designed database structure through a web site.
Learning Outcomes: Personal Abilities:	*Cognitive skills, Core skills and Professional Awareness* ♦ To analyse complex information and organise it in a structured way for a web site. ♦ To understand stakeholders' requirements and address them. ♦ To design a web site that is easy and cost efficient to manage. ♦ To analyse data sources and represent them in an efficient structured form. ♦ Problem solving (PDP). ♦ Paired work (PDP). ♦ Time management (PDP). ♦ Reflection, constructive criticism and learning from peers (PDP).
Assessment Methods:	Assessment: Examination: (weighting – 100%)	Re-assessment: Examination: (weighting – 100%)

Course Code: **F27SG**	Course Title: **Software Development 3**	Course Co-ordinator: **D McGookin/G Grov**

Pre-requisites:	
Aims:	To develop further skills and techniques in programming in a high-level language.
Syllabus:	♦ static structures – tables ♦ linear techniques e.g. search, delete, update ♦ string & text processing ♦ dynamic structures - stacks & queues ♦ recursive techniques – linear recursion, accumulation recursion ♦ sorting & searching e.g. binary search, quicksort, merge sort, hash tables ♦ linked structures – lists – construction, traversal, delete, update ♦ linked structures – trees – construction, traversal, delete, update, balance ♦ file processing ♦ introductory complexity & "big O" notation
Learning Outcomes: Subject Mastery	*Understanding, Knowledge and Subject-Specific Skills* ♦ To understand properties of and algorithms for fundamental static, dynamic and linked data structures ♦ To know when to deploy fundamental data structures and algorithms in practical problem solving ♦ To gain mastery of fundamental linear and recursive programming techniques ♦ To know when to deploy linear and recursive programming techniques in practical problem solving ♦ To understand fundamental techniques for processing very large data sets from files ♦ To gain skill in elementary analyses of fundamental algorithms and data structures to give insight into their time and space complexity bounds ♦ To understand correspondences between different programming techniques ♦ To understand correspondences between different data structures and algorithms
Learning Outcomes: Personal Abilities:	*Cognitive skills, Core skills and Professional Awareness* ♦ To understand how the choice of algorithms and data structures determines the efficacy of proposed solutions to problems ♦ To be able to explain the implications of choosing particular algorithms and data structures for the time and space behaviour of solutions
Assessment Methods:	Assessment: Examination: (weighting – 100%)	Re-assessment: Examination: (weighting – 100%)

BSc Computer Systems

Year 2, Semester 1

Course Code: F28IN	Course Title: Interaction Design	Course Co-ordinator: Sandy Louchart, Helen Hastie
Pre-requisites:	F27IS Interactive Systems or or other prior learning approved by MACS	
Aims:	The module aims to give students the opportunity to develop: ♦ A broad knowledge and understanding of requirements gathering, design and evaluation theory and techniques in interaction design. ♦ An introduction to commonly used design techniques and pattern for user interfaces. ♦ A selection of routine skills and methods involved in working with users.	
Syllabus:	Current topics in Interaction Design including: interaction design lifecycles, user interface design patterns, basic qualitative and quantitative data gathering and presentation techniques, accessibility.	
Learning Outcomes: Subject Mastery	*Understanding, Knowledge and Subject-Specific Skills* Students will develop skills in the following areas: ♦ Critically analyse interaction design and interfaces. ♦ Propose solutions in response to interface design problems ♦ Evaluate the effectiveness of user interfaces with respect to user requirements.	
Learning Outcomes: Personal Abilities:	*Cognitive skills, Core skills and Professional Awareness* Students will develop skills in the following areas: ♦ Use discipline appropriate software for data analysis, ♦ Present, analyse and interpret simple numerical and graphical data gathered as part of evaluation studies. (PDP) ♦ Communicate effectively to knowledgeable audiences by preparing informal presentations and written reports. (PDP) ♦ Exercise autonomy and initiative by planning and managing their own work within a specified project; (PDP) ♦ Take responsibility for their own and other's work by contributing effectively and conscientiously to the work of a group (PDP)	
Assessment Methods:	Assessment: Examination: (weighting – 100%)	Re-assessment: Examination: (weighting – 100%)

Course Code: F28WP	Course Title: Web Programming	Course Co-ordinator: H Taylor, S Chumbe

Pre-requisites:	F27WD Web Design and Databases or equivalent
Aims:	To familiarise students with current techniques and paradigms in web programming. To enable them to design and implement robust and scalable web based applications.
Syllabus:	History of web development technologies Design patterns (such as REST, Separation of content and presentation, and abstraction of resources) Server side programming using an appropriate scripting language General architecture of a web server Templating systems Client side programming topics, including the Document Object Model Security relating to web applications Deployment, including coping with scale
Learning Outcomes: Subject Mastery	*Understanding, Knowledge and Subject-Specific Skills* • Broad knowledge and understanding of the history of web programming • The ability to apply the concepts, patterns and architectures used in web programming to new problems • Detailed technical skills to use a scripting language for both server side and client side programming • The ability to make informed decisions about appropriate web technologies to use for a particular task
Learning Outcomes: Personal Abilities	*Cognitive skills, Core skills and Professional Awareness* Students will develop skills in the following areas: • Practice in working on a development project in a small group under the guidance of a tutor • Practice in defining the subject and scope of a development project (PDP) • Deconstructing a problem and synthesizing a solution • Time management
Assessment Methods:	Assessment: Examination: (weighting – 100%)	Re-assessment: Examination: (weighting – 100%)

Course Code: **F28DA**	Course Title: **Data Structures & Algorithms**	Course Co-ordinator: **Lilia Georgieva**

Pre-requisites:	F27SB Software Development 2 & F27SG Software Development 3
Aims:	♦ To introduce core algorithms and data structures used in a wide range of applications in Computer Science ♦ To further develop skills in algorithm and data structure design, and the development of medium sized programs
Syllabus:	♦ Algorithm and data structure topics including: advanced trees, string processing, graphs, hash tables ♦ Algorithm/data structure choice, design and deployment
Learning Outcomes: **Subject Mastery**	*Understanding, Knowledge and Subject-Specific Skills* ♦ Ability to analyse and hence choose suitable algorithms and data structures for a given problem ♦ To design and implement medium sized programs based on a range of standard algorithms and data structures and making appropriate use of libraries ♦ Understanding the distinction between abstract Algebraic Data Type (ADT) properties and concrete ADT realisations ♦ Appreciation of need for integration of multiple ADTs in substantial programs ♦ Appreciation of efficiencies/reassurances from ADT reuse
Learning Outcomes: **Personal Abilities:**	*Cognitive skills, Core skills and Professional Awareness* ♦ To be able to critically analyse and hence choose suitable algorithms and data structures for a given problem ♦ To be able to convey the advantages and disadvantages of alternative data structures and algorithms ♦ To develop practical problem-solving skills in the context of programming ♦ To be able to plan & execute a substantial software
Assessment Methods:	Assessment: Examination: (weighting – 100%)	Re-assessment: Examination: (weighting – 100%)

Course Code: F28PL	Course Title: Programming Languages	Course Co-ordinator: Greg Michaelson/Jamie Gabbay
Pre-requisites:	Software Development 3 (F27SG), Introduction to Computer Systems (F27CS), Logic & Proof (F17LP) or equivalent	
Aims:	• To gain understanding of different language paradigms • To gain understanding of defining concepts of programming languages • To develop skills in programming in languages from key paradigm	
Syllabus:	• Overviews of language history, definition (lexicon, syntax, semantics), implementation (compiler, interpreter, virtual machine) • Overviews of language paradigms: e.g. imperative (high-level, system, low-level), declarative (functional, logic), concurrency/parallelism • Overviews of programming language concepts: variable, lvalue&rvalue, assignment (sharing/copying), data abstraction (sequential, structured, recursive, shared/distributed), type mechanisms (weak/strong, static/dynamic, ad-hoc/parametric polymorphism), declaration (scope, extent), control abstraction (sequence, choice, repetition, block, procedure, labels/jumps, exceptions, processes) , expression abstraction (functions), parameter mechanisms (value, reference) , evaluation mechanisms (strict/lazy, ordered/unordered, concurrent) • An introduction to programming in languages from key paradigms e.g. • imperative/system: C • imperative/low-level: assembler • declarative/functional: SML • declarative/logic: Prolog	
Learning Outcomes: Subject Mastery	*Understanding, Knowledge and Subject-Specific Skills* • understanding of distinguishing characteristics of language paradigms • understanding of relationships between languages • understanding of generic language concepts • ability to program in languages from key paradigms • ability to use tool sets for these languages	
Learning Outcomes: Personal Abilities:	*Cognitive skills, Core skills and Professional Awareness* • understanding of how to choose an appropriate language for different problem domains	
Assessment Methods:	Assessment: Examination: (weighting – 100%)	Re-assessment: Examination: (weighting – 100%)

BSc Computer Systems

Year 2, Semester 2

Course Code: F28SD	Course Title: Software Design	Course Co-ordinator: A Ireland, P Vargas
Pre-requisites:	F27SA – Software Development 1 OR *equivalent*	
Aims:	♦ An introduction to a range of processes and methods that promote the design of high quality software systems. ♦ A perspective of where design sits within the development life-cycle.	
Syllabus:	♦ Software process models; ♦ Architectural styles; ♦ Design methods and associated notations – including function-oriented, object-oriented and component-based design; design patterns; ♦ Software development life-cycle issues, with particular focus on requirements engineering, validation and verification (testing).	
Learning Outcomes: **Subject Mastery**	*Understanding, Knowledge and Subject-Specific Skills* ♦ To demonstrate a critical understanding of software process models and design methods. ♦ To be able to develop design solutions using a range of structured notations. ♦ To demonstrate a critical understanding of the context in which software design takes place, in particular requirements engineering and the activities of validation and verification (testing).	
Learning Outcomes: **Personal Abilities:**	*Cognitive skills, Core skills and Professional Awareness* ♦ Take responsibility for own work and exhibit critical reflection on development process. (PDP) ♦ To be able to use appropriate methods and standards for practice and documentation in software engineering and information systems. ♦ Demonstrate evidence based approaches to problem solving. ♦ Use a range of numerical and graphical skills in evaluating and communicating ideas, as well as measuring progress toward achieving goals.	
Assessment Methods:	Assessment: Examination: (weighting – 100%)	Re-assessment: Examination: (weighting – 100%)

Course Code: F28DM	Course Title: Database Management Systems	Course Co-ordinator: M Farrow, A Gray
Pre-requisites:	F27WD Web Design and Databases or equivalent	
Aims:	To familiarise students with the principles of database management systems, to enable them to design and implement databases for specific applications and to integrate databases with application programs.	
Syllabus:	♦ **Database Design:** data requirements, entity relationship diagrams, relational data model, integrity constraints, key constraints, types, integrity maintenance ♦ **Relational Queries:** SQL, Boolean combinations of queries, aggregation, duplicate elimination, nested queries, negation, views, insertions, deletions, updates, command level interfaces, JDBC ♦ **Query execution and optimisation:** data storage principles, file organisation, indexing, indexes in commercial DBMS's, relational algebra, query execution plans, cost estimation of plans, interpretation of plans, physical database design ♦ **Concurrency:** transactions, schedules, serialisability, concurrency control protocols, locking, two-phase-locking, time stamp based concurrency control. ♦ **Emerging Database Trends:** XML and data warehousing	
Learning Outcomes: Subject Mastery	*Understanding, Knowledge and Subject-Specific Skills* ♦ Broad knowledge and understanding of the concepts and formalisms of database design ♦ Detailed knowledge of the building blocks and meaning of relational database queries ♦ Critical understanding of the principles of query evaluation and concurrency control underlying database applications ♦ Practice in the collection of data requirements and the design of conceptual database schemas ♦ Evaluation of emerging database trends and ability to understand their benefits	
Learning Outcomes: Personal Abilities:	*Cognitive skills, Core skills and Professional Awareness* ♦ Practice in working on a development project in pairs under the guidance of a tutor (PDP) ♦ Practice in defining the subject and scope of a development project (PDP) ♦ Deconstructing a problem and synthesizing a solution (PDP) ♦ Time management (PDP).	
Assessment Methods:	Assessment: Examination: (weighting – 100%)	Re-assessment: Examination: (weighting – 100%)

Course Code: F28FS	Course Title: Formal Specification	Course Co-ordinator: Jamie Gabbay
Pre-requisites:	F28PL Programming Languages, and F17LP Logic and Proof or equivalent	
Aims:	To introduce students to specification of programs in a formal logical language (Z), and demonstrate the path from this to programs in a programming language (SML).	
Syllabus:	♦ Reprise of logic and proof. ♦ Basic notions of set theory. ♦ Introduction to Z notation. ♦ Relations and functions. ♦ Schemas and specification structure. ♦ SML programming as needed for the course (mainly: datatypes, pattern matching, recursion, higher-order functions). ♦ Representing Z constructs in SML (types, predicates, sets, relations, functions, sequences). ♦ Converting Z specifications to SML (e.g., invariants as assertions, preconditions as guards, postconditions as actions). ♦ Testing of Z specifications via prototyping.	
Learning Outcomes: Subject Mastery	*Understanding, Knowledge and Subject-Specific Skills* ♦ Accurate understanding of the syntax and informal semantics of Z. ♦ Given a real world example, create a formal specification to model it. ♦ Reason with the specification, once produced. ♦ Given a specification, discuss what it models. ♦ Understand SML: polymorphic types, recursive functions, higher order functions, pattern matching, structured types. ♦ Given a specification, interpret it as operational requirements of a program. ♦ Given a specification, refine it to a program satisfying that specification. ♦ Understand the limitations and appropriate use of formal techniques	
Learning Outcomes: Personal Abilities:	*Cognitive skills, Core skills and Professional Awareness* ♦ Understand the importance of specification and its distinction from implementation. ♦ Develop mathematical specification skills. ♦ Appreciation of the role of formal techniques in software development. ♦ Ability to deploy declarative abstraction in software development. ♦ Awareness of limitations of formal techniques. ♦ Awareness of appropriate use of formal logic in programming & software design.	
Assessment Methods:	Assessment: Examination: (weighting – 100%)	Re-assessment: Examination: (weighting – 100%)

Course Code: **F17SC**	Course Title: **Discrete Mathematics**	Course Co-ordinator: **A Konechney**
Pre-requisites:	Higher Mathematics grade C (or equivalent)	
Aims:	The goal of the course is to explain the basic techniques of discrete mathematics which are used in computer science.	
Syllabus:	♦ Set Theory and Combinatorics: Set algebra, The Inclusion-Exclusion Principle, Binomial Theorem, Elementary counting methods, Mathematical Induction. ♦ (6 lectures) ♦ Graph Theory 1: Introduction to graphs, Basicgraph terminology. Adjacency Matrices, Paths and connectivity, Connected components, ♦ Shortest path problems in weighted graphs, Dijkstra's Algorithm. (5 lectures ♦ Graph Theory 2: Trees and spanning trees, Breadth-first search, Kruskal's and Prim's Algorithms for a minimal spanning tree, Euler and Hamilton paths, ♦ Fleury's Algorithm for constructing Euler circuits, Prefix Codes and Huffmann Coding. (6 lectures) ♦ Recurrence Relations: Solving problems by iteration, First and second order recurrence relations, Recurrences in Algorithms (3 lectures) ♦ ♦ Matrices and Linear Transformations: Linear equations and elementary row operations, Elementary matrices and Gaussian elimination, Echelon matrices, ♦ Matrices as space transformations, Eigenvectors and eigenvalues, Diagonalization, The rank theorem. (8 lectures) ♦ Probability Theory: Probability Space, Conditional Probability, Independence and Bayes' Theorem, ♦ Random Variables and Distributions, Expected Value, Variance, Examples of applications to algorithms (5 lectures)	
Learning Outcomes: Subject Mastery	*Understanding, Knowledge and Subject-Specific Skills* ♦ Know the basic terminology of set theory, graph theory, liner algebra and probability theory ♦ Understand how formal mathematical objects like sets, graphs, matrices, recurrence relations arise in computer science related problems ♦ Be able to solve elementary counting problems, solve systems of linear equations, apply graph algorithms, solve simple recurrence relations, be able to compute probabilities ♦ Appreciate the power of mathematical formalisation, facilitated by the use of precise definitions and notations, in solving practical problems. ♦ Appreciate the value of careful, quantitative reasoning in analysing problems related to computer science and to recognise that the outcome of such reasoning can defy naïve intuition	
Learning Outcomes: Personal Abilities:	*Cognitive skills, Core skills and Professional Awareness* ♦ Understand and use abstract mathematical concepts ♦ ♦ Use logical reasoning to prove theorems ♦ Communicate mathematical reasoning orally and in writing	
Assessment Methods:	Assessment: Examination: (weighting – 100%)	Re-assessment: Examination: (weighting – 100%)

BSc Computer Systems

Year 3, Semester 1

Course Code: **F29SO**	Course Title: **Software Engineering**	Course Co-ordinator: **Monica Farrow**
Pre-requisites:	F28SD Software Design, F28IT Internet & Communications, F28DM Database Management, F28IN Interaction Design	
Aims:	♦ To equip students with knowledge and skills for the effective management of a group project which encompasses the software development lifecycle ♦ To enable students to reinforce their knowledge and skills gained in software processes, internet technology, database management and interaction design ♦ To build students understanding, knowledge and skills in teamwork, software development in groups, and project planning. ♦ To enable students to develop a broader understanding of the interrelationship of development life-cycles and a critical capability in the selection of tools and methods to support project planning, systems analysis, requirements capture, and system specification.	
Syllabus:	♦ Review and extension of the components studied in earlier years which contribute to the group project ♦ Software project management including working in groups, project planning and costing, risk assessment ♦ Use of Industry-level Standards for software development and documentation, covering aspects such as change control and requirements traceability ♦ Further study of software development tools, especially version control	
Learning Outcomes: Subject Mastery	*Understanding, Knowledge and Subject-Specific Skills* ♦ A broad and integrated understanding and knowledge of the various development and programming paradigms, software development life-cycles, teamwork and project planning ♦ Detailed theoretical and practical knowledge of the use of methodologies for requirements capture, iterative design, resource capture and management, deployment and evaluation of systems, at a basic level ♦ Practice in the use of object-oriented programming, databases, scripting and markup languages applied to a substantial project	
Learning Outcomes: Personal Abilities:	*Cognitive skills, Core skills and Professional Awareness* ♦ Identification, critical analysis and evaluation of the development of a software system (PDP) ♦ Practice in working in a group, negotiating requirements, reaching a consensus, taking responsibility for own work, taking part in a presentation, and working with others to a deadline (PDP) ♦ Appreciation of the interrelationship of knowledge domains	
Assessment Methods:	Assessment: Group Project: (weighting - 50%) Examination: (weighting – 50%) Synoptic with F29PD Professional Development	Re-assessment: Examination: (weighting – 100%)

Course Code: F29GR	Course Title: Computer Graphics	Course Co-ordinator: Mike Chantler

Pre-requisites:	F28PL2 Programming Languages *or equivalent*
Aims:	To introduce fundamental Computer Graphics theory and programming.
Syllabus:	♦ Overview of Computer Graphics & practical introduction to graphics programming ♦ Event driven I/O and callback programming & typical structure of an interactive, real-time computer graphics program ♦ 2&3D transformations, homogeneous co-ordinates, post-multiplication ♦ Modelling and instantiation ♦ Hierarchical modelling and scene graphs ♦ Scene graphs: creating, manipulating, creating a display list ♦ Perspective & orthographic projection ♦ Project specification ♦ Shading models and programming ♦ Texture mapping ♦ Putting it all together: the graphics pipeline ♦ Course summary and review
Learning Outcomes: Subject Mastery	*Understanding, Knowledge and Subject-Specific Skills* ♦ Critical understanding of the theory of 2D and 3D transformations, projection and viewing ♦ Ability to find & combine relevant sources and synthesise designs ♦ Detailed knowledge of the graphics pipeline ♦ Detailed knowledge of shading and texture mapping algorithms ♦ Broad knowledge of 3D modelling and rendering techniques ♦ Ability to understand, design and implement scene graphs ♦ Practical skills in graphics programming including scene graph programming and I/O processing
Learning Outcomes: Personal Abilities:	*Cognitive skills, Core skills and Professional Awareness* ♦ Ability to think and plan critically in three dimensions ♦ General critical analysis, evaluation and synthesis of ideas for the design of their project ♦ Technical report writing and organisation ♦ Team working skills (in pairs) ♦ Representation of, planning for, and solution of problems ♦ Ability to draw upon a range of sources when making decisions in their project work
Assessment Methods:	Assessment: Examination: (weighting – 100%)	Re-assessment: Examination: (weighting – 100%)

Course Code: **C89OM / C89OP**	Course Title: **Operations Management 1/Operations Management 2**	Course Co-ordinator: **Nigel Shaw**
Pre-requisites:	None	
Aims:	♦ to acquire knowledge about managing operations and resources in organisations of various sizes: private, public and not-for-profit. ♦ to explore some basic strategic, managerial perspectives and frameworks of operating systems. ♦ to develop an understanding of the many internal and external factors that impinges on the development of effective operating systems. ♦ to recognise and appreciate the role of technology and its impact on operations management. ♦ to appreciate the impact decisions made by operations managers have on an organisation's competitive performance. ♦ to develop an appreciation of planning and control concepts in operations management and their importance to an organisation's competitive performance. ♦ to recognise and understand the role of the human factor in operations management. ♦ to give students an understanding and practical grounding in modern project management theory and methods.	
Syllabus:	**Operations Management 1** ♦ Introduction to Operations Management ♦ Operating Systems, Performance Objectives & Operations Strategy ♦ Product and Service Design ♦ Facilities Location ♦ Demand Forecasting and Capacity Management ♦ Process Types ♦ Facilities Layout and Flow ♦ Process Design and Process Technology ♦ Performance Improvement	**Operations Management 2** ♦ Job Design and Work Organisations ♦ Planning and Control ♦ Inventory Management ♦ Supply Chain Management ♦ Materials Requirement Planning/Manufacturing Resource Planning ♦ Just-in-Time Management ♦ Project Planning ♦ Failure Prevention, Maintenance and Safety ♦ Quality ♦ Total Quality Management
Learning Outcomes: **Subject Mastery**	*Understanding, Knowledge and Subject-Specific Skills* ♦ discuss and explain a range of operations management concepts and techniques which can be used to support management decision-making. ♦ understand and use new developments in operations management thinking. ♦ explain the subjective, ever changing and uncertain nature of the environment within which operations management operate. ♦ solve real operational problems by application of theoretical and analytical models.	
Learning Outcomes: **Personal Abilities**	*Cognitive skills, Core Skills and Professional Awareness* ♦ develop analytical and evaluation skills ♦ work independently and as part of a group ♦ communicate and present ideas effectively by written means ♦ demonstrate an interest and awareness of current developments in operations management. ♦ work independently and as part of a group	
Assessment Methods:	Assessment: Examination: (weighting – 100%)	Re-assessment: Examination: (weighting – 100%)

BSc Computer Systems

Year 3, Semester 2

Course Code: F29PD	Course Title: Professional Development	Course Co-ordinator: Sandy Jean-Jacques Louchart/ Nick Taylor
Pre-requisites:	F28IN1 Interaction Design, F28IT1 Internet & Communications, F28DM2 Database Management Systems, F28SD2 Software Design, *or equivalent*	
Aims:	♦ **To instil a professional and ethical attitude toward the application of computer technology** ♦ **To introduce methods for the rational resolution of ethical problems** ♦ **To provide an appreciation of the relevant professional and legal requirements concerning computer-based systems** ♦ **To ensure an awareness of, and encourage deliberation about, the social implications of information technology**	
Syllabus:	♦ **Professionalism -** British Computer Society. ♦ **Rules & Regulations -** Codes & Standards; Computer Law; Ethical Decision Making. ♦ **Risks & Threats -** Computer Crime; Viruses. ♦ **Privacy & Security** – Databases; Biometrics. ♦ **Dependence & Change -** Safety-Critical Systems; Technology & Society. ♦ **Brave New Worlds -** Co-operative Computing; *e*Life.	

Learning Outcomes:
Subject Mastery
	Understanding, Knowledge and Subject-Specific Skills
	
	♦ **British Computer Society Codes -** Conduct; Practice
	♦ **ISO&BSI Standards -** Safety; Quality; Security
	♦ **Statute Law -** Contracts, Torts, Restitution; Data Protection; Freedom of Information, Intellectual Property; Computer Misuse
	♦ **Ethics -** Frameworks; Decision Making
	  ♦ Development life-cycle of a software system
	  ♦ Bi-directional influence between technological and societal trends
	  ♦ Current concerns over the application of computer technology
	  ♦ Current and potential remedies to abuse of computer technology	

Learning Outcomes: **Personal Abilities:**	*Cognitive skills, Core skills and Professional Awareness* ♦ Practice in personal decision making and introspection ♦ Identification and analysis of justification of personal choices to others ♦ Critical analysis of rational reasoning, consequential reasoning and debate ♦ Practice and reflective analysis of communication skills using a variety of media ♦ Practice in working in a group, negotiating requirements, reaching a consensus, and working with others to a deadline	
Assessment Methods:	Assessment: Group Project: (weighting - 50%) Examination: (weighting – 50%) Synoptic with F29SO Software Engineering	Re-assessment: Examination (weighting – 100%)

Course Code: **F29KM**	Course Title: **Knowledge Management**	Course Co-ordinator: **Jenny Coady**
Pre-requisites:	None	
Aims:	♦ To provide students with an overview of information and knowledge management in organisations ♦ To critically evaluate a range of methods used to develop strategies for information and knowledge management ♦ To examine the role that knowledge and users play in the learning organisation ♦ To critically evaluate the value of knowledge and IT for competitive advantage	
Syllabus:	♦ Information and Knowledge Management in Organisations ♦ Principles of Knowledge Management: information mapping and information audits ♦ Knowledge elicitation and representation ♦ Information strategy development ♦ Knowledge and IT for competitive advantage and as a corporate resource ♦ The learning organisation ♦ Planning for Knowledge Management within an organisation and the ethical issues which arise	
Learning Outcomes: Subject Mastery	*Understanding, Knowledge and Subject-Specific Skills* ♦ Differentiating between Data, Information and Knowledge ♦ Understand and evaluate theories and practices of knowledge management in organisations ♦ Critically evaluate the value of knowledge and IT for competitive advantage ♦ Compare and contrast methods to develop strategies and planning for knowledge management within organisations ♦ Examine the rise of the concept of the Learning organisation and how it can aid in competitive advantage	
Learning Outcomes: Personal Abilities:	*Cognitive skills, Core skills and Professional Awareness* ♦ Evaluating policies and strategies ♦ Planning for large scale organisations ♦ Ability to manage directed reading with self research (PDP) ♦ Report writing and demonstrating argument development (PDP) ♦ Use of technology as a means of learning, contributing and discussing (PDP)	
Assessment Methods:	Assessment: Examination: (weighting – 100%)	Re-assessment: Examination: (weighting – 100%)

Course Code: **F28IN**	Course Title: **Interaction Design**	Course Co-ordinator: **Sandy Louchart/Helen Hastie**

Pre-requisites:	F27IS1 Interaction Systems *or equivalent*
Aims:	**The course aims to give students the opportunity to develop:** ♦ **A broad knowledge and understanding of requirements gathering, design and evaluation theory and techniques in interaction design.** ♦ **An introduction to commonly used design techniques and pattern for user interfaces.** ♦ **A selection of routine skills and methods involved in working with users.**
Syllabus:	Current topics in Interaction Design including: interaction design lifecycles, user interface design patterns, basic qualitative and quantitative data gathering and presentation techniques, accessibility.
Learning Outcomes: **Subject Mastery**	*Understanding, Knowledge and Subject-Specific Skills* ♦ Critically analyse interaction design and interfaces. ♦ Propose solutions in response to interface design problems ♦ Evaluate the effectiveness of user interfaces with respect to user requirements.
Learning Outcomes: **Personal Abilities:**	*Cognitive skills, Core skills and Professional Awareness* ♦ Use discipline appropriate software for data analysis, ♦ Present, analyse and interpret simple numerical and graphical data gathered as part of evaluation studies. (PDP) ♦ Communicate effectively to knowledgeable audiences by preparing informal presentations and written reports. (PDP) ♦ Exercise autonomy and initiative by planning and managing their own work within a specified project; (PDP) ♦ Take responsibility for their own and other's work by contributing effectively and conscientiously to the work of a group (PDP)
Assessment Methods:	Assessment: Examination: (weighting – 100%)	Re-assessment: Examination: (weighting – 100%)

Course Code: **F27EM**	Course Title: **Emerging Technologies**	Course Co-ordinator: **Peter King/Rob Pooley**

Pre-requisites:	None
Aims:	♦ **To explore emerging technologies through a variety of project work**
Syllabus:	*Mixed groups carrying out 4 projects, each of 3 weeks in duration.* *Projects will vary, but the following are typical projects:* ♦ Controlling robots ♦ Programming mobile/hand-held devices ♦ Games ♦ Ant based systems (biologically inspired computing) ♦ Data-mining
Learning Outcomes: **Subject Mastery**	*Understanding, Knowledge and Cognitive Skills Scholarship, Enquiry and Research (Research-Subject Mastery Informed Learning)* ♦ The ability to carry out basic background research in a defined area ♦ Active exploration of a problem domain within the department's research portfolio ♦ Develop problem solving strategies which are applicable across domains. ♦ Reporting achievement
Learning Outcomes: **Personal Abilities:**	*Industrial, Commercial & Professional Practice Autonomy, Accountability & Working with Others Communication, Personal Abilities Numeracy & ICT* ♦ Report writing ♦ Presentation skills ♦ Skills for working in larger groups ♦ Time management ♦ Peer evaluation (where applicable)
Assessment Methods:	Assessment: Examination: (weighting – 100%)	Re-assessment: Examination: (weighting – 100%)

Course Code: F29AI	Course Title: Artificial Intelligence and Intelligent Agents	Course Co-ordinator: Verena Rieser/ Patricia Vargas
Pre-requisites:	Elementary knowledge of logic at the level of undergraduate Computer Science. Knowledge of high-level programming language concepts	
Aims:	◆ **To introduce the fundamental concepts and techniques of AI, including planning, search and knowledge representation** ◆ **To introduce the scope, subfields and applications of AI, topics to be taken from a list including natural language processing, expert systems, robots and autonomous agents, machine learning and neural networks, and vision.** ◆ **To develop skills in AI programming in an appropriate language**	
Syllabus:	◆ Search algorithms (depth first search, breadth first search, uniform cost search, A* search) ◆ constraint satisfaction problems; ◆ games (min-max, alpha-beta pruning); ◆ logic, resolution, introductory logic programming ◆ knowledge representation – logic, rules, frames ◆ goal and data-driven reasoning ◆ practical rule-based programming ◆ Overview of main fields of AI (Vision, Learning, Knowledge Engineering) ◆ In depth view of one field of AI (e.g. Planning, Natural language) ◆ Autonomous agents ◆ Applications of AI ◆ AI programming	
Learning Outcomes: **Subject Mastery**	*Understanding, Knowledge and Subject-Specific Skills* ◆ Critical understanding of traditional AI problem solving and knowledge representation methods ◆ Use of knowledge representation techniques (such as predicate logic and frames). ◆ Critical understanding of different systematic and heuristic search techniques ◆ Practice in expressing problems in terms of state-space search ◆ Broad knowledge and understanding of the subfields and applications of AI, such as computer vision, machine learning and expert systems. ◆ Detailed knowledge of one subfield of AI (e.g. natural language processing, planning) and ability to apply its formalisms and representations to small problems ◆ Detailed understanding of different approaches to autonomous agent and robot architectures, and the ability to critically evaluate their advantages and disadvantages in different contexts. ◆ Practice in the implementation of simple AI systems using a suitable language	
Learning Outcomes: **Personal Abilities:**	*Cognitive skills, Core skills and Professional Awareness* ◆ Identification, representation and solution of problems ◆ Time management and resource organization ◆ Research skills and report writing ◆ Practice in the use of ICT, numeracy and presentation skills.	
Assessment Methods:	Assessment: Examination: (weighting – 100%)	Re-assessment: Examination: (weighting – 100%)

Course Code: **F29OC**	Course Title: **Operating Systems & Concurrency**	Course Co-ordinator: **Peter King**
Pre-requisites:	F28DA1 Data Structures & Algorithms, F28PL2 Programming Languages *or equivalent*	
Aims:	*For the Operating Systems part*: **To provide an introduction to operating systems, their basic principles and shell programming.** *For the Concurrency part*: **To introduce the theory and practice of concurrent hardware and software systems**	
Syllabus:	*For the Operating Systems part*: overview on operating systems concepts and structures, processes, threads, classical inter-process communication problems, Linux shell scripting. *For the Concurrency part*: Process and Threads, Concurrent Execution, Shared Objects and Mutual Exclusion, Monitors and Condition Synchronisation, Deadlock, Safety and Liveness, Model Based Design. Performance, Introductions, Processors, Pipelines. ♦	
Learning Outcomes: **Subject Mastery**	*Understanding, Knowledge and Subject-Specific Skills* *For the Operating Systems part:* ♦ Understanding of the concepts and structures present in modern operating systems. ♦ Ability to write Linux shell scripting. *For the Concurrency part:* ♦ Broad and integrated knowledge and understanding of concurrency concepts, techniques and problems ♦ Critical understanding of exclusion, synchronisation and deadlock ♦ Detailed knowledge of abstract modelling and model-based design	
Learning Outcomes: **Personal Abilities:**	*Cognitive skills, Core skills and Professional Awareness* ♦ Critically evaluate the problematic and concepts related to operating systems. ♦ Analysis of the different possible solutions to the problematic.	
Assessment Methods:	Assessment: Examination (weighting – 100%)	Re-assessment: Examination: (weighting – 100%)

Examinations, Transferring to On-Campus and Withdrawing from the Programme

Examination Process

A team of Heriot-Watt University approved tutors (Course Subject Examiners) prepares each course examination paper. The draft paper is then passed to a Course Academic Reviewer who is responsible for checking the balance of the paper. Following this procedure, the paper is then proof read (by an Approved Proof-Reader). The final stage is for the paper to be sent to an External Examiner (i.e. a senior academic in another university) for comments on the content and level of the questions. Subject to the comments received from the External Examiners, the examination papers are then printed in their final booklets.

When all the examinations have been sat, the examination scripts are returned to Heriot-Watt University. The scripts are then marked by the course examination team and are internally moderated by approved examiners (who are specialists in that discipline). A Board of Examiners' meeting consisting of all the examiners involved in the marking, the External Examiners, the Head of School and the Dean of the University, is then convened and the results reviewed and approved.

Following the Board of Examiners' meeting, students are informed of the grade that they have obtained in a particular synoptically-linked, or stand-alone, course examination. No further detail about individual examination performance is given to students with their results; but students are entitled to receive feedback on their performance. Students wanting to do so must write to the CS DL team to seek this feedback.

Note, however, that students' scripts will not be remarked and the feedback provided does not constitute a remarking of the script.

Subject to subsequent appeals, the Board's decision is final and there is no automatic right to a further remark of any script. However, students can lodge an official appeal.

Format of Examinations

Samples of previous examination papers are available on VISION.

If students are taking a re-sit in a course examination they should use the *Re-sit Examination Application form*.

Subsequent Examination Opportunities

If a student has failed an examination then they are automatically permitted one re-sit opportunity, but incur a re-sit fee per examination. The re-sit fee is currently £65 per examination.

However, it should be noted that if a student fails an examination they will not be permitted to present themselves at any subsequent examination diet for assessment in higher level synoptically-linked or stand-alone course(s) for which the failed synoptically-linked courses were a pre-requisite.

If students have obtained a Grade E in pre-requisite synoptically-linked courses then they must apply for re-assessment and pass with a Grade D or above if they wish (at any time) to apply for the higher subject-linked synoptically-linked or stand-alone course(s).

Applications for Examination will not be accepted for a higher subject-linked synoptically-linked or stand-alone course until they have obtained at least a Grade D or above in a failed pre-requisite course.

Applications for course resit examination assessment must be received on or before the deadline for that examination diet, as detailed below:

DEADLINE FOR THE DECEMBER EXAMINATION DIET: *1stSEPTEMBER*

DEADLINE FOR THE JUNE EXAMINATION DIET: *1stMARCH*

If their application is not received by these dates students may not be permitted to take the examination at that particular diet of examinations and a late fee may be enforced.

When completing the *Course Resit Registration and Examination form*, students must indicate their "preferred location" (i.e. where they wish to sit the examination). On most occasions this will be the examination centre closest to their ALP. However, students can request to sit their examinations at alternative venues. If a student has any doubt about the nearest examination centre then they should contact their ALP or the CS DL team directly. It may not always be possible for students to sit their examination at a different venue (i.e. at the students "preferred location"), but every attempt will made to limit the amount of travelling required to reach the examination centre.

The cost of the first examination attempt is contained in the price of obtaining the study material for the synoptically-linked or stand-alone course(s). If a subsequent examination is required then a re-sit fee is payable.

Late Examination Application Fee

If a student submits their completed *Course Registration and Examination form* after the specified deadline then they will be required to complete a Late Examination Submission form and will be subject to a Late Examination Fee of £30 per examination.

The deadline for submission of a late examination registration is:

One week AFTER 1st September for the December diet
One week AFTER 1st March for the June diet

Course Examinations

A student can attempt any number of course examinations at any one diet (subject to pre-requisites).

However, it is important that students do not over-burden themselves and it is recommended that students study for no more than four examinations at any one diet, and should do so on a stage by stage basis (i.e. sit Stage 1 before attempting any Stage 2 or 3 examinations). This will allow students to acquire a deep learning of the subject matter and to be fully prepared for their examinations.

Students should be aware that normally students who attempt more than four examinations at any one diet do not pass all their examinations. This results in the students having to re-sit their failed examination(s) and also incurs a re-sit fee, for each examination required to be repeated.

Additionally, students must ensure that the examinations they are applying for are not timetabled at the same time and should refer to the Examination Timetables available on VISION for the specific timetable for the examination diet.

If, however, students are **not** intending to **ever** apply for the higher subject-linked synoptically-linked or stand-alone course(s) which has a pre-requisite they are not required to be re-assessed in the Grade E course(s) (subject to the rules for the award of degree). However, they are strongly advised to take the re-assessment as this could affect their overall degree award.

Examination Progression

Students are advised to register for and complete all their Stage 1 (Certificate Level) courses before registering for higher level courses. Students are further advised to complete their chosen Stage 2 (Diploma Level) courses before attempting Stage 3 (Degree Level) courses.

Evidence from previous examination diets indicates that students who attempt Stage 3 course examinations before completing Stage 1 and Stage 2 tend to normally perform poorer than those students who progress successfully from stage to stage.

However, students are currently permitted to apply for any synoptically-linked or stand-alone course examination they wish, subject to pre-requisites.

The First Examination Opportunity

A student's first opportunity at any given course examination is contained in the price they pay when purchasing and registering for the course(s). Therefore, there is no additional cost in taking their first examination opportunity.

Students must ensure that they have passed, or been exempt from, the required pre-requisite courses *with a Grade D or above* prior to applying for the assessment in the higher level courses.

Subsequent Examination Opportunities

If a student has failed an examination then they are automatically permitted one re-sit opportunity, but incur a re-sit fee per examination. The re-sit fee is currently £65 per examination.

However, it should be noted that if a student fails an examination they will not be permitted to present themselves at any subsequent examination diet for assessment in higher level synoptically-linked or stand-alone course(s) for which the failed synoptically-linked courses were a pre-requisite.

Registering with a Grade E (also referred to as a 'Restricted Pass')

An examination performance that has been given a Grade E indicates that the "*specified learning outcomes have been fulfilled to the minimum acceptable level for the award of credit points but insufficient to continue study within that subject*".

If students have obtained a Grade E in pre-requisite courses then they must apply for re-assessment and pass with a Grade D or above if they wish (at any time) to apply for the higher subject-linked course(s).

Applications for Examination **will not** be accepted for a higher subject-linked synoptically-linked or stand-alone course until they have obtained at least a Grade D or above in a failed pre-requisite synoptically-linked course.

Registering with a Grade F

A Grade F demonstrates a lack of knowledge in the subject content of the particular synoptically-linked or stand-alone course(s).

Applications for Examination **will not** be accepted for a higher subject-linked synoptically-linked or stand-alone course until students have obtained at least a Grade D or above in a failed pre-requisite synoptically-linked course.

Students are advised to re-take the failed synoptically-linked course examinations at a subsequent diet of examinations.

Number of Examination Attempts

Students are permitted, in the first instance, two examination attempts. When students register for the synoptically-linked or stand-alone course(s) they will be entitled to their first examination attempt. If students fail the particular course examination, they will be allowed to register for the resit (second attempt).

Further opportunities (third and fourth attempts) are at the discretion of the Board of Examiners and the School. Allowing students third and fourth opportunities is not obligatory, and the University reserves the right to limit student attempts to two opportunities and to set a final examination diet deadline for particular courses.

There is no fee for the first time that a particular examination is attempted, as the cost is included in the purchase price of the study material. Any subsequent attempt for a particular course examination (either synoptically-linked or stand-alone) is subject to a re-sit examination fee.

In exceptional circumstances (with valid reasons presented) the University may permit a student a fifth attempt at an assessment (examination).However, this is not automatic and requires the student to appeal to the Undergraduate Studies Committee for this fifth attempt.

Deferring an Examination Attempt

Students may find that as it gets closer to the examination diet they realise that they are not able to undertake one, or more of the examinations that they have applied for. This may be because they have not spent sufficient time on their studies or there are personal reasons why they have not been able to complete their studies in time or outside commitments mean that they will not be able to attend. Whatever the reason, if students do not feel that they are in a position to pass the examination, they can **defer** their examination opportunity.

To do so, students must inform the CS DL team **on or before the deadline** below, using the *Examination Deferral Application* form**.**

DEADLINE FOR THE DECEMBER EXAMINATION DIET: **1ˢᵗ NOVEMBER**

DEADLINE FOR THE JUNE EXAMINATION DIET: **1ˢᵗ MAY**

If students do not notify the CD DL team by these dates, and subsequently do not attend the examination (i.e. are absent) then they will incur a re-sit fee penalty (unless they were absent for medical reasons or extenuating circumstances and these are approved by the Board of Examiners).

By submitting an *Examination Deferral Application* form by the deadline students will be deferred for that specified diet of examinations, for the course(s) indicated on their form, but will **not** be automatically entered for the next diet of examinations and **will be required to apply** for the examination. This should be done by completing a *Re-Sit Examination Application* form. Students do not have to re-submit a *Registration* and *Examination* form.

Following a submission of an *Examination Deferral Application* form students will not be required to pay the fee associated with the subsequent examination application unless they failed to submit their deferral form by the deadline.

If students are deferring a re-sit examination, and a re-sit payment was required then their payment will still be processed (i.e. their credit card/cheque will still be debited/cashed). However, when students re-apply for the examination following the deferral then they will **not** be required to make a further payment as the re-sit fee is stored in their account until they take up their re-sit opportunity. If students do **not** submit their deferral form on time, they will have to pay for the re-application.

Medical and Mitigating Circumstances

Overview

Students who feel that their studies (either during or prior to the examinations) have been affected by medical or any other extenuating circumstances, should inform the CS DL team as soon as possible; and no later than two weeks after the examination week.

Students must disclose any such information before they have received their results. The Board of Examiners' are required to be informed of any instances which could have affected student's performances and not after considering the results. Students should therefore inform the CS DL team immediately (and provide any supporting evidence) as well as ensuring their ALP is informed.

The CS DL team should also be informed of any medical or mitigating circumstances which have affected your studies during the semester prior to the examination. That is, factors which, for example, may have meant you being unable to attend classes.

Medical and Mitigating Circumstances Procedure

The School of Mathematical and Computer Sciences has set out the following procedures that must be adhered to by all students submitting Medical Certificates (or mitigating circumstances) prior to and after the examination diets:

As per Regulation 9 of Heriot-Watt University: "*A student who is prevented through illness from taking an examination shall submit to the [CS DL team] a certificate issued by a registered medical practitioner*"

- All students must submit their Medical Certificates (or mitigating circumstances) within *two weeks* of the end of the examination diet. It is the *students' responsibility* to ensure that the CS DL team receives these by the *second* Friday following the examination week.
- *Photocopied* or *faxed* versions of Medical Certificates (or mitigating circumstances) are *not permitted* and will *not be accepted* by the Board of Examiners.
- The Registered Medical Practitioner (Doctor/Medical Specialist/Nurse) must *sign and date* all Medical Certificates. It must also be *stamped* with the medical practitioners' seal. The authorisation signature must be legible.
- A completed *Medical Certificate form*, which must be *signed, dated and stamped* by the registered medical practitioner, must accompany all original Medical Certificates. A Medical Certificate (or mitigating circumstances) that is not accompanied by this form *will not be accepted*.
- Students must indicate the *exact date* and the *time period* for which the Medical Certificate (or mitigating circumstances) is to apply and sign the attached form that the information contained is accurate.
- Students must indicate for which synoptically-linked or stand-alone course examination(s) their Medical Certificate (or mitigating circumstances) is to apply.
- The Registered Medical Practitioner is *required* to indicate whether the student was *capable*, or otherwise, of undertaking an examination and *verify* the dates and time concerned. If this is not indicated, the Medical Certificate will not be accepted.

Medical and Mitigating Circumstances form

The *Medical and Mitigating Circumstances forms* can be obtained from your ALP or on VISION. The forms should be completed following the guidance above (and on the forms), and submitted to the CS DL team by the required deadline (that is, no later than two weeks after the examination week).

Temporary Suspension of Studies

If students are unable to study for a considerable period (i.e. more than one diet) they should inform the CS DL team, so that such periods of non-study can be taken into consideration when reviewing the students continued registration on the Programme.

If students continue to be unable to study for a specific known period (for example, more than one year) due to other external factors (for example, maternity), then they should seek to temporarily suspend their studies.

If you intend to apply for a suspension of studies, please contact your School/Institute Office.

Examination Results
Procedure

All examination results are considered at a Board of Examiners' meeting at which the results are finalised and approved. Assessment Results letters are then sent out to students, via their ALP, normally in February or August, after the December or June diets, respectively.

*The examination results, with marks, are posted online on the Student Self Service*https://myhwu.hw.ac.uk/HWSAS8/twbkwbis.P_ValLogin*Students have to be enrolled to be able to check their results on-line.*

A list of outstanding coursework will be made available on Vision. All students should check this list on Vision to ensure they have no outstanding coursework.

Heriot-Watt University Common Assessment and Progression Scheme (CAPS)

Alphabetical Grades

The Common Assessment and Progression System (CAPS) apply to all undergraduate courses at Heriot-Watt University and the key features include:

- Grades in the range of A-F are used on Assessment Results issued by the University; and
- A Grade D is the minimum requirement to pass core courses or to progress in subjects continuing into the next year of a student's course.

The following notes give some general guidance on how to interpret the grades:

A	All or the majority of the specified learning outcomes have been fulfilled to an excellent standard.
B	All or the majority of the specified learning outcomes have been fulfilled to a proficient standard.
C	The majority of the specified learning outcomes have been fulfilled to a competent standard.
D	The specified learning outcomes have been fulfilled to the minimum acceptable level to continue study within that subject area and for the award of credit points.
E	The specified learning outcomes have been fulfilled to the minimum acceptable level for the award of credit points but insufficient to continue study within that subject.
F	Very few or none at all of the specified learning outcomes have been fulfilled, even at the minimum acceptable level and the candidate is not eligible for the award of credit points.

Students are normally expected to obtain at least a Grade D in order to be regarded as having passed the course examination. However, the Grade E indicates that their performance merits a restricted pass in that particular synoptically-linked or stand-alone course and implies that their performance is not strong enough in the subject area to be taken at the next stage if that subject area is a continuing one.

Grade E Results

If students are awarded a Grade E for an examination then their performance indicates that the "*specified learning outcomes have been fulfilled to the minimum acceptable level for the award of credit points but insufficient to continue study within that subject*".

This may restrict the study options open to students, if the Grade E result is in synoptically-linked courses which are pre-requisites for higher level synoptically-linked or stand-alone course(s). For these courses they would be required to re-sit and obtain a minimum of Grade D before being permitted to apply to sit a higher level subject-linked course examination. They may, however, proceed to higher level synoptically-linked or stand-alone course(s) for which the Grade E synoptically-linked courses are not pre-requisites.

Credits will be awarded regardless of whether the Grade E is a pre-requisite for higher level synoptically-linked or stand-alone course(s).

Students are, however, strongly advised to re-take the Grade E synoptically-linked course examination to obtain at least a Grade D, in order to avoid restricting their study options when they have to select their Stage 2 and Stage 3 courses or should they wish to continue onto stage 4 on-campus.

Grade F Results

A Grade F in an examination demonstrates a lack of knowledge in the subject content for the synoptically-linked or stand-alone course(s) and the student will not be awarded credit points.

An examination application for synoptically-linked or stand-alone course(s) where a student has achieved a *Grade F* in the pre-requisite course examination, regardless of whether it is at the first, second or third opportunity, will not be accepted until a Grade D or above has been achieved in the pre-requisite.

Students should complete a *Re-Sit Examination Application* form when they decide to re-apply for the examination. There is a re-sit fee for each examination attempt following the first attempt at each synoptically-linked or stand-alone course examination.

First Grade F

If students obtain a Grade F in an examination at their first opportunity then they are permitted a re-sit examination attempt at a future examination diet.

Second Grade F

If students obtain a Grade F in an examination at their second opportunity then they will normally be permitted a re-sit examination attempt at a future examination diet. However, this is not automatic and is at the discretion of the Board of Examiners and the School. It is also dependant on the course being available at the next diet of examinations.

Examination Feedback

Students are entitled to request feedback on their examination performances. Students are required to write to (or email) the CS DL team seeking such feedback, and must do so within one month from when the examination results are released. Requests after this date will not be considered.

Note however that student's **scripts will not be remarked** and only general feedback will be provided. Students should be realistic in seeking feedback, as a clear fail means that the student has performed to a very low level and not achieved the minimum level of learning outcomes expected. Therefore, it is clear that such students have to revise the entire course(s) again.

Students should also be aware that **all borderline scripts** are second marked internally and all scripts are verified (by the Board of Examiners, including External Examiners) to have been fairly and consistently marked.

Appeals

The regulations relating to Examination Appeals are contained in **Regulation 36, Student Appeals**, of Heriot-Watt University, and information for students on the academic appeals processes are contained in the "Guidelines on Student Academic Appeal Procedures" document which can be accessed via
http://www.hw.ac.uk/registry/resources/feedbackexamperformance.pdf

Students should pay particular consideration to Sections 3, 4, 5 and 6 of the "Guidelines on Student Academic Appeal Procedures" document.

Of particular note is Section 4.2 of the document:

*"4.2 There is **no right of appeal** where it relates to questioning grades or marks or decisions of Examiners, or other matters which are based on questioning the academic judgement of members of academic staff or Examiners."*

The following further aims to assist students' understanding:

If students wish to dispute the decision of the Board of Examiners then they should write in the first instance to the Head of School (School of Mathematical and Computer Sciences) outlining their reasons for their dispute. Students may be required to provide additional verified supporting documentation. The Head of School, if deemed appropriate, will then invite the Board of Examiners and the relevant External Examiner(s) to give further consideration to their examination performance.

Students should note that their own personal views on how well they believe they have performed are not generally regarded as sufficient grounds of appeals. All examinations go through a rigorous review process.

If students are still dissatisfied with the outcome from the Head of School then they may appeal to the Senate of the Heriot-Watt University (i.e. the supreme governing body of the University) indicating the grounds for their appeal. An appeal will only be considered on medical grounds or other exceptional circumstances. The background information concerning the appeal should be outlined and any supporting documentation such as medical certificates etc attached.

It should be noted that if an appeal is pending then students will not be eligible to receive a proposed award (i.e. Certificate or Diploma of Higher Education or Ordinary degree). In the case of an Ordinary degree award then the student would not be able to graduate until all the appeal procedures have been exhausted or the appeal is withdrawn.

Students should note that examination scripts will not be reviewed, under any circumstance, by the Head of School, the Internal Examiners, the External Examiners or the Board of Examiners unless they are the subject of a formal appeal.

A formal appeal must be submitted if students wish to question their examination results.

Scripts will not be re-marked, under any circumstance, unless they are the subject of a <u>formal appeal</u>, and there is sufficient evidence presented to conduct an appeal.

Regulations and Policies

Section B of this handbook, provided by the Academic Registry of Heriot-Watt University for all Undergraduate Students who study off-campus (i.e. at a location other than a Heriot-Watt University campus), contains information regarding the regulations and policies of the University.

All students should familiarise themselves with those regulations and policies, available on the Heriot-Watt University web-site (http://www.hw.ac.uk/ordinances/regulations.pdf).

The following may be of particular reference to students:

Mixed-Mode Study Regulations

Of particular importance is *Regulation 44, Mixed-Mode Study – Modular First Degrees*. Mixed-Mode refers to any mode of study for a first degree that is not conducted full-time at a Heriot-Watt University campus. Regulation 44 encompasses all Heriot-Watt University Mixed-Mode study degrees and should be read in conjunction with the preceding sections of this Handbook, which helps explain how these regulations apply.

Student Complaints Procedure

The School of Mathematical and Computer Sciences encourages a positive environment where contact with and feedback from students is both welcomed and encouraged. We also realise that from time to time mistakes can occur and arrangements can be improved upon. We welcome student feedback on where we can improve to make students' learning and learning environment better.

Though we hope that students will have no need to raise a concern or complaint, students should also be aware that there is a formal Complaints Procedure that applies equally to those who study through Mixed-Mode study. Full information is contained in the Complaints Procedure Booklet http://www.hw.ac.uk/policy/general-complaints-procedures.pdf

To help digest this document, we provide the following summary:

A complaint is defined as "*any concern a student might have relating to the University including concerns about the provision of a programme of study, academic related matter, service or facility provided by the University*".

This includes, but is not limited to, concerns regarding the CS DL programme and, where applicable, a student's ALP.

There are a number of stages involved in a Complaints Procedure, and further information is contained in the documentation.

- ***<u>Informal Direct Complaint at Source</u>***

Most concerns can be resolved by dealing directly with the person involved. Therefore, we would encourage students to raise their concerns directly with their tutor or programme director at their ALP (if appropriate).

If students either:
> (a) feel unable to approach their tutor or programme director or
> (b) are not satisfied with the response received

then we would encourage students to contact the CS DL team (School of Mathematical and Computer Sciences). The DL Director will then aim to resolve the matter without having to make it a matter for the Head of School (School of Mathematical and Computer Sciences), unless deemed necessary.

All Independent Learners are encouraged to contact the DL Director in the first instance, unless they feel that this is inappropriate. In such circumstance, they can write to the Head of School

- ***Complaint to Head of School***

If students feel that their complaint has not been resolved to their satisfaction or the student feels unable to make direct contact with either their ALP or directly to the DL Director, the complaint should be put in writing and sent to the Head of School (School of Mathematical and Computer Sciences).

- ***Formal Complaint to Student Complaints Officer***

Where the student feels that their complaint has not been satisfactorily resolved, or feels unable to raise their complaint with their ALP, the DL Director, or the Head of School (School of Mathematical and Computer Sciences), then they should contact the Student Complaints Officer of Heriot-Watt University. The contact details of the Student Complaints Officer are on the Heriot-Watt University web-site http://www.hw.ac.uk/policy/general-complaints-procedures.pdfStudents should submit their complaint to the Student Complaints Officer using the standard "*Student Complaints Form*" also available from the registry web-site.

- ***Complaint to the Secretary of the University, Referral to the Complaints Committee and Independent Review***

If a student considers that after raising the issue with the Student Complaints Officer the matter has still not been resolved to their satisfaction then the complaint can be referred to the Secretary of the University. Thereafter, if still not resolved, it should be referred to the Complaints Committee of Heriot-Watt University. If the student is still dissatisfied with the outcome reached then they can lodge a case for an independent review. Further details are contained on the registry web-site.

Transferring to On-Campus Programmes
Introduction
Students may decide part-way through their studies that they would like to complete them by studying full-time at a Heriot-Watt University Edinburgh campus. Transfer on-campus is possible provided that they have passed a complete Stage of studies. Transfers to on-campus are not automatic and students must contact the CS DL team in the first instance to discuss

their options. If applicable, further information will then be sent to them by the School of Mathematical and Computer Sciences.

For example, students can transfer to Year 2 of the equivalent on-campus degree programme when they have completed Stage 1 of their Programme; to Year 3 when they have completed Stage 2 of their Programme; and to Year 4 (i.e. the Honours year) when they have completed Stage 3 of their Programme.

Issues regarding Transferring On-Campus

Students should not consider transferring to an on-campus programme without very careful consideration. There are considerable difficulties in adjusting to a new mode of study in a new country that has a different culture. It can be very expensive to study in the United Kingdom. In very broad terms, it will cost them at least £18,000 per year to stay on-campus and pay for their programme. Thus students have to be absolutely certain that they want to do so and that it will be in their own best interests.

If students transfer (to Year 2 after Stage 1 or Year 3 after Stage 2) to an on-campus mode, the content of the various courses that they take will be very similar to those studied in previous stages. The approach will, however, be very different. Students will have to attend a number of lectures and tutorials and the pace will be largely determined for them.
Students will also have examinations at the end of each academic semester so they will only have about eight weeks to prepare for them. If students transfer at the Honours stage (i.e. to Year 4 after Stage 3) there are some further considerations that they will need to take into account.

- ***The Cost of Studying in Scotland***

It is not cheap to study in the UK. Students from non-European Union countries are charged a full tuition fee. The government sets this fee. Estimates costs of living can be found here http://www.hw.ac.uk/documents/international-student-guide.pdf. It is difficult to give a precise figure for such costs because it depends on the type of accommodation students choose and how much they spend. As a general guide, it is suggested that students should allow for at least £6,000 for the academic year September to May for this type of expenditure. Thus the total cost for a year on-campus in Scotland could easily amount to over £20,000 (excluding travel costs to Edinburgh).

This is a very large sum of money and students should balance the costs against the benefits. Students will also incur travelling costs in getting to and from Edinburgh. Such costs will obviously vary depending from which country they come.

- ***Travelling to Scotland***

The Heriot-Watt academic year normally begins the in the middle of September. Students are normally advised to arrive in Scotland a week earlier in order to give themselves time to settle in.

Edinburgh is an hour's flight time away from London Heathrow and slightly longer from London Gatwick. If students come via London then they can either fly or take the train or the bus (the bus is the cheapest). The airport, railway station and the bus station in Edinburgh are all within less than 12 km from the Riccarton campus. When they first arrive in Edinburgh they are advised to take a taxi to the campus; this should cost no more than about £15.

- *Accommodation On-Campus*

Accommodation is reserved for overseas students on-campus provided that a reservation has been made by 22 August. Catered and non-catered accommodation is available and there are single and double rooms (including some that have en suite facilities). Students should go to the Heriot-Watt University web-site for further information.

Medical and Dental Services Facilities

All students are automatically registered with the University Health Service on the Riccarton campus. Undergraduate and post graduate students undertaking a course of more than six months are entitled to free medical treatment available under the British Health Service, although there are some items that have to be paid for e.g. prescriptions for medicines.

University Regulations for Transfer On-Campus

Transferring to an on-campus mode of study is permitted but it is not an automatic right. Certain conditions are laid down. In summary, they are as follows:

A transfer from Mixed-Mode study may *normally* only be made at the start of the University's academic year, i.e. September.

Students **will not** be permitted to take a course on-campus where they have previously registered for the equivalent course. That is, students cannot take a course where they have already been awarded credits for its equivalent.

For example:
If a student has passed the Stage 3 Computer Graphics then they would not be permitted to take Computer Graphics whilst studying on-campus at Heriot-Watt University.

The applicant must have *successfully completed* a full Stage of study before being eligible to apply. Additionally, students should have obtained a Grade D or above in each of the synoptically-linked or stand-alone courses relating to that Stage. A Grade E also counts as having *successfully completed* the synoptically-linked courses, provided that it is not a pre-requisite for higher level subject-linked synoptically-linked or stand-alone course(s).

The Head of the School (School of Mathematical and Computer Sciences) must give their permission for students to transfer to on-campus mode.

Honours Year On-Campus

Students are accepted, in the first instance, only onto the three year Ordinary Degree. To obtain an Honours degree from a Scottish University you are required to study a further one year (year 4). At present this is available at our Edinburgh Campus (UK) and Dubai Campus not through Approved Learning Partners.

There is no automatic right of progression onto an Honours year on-campus. The student's eligibility to be admitted to the Honours year on-campus is subject to fulfilment of the requirements of eligibility for an award of degree and satisfying the entry requirements into the on-campus Honours degree pathway chosen, and at the discretion of the admissions office and Head of School (School of Mathematical and Computer Sciences).

The School reserves the right to change the rules and requirements for transferring to the Honours year on-campus, and students who wish to transfer should contact the CS DL team in the first instance for guidance.

The minimum progression criterion is to achieve an overall 50% average mark in *the first attempt* for all courses.

- *Structure*

Heriot-Watt's academic year is broken down into two twelve-week semesters - Semester 1 runs from September to December; Semester 2 from January to May.

Students are required to take four courses per semester. Some courses are synoptically-linked. The courses that they select will depend upon the specialism that they wish to pursue or the type of degree that they wish to obtain. Students must get at least a Grade D in a course that is a pre-requisite for a subsequent course.

Most fourth year courses are assessed partly on an assignment basis and partly by formal examinations. Some courses have formal examinations at the end of Semester 1 while other courses have them at the end of Semester 2. Graduation normally takes place in June.

- *Grading*

The UK Honours Degree system is a way of grading students' degree results. Some degrees are classified into 'Ordinary' and 'Honours'. The distinction is a fine one but ordinary degrees generally include less material and they may demand a less analytical approach than Honours year degrees do. An Honours Degree is also usually divided into 'classes'.

The Scottish (and UK) honours classification system is summarised below. The highest award is a *first class* honours degree. A First class honours degree is normally only awarded to students who obtain an average of 70% or more in their final year examinations. Only a small proportion of students gain a first class honours degree and few employers demand it as a condition of employment.

Many UK universities still record the performance of students on a percentage basis using the scheme outlined above. Heriot-Watt now uses an alphabetical grading system but this does not necessarily equate to the percentages shown above. Grade A is the equivalent of first class honours, Grade B an upper second, Grade C a lower second, and Grade D a third. An overall Grade E would mean that students would be awarded 'a degree with honours', and Grade F would be a fail.

Classification of Honours Degree	Average mark normally required	Comment
	%	
1 (First Class)	70+	Highly prestigious.
2.1 (Upper Second Class)	60-69	Considered to be a very good Honours Degree. Many employers now demand an award at this level. The number of '2.1s' being awarded has increased in

		recent years.
2.2 (Lower Second Class)	50-59	Regarded as a good Honours Degree. Students should feel comfortable if they receive such an award.
3 (Third Class)	40-49	An award at this level is not highly regarded, although it does not rule out a successful career. Nonetheless, if students are likely to get a third it might be best for them to graduate with an Ordinary Degree.

Applying for a Transfer On-Campus

If students are interested in transferring to an on-campus degree course they should make a provisional application, using the *Course Transfer* form (obtainable by contacting the CS DL team), by 1 May (students can only transfer in September). Once students know that they have successfully completed a particular Stage of their Programme, they should confirm their interest by writing to the CS DL team as soon as possible, since the accommodation arrangements have to be confirmed by 22nd August at the latest.

Withdrawing from Study

Students may find that the Programme is not suitable for them and they may decide to withdraw from it.

Students should think very carefully before they do withdraw. If they do so, it may well be that sometime later they decide that they would like to continue with their studies.

Before making a final decision about withdrawing, students should discuss their situation with their Approved Learning Partner representative or contact the CS DL team directly.

Certificate and Diploma of Higher Education Exit Awards

Students may decide that after completing the whole of Stage 1 (Certificate level) of the Programme, they are satisfied with the level that they have reached. It is then possible for them to exit with a Certificate of Higher Education. Similarly, after completing Stage 2 (Diploma level) students may decide that they do not wish to study any further for a degree. Students may then exit with a Diploma of Higher Education.

The above do not apply to students who are direct entrants into Stage 3.

The CS DL team must be informed immediately if students opt for one of the above options or decide to withdraw altogether before they have completed their certificate, diploma or degree course.

Procedure

If students do decide to withdraw from the Programme then they are required to complete a *Programme Withdrawal* form. This form should be returned to your ALP or to the CS DL team.

Students **must** also enclose their *Student Identity card*.

Re-admission

The School of Mathematical and Computer Sciences may exceptionally re-admit a student who has withdrawn (or been withdrawn) from the Programme if a period of **no more than 4 years** has passed since they withdrew/were withdrawn **and** they have **not achieved a further relevant qualification**. Such students can recommence from where they stopped and their period of study will be extended by the time that they were not a matriculated student of Heriot-Watt University.

However, it will be the student's responsibility (and cost) to acquire the current learning materials in use at the time of recommencing their studies and should not automatically expect that they will be able to rely on learning materials obtained when they first began their studies.

If a **period of four years or more** has elapsed since their withdrawal, **or** the student **has achieved a further relevant qualification**, then the student will have to re-apply and be given entry to the appropriate Stage of study. Such students will be treated as new students and be subject to the rules and regulations, policies and procedures at the date of acceptance (not when they first began their studies). They will also be subject to the costs prevailing at the time they recommence their studies.

The above re-admission rules do not apply to students who have not informed the CS DL team (or Heriot-Watt University) of their withdrawal or have not studied (i.e., actively undertaken assessment) for a period of years (however long) and wish to recommence their studies.

Maximum period of study

Unless a student formally withdraws (or is withdrawn by the School of Mathematical and Computer Sciences following the issuant of a letter requesting to know if they are intending to complete or continue their studies) they will be deemed as being active and will have a **maximum of ten years** to complete their degree from the date of their matriculation. That is, students cannot expect to discontinue their studies (for whatever reason), not inform the CS DL team (or Heriot-Watt University) of their withdrawal, and then be permitted to have any extension to their maximum period of study – the above rules are by exception, rather than the norm.

Therefore, students have to complete their degrees before their ten year study period elapses. That is, if a student was matriculated at 1st September 2001, they have to complete their degree by June 2011 – the June 2011 being their last examination diet for which they can register for examinations.

Students who do not complete their degree within the ten year period can appeal to the University for an extension (normally a maximum of one year). However, for the appeal to be successful, there has to be compelling reasons to support the student's case. If a student knows that they are going to be unable to study for a period of diets (i.e., more than two consecutive diets) then they should seek to suspend their studies for the duration of their intended study absence.

Any undergraduate student wishing to temporarily suspend their studies or apply for an extension to their period of study need to apply to contact your School/Institute Office.

PART B – UNIVERSITY INFORMATION

The Academic Registry is responsible for producing Part B of the handbook to provide information and assistance on University policies and support services. Kathy Patterson is the University Registrar and Deputy Secretary.

All flexible, distributed and independent learners should contact Miss Jenny Tough, Registry Officer (Quality and External Partnerships, Academic Registry, on any query relating to Part B of this handbook and this will be directed to the relevant staff.

Email: J.Tough@hw.ac.uk

Tel: + 44 (0)131 451 3292

Please note that the following sections are standard sources of information provided to all students. However, certain aspects are programme-specific and students should refer to Part A where directed.

B1.   UNIVERSITY POLICY AND GUIDANCE

The University publishes many policies and reference information on its website that may be of use and of interest to students through the programme of their studies at Heriot-Watt University

Wherever practicable, University policy is designed to include all members of the University's community, both within and out with the main campus environments.

Important information for students is contained in the Student Learning Code of Practice. This document is attached in Appendix A.

Policies of specific interest and relevance to students can be accessed via:
http://www.hw.ac.uk/committees/ltb/ltb-policies.htm

B2.   ORDINANCES AND REGULATIONS

Heriot-Watt University has a detailed set of rules which governs the operation and management of University business. These are referred to as Ordinances and these Ordinances are set by the Court, which is the governing body of the University. The Ordinances provide a regulatory framework for corporate governance,

The University Ordinances are supported by University Regulations which provide a regulatory framework for the governance of academic-related matters which Staff and Students must adhere to for all academic matters.

There are a number of policies and procedures that underpin the Ordinances and Regulations.

The following section on Academic Support Services often refers to Ordinances and Regulations. These links will provide you with information and guidance on all matters relating to your academic life.

A full list of Ordinances and Regulations are available at the following weblink:
http://www.hw.ac.uk/ordinances/regulations.pdf

B3. QUICK FINDER GUIDE TO ACADEMIC SUPPORT SERVICES

1. Academic Support		
On-campus students at Heriot-Watt University are provided with the following services, and where possible we will seek to provide you with the same opportunities.		
1.1	**Mentoring**	http://www.hw.ac.uk/quality/studentsupport.htm and http://www.hw.ac.uk/registry/enrolment.htm *Please note that each student will be notified of a named contact within the Approved Learning Partner (ALP) who can be consulted on all aspects of work, study and other areas of student life. Typically, these individuals are known as mentors.*
1.2	**Professional Development Planning**	For further information and to access e-PDP templates: http://www.hw.ac.uk/careers/pdp/index.php
1.3	**Student Feedback**	http://www.hw.ac.uk/quality/studentfeedback.htm *Please communicate with your mentor in the first instance.*
2. Enrolment, Attendance and Periods of Study		
2.1	**Accreditation of Prior Learning**	http://www.hw.ac.uk/ordinances/regulations.pdf **Regulation 46** – Accreditation of Prior Learning (APL)
2.2	**Change of Address**	Please login to Student Self https://myhwu.hw.ac.uk/HWSAS8/twbkwbis.P_WWWLogin *Please refer to the programme information in Part A of this handbook for further details on notifying a change of address to the relevant School/Institute.*
2.3	**Enrolment**	http://www.hw.ac.uk/registry/enrolment.htm *Please refer to the programme information in Part A of this handbook for further information on Enrolment.*
2.4	**Periods of Study**	Additional information is available from: http://www.hw.ac.uk/ordinances/regulations.pdf **Regulation 3** – Modular First Degrees, paragraph 6 **Regulation 4** – Postgraduate Diplomas and Graduate Diplomas, paragraph 10 **Regulation 18 –** Postgraduate Certificates and Graduate Certificates, paragraph 10 **Regulation 44** – Mixed-Mode Study – Modular First Degrees (for undergraduates only), paragraph 4 **Regulation 48 –** Higher Degree of Master (Taught), paragraph 10 *Please refer to the programme information in Part A of this handbook for further details on Periods of Study.*
2.5	**Suspension of Studies**	Students are advised to consult with their mentor /Year Co-ordinator/Director of Studies in the first instance Application forms are available on the Registry website –Find a Form, under the heading of Student Records http://www.hw.ac.uk/registry/forms.htm

		Undergraduate students should complete either: • Amendment to Registration (Approval by School/Institute) (Undergraduate) • Amendment to Registration Undergraduate and Postgraduate Taught (Approval By Studies Committees) **Postgraduate students** should complete either: • Amendment to Registration (Approval by School/Institute) (Postgraduate) Amendment to Registration Undergraduate and Postgraduate Taught (Approval By Studies Committees)
2.6	**Student Personal Information (Data Protection)**	Student Data Collection Notice and Student Personal Data Statement: www.hw.ac.uk/students/data_protection_policy.pdf

3. Guidance on Assessment

3.1	**Common Assessment and Progression System (CAPS)**	CAPS Policy: http://www.hw.ac.uk/registry/policies.htm
3.2	**Extension to Assessment Deadlines**	*Please refer to the programme-specific information in Part A of this handbook for further details on extensions to assessment deadlines or refer to the Campus Office in the first instance.*
3.3	**Non-Submission of Assessment**	*Where applicable, students should inform their School/Institute if they are unable to submit assessed work for any reason.*
3.4	**Submission of Assessment**	*Please refer to the programme-specific information in Part A of this handbook for further details on Submission of Assessment deadlines.*

4. Examination and Re-assessment Procedures

4.1	**Assessment Results**	http://www.hw.ac.uk/registry/examinations.htm *Please refer to the programme-specific information in Part A of this handbook for further details on assessment results.*
4.2	**Discretionary Credits**	http://www.hw.ac.uk/ordinances/regulations.pdf **Undergraduate:** **Regulation 3** – Modular First Degrees, paragraph 22 **Postgraduate:** **Regulation 4 –** Postgraduate Diplomas and Graduate Diplomas, paragraph 20 **Regulation 18** – Postgraduate Certificates and Graduate Certificates, paragraph 20 **Regulation 48** – Higher Degrees of Master (Taught), paragraph 21
4.3	**Examinations**	http://www.hw.ac.uk/registry/examinations.htm http://www.hw.ac.uk/ordinances/regulations.pdf **Regulation 9** – Assessments and Examinations, paragraph 9, 12, 13 *Students should refer to the relevant School/Institute or institution for information on fee requirements for the examination of courses for which they are enrolled.*
4.4	**Examination Diets**	http://www.hw.ac.uk/registry/examinations.htm *Please refer to the programme information in Part A of this handbook*

		for further details on examination diets.
4.5	**Ill Health and Extenuating Circumstances – Examinations**	http://www.hw.ac.uk/ordinances/regulations.pdf **Regulation 1** – General Regulation, paragraph 6 **Regulation 3** – Modular First Degrees, paragraph 10, 16, 25 **Regulation 4 –** Postgraduate Diplomas and Graduate Diplomas, paragraph 12, 17, 21 **Regulation 18 –** Postgraduate Certificates and Graduate Certificates, paragraph 12, 17, 21 **Regulation 44** – Mixed-Mode Study – Modular First Degrees (for undergraduates only), paragraph 8 **Regulation 48** – Higher Degree of Master (Taught), paragraph 12, 17, 21
4.6	**Special Circumstances in Assessment and Examinations**	Policy: http://www.hw.ac.uk/registry/resources/special-circumstances-policy.pdf Application Form: http://www.hw.ac.uk/registry/resources/special-circumstances-form.doc
4.7	**Examination in Different Time Zones**	Policy: http://www.hw.ac.uk/registry/resources/QESCpolicyexams.pdf
4.8	**Re-assessment**	For Information: http://www.hw.ac.uk/registry/examinations/reassessmentprocedures.htm *Please refer to the programme-specific information in Part A of this handbook for further details on re-assessment.*
4.9	**Use of Calculators in Examinations**	Policy on the Use of Calculators http://www.hw.ac.uk/registry/resources/approvedcalculatorguidance.pdf For further information please refer to: http://www.hw.ac.uk/ordinances/regulations.pdf **Regulation 9** – Assessment and Examinations, paragraph 8

5. Grading, Awards and Qualifications

5.1	**Intermediate Awards**	http://www.hw.ac.uk/registry/awards/intermediateawards.htm
5.2	**Requirements for Awards**	http://www.hw.ac.uk/ordinances/regulations.pdf **Regulation 3** – Modular First Degree, paragraph 14, 20 **Regulation 4 –** Postgraduate Diplomas and Graduate Diplomas, paragra[ ]15, 19, 21 **Regulation 18 –** Postgraduate Certificates and Graduate Certificate[ ]paragraph 15, 19, 21 **Regulation 44** – Mixed-Mode Study – Modular First Degree (f[ ]undergraduate students only), paragraph 17, 20 **Regulation 48** – Higher Degrees of Master (Taught), paragraph 15, 20, 22
5.3	**Undergraduate Honours Classification and Awards Grading**	In some cases, Honours year may be available at the Approved Learning Partner, and it should be possible for students to transfer to Edinburgh to do the final Honours year. *Students should refer to the programme-specific information in Part A of this handbook on award criteria.*

6. Graduation

6.1	Graduation Information and Application Forms	http://www.hw.ac.uk/registry/graduation.htm

7. Conduct, Discipline and Appeals

7.1	Academic Conduct (including copying, plagiarism and collusion)	http://www.hw.ac.uk/ordinances/ **Ordinance 9** – Student Discipline **Regulation 9** – Assessment and Examinations, Paragraph 8 **Regulation 50** – Student Discipline Further information on Student Discipline is available from: http://www.hw.ac.uk/registry/discipline.htm
7.2	Academic Misconduct	*Please refer to your School/Institute in the first instance for further information on Academic Misconduct.*
7.3	Appeals	http://www.hw.ac.uk/ordinances/regulations.pdf **Regulation 36** – Student Appeals
7.4	Detection of Plagiarism	http://www.hw.ac.uk/registry/discipline.htm http://www.hw.ac.uk/registry/resources/plagiarismjiscnote.pdf
7.5	Guidelines for Students and Staff on Student Discipline Procedures	http://www.hw.ac.uk/registry/resources/discguidelines.pdf
7.6	Plagiarism	Further Information is available from: http://www.hw.ac.uk/registry/discipline/plagiarism.htm Plagiarism Guide: For an English language version, please refer to http://www.hw.ac.uk/registry/resources/plagiarismguide.pdf (this document is attached in Appendix B) For the Chinese language version, please refer to http://www.hw.ac.uk/registry/resources/plagiarismguidechinese.pdf For the Arabic language version, please refer to http://www.hw.ac.uk/registry/resources/plagiarismguidearabic.pdf
7.7	Use of Mobile Telephones	http://www.hw.ac.uk/registry/Discipline.php http://www.hw.ac.uk/ordinances/regulations.pdf **Regulation 9** – Assessment and Examinations, paragraph 8 **Regulation 50** – Student Discipline

8. Complaints

8.1	Complaints Policy and Procedures	Further information on the University's Complaints Policy and procedures is available from: http://www/hw.ac.uk/registry/complaints.htm

9. Suspension, Withdrawal and Exit Award

9.1	Suspension	Students are advised to consult with their mentor /Year Co-ordinator/Director of Studies in the first instance

		Application forms are available on the Registry website –Find a Form, under the heading of Student Records: http://www.hw.ac.uk/registry/forms.htm **Undergraduate students** should complete either: • Amendment to Registration (Approval by School/Institute) (Undergraduate) • Amendment to Registration Undergraduate and Postgraduate Taught (Approval By Studies Committees) Further Information is available from: http://www.hw.ac.uk/ordinances/regulations.pdf **Regulation 3** – Modular First Degrees, paragraph 19 **Regulation 4** – Postgraduate Diplomas and Graduate Diplomas, paragraph 10 **Regulation 18** – Postgraduate Certificates and Graduate Certificates, paragraph 10 **Regulation 48 –** Higher Degree of Master (Taught), paragraph 10
9.2	**Withdrawal**	Application Form to withdraw from the University: http://www.hw.ac.uk/registry/studentrecords.htm ***Before making any decision to withdraw, students are strongly advised to speak to their Programme Director, mentor or other trusted member of staff to discuss the situation fully.***
9.3	**Exit Awards**	Information and application form: http://www.hw.ac.uk/registry/awards/exitawards.htm
10. Student Fees and Charges		
10.1	**Charges for Transcripts, Certifications and Student Identity Cards**	Follow the link for Additional Notes on Fees at: http://www.hw.ac.uk/registry/resources/additionalfees.pdf
10.2	**Re-assessment Fees and Procedures**	http://www.hw.ac.uk/registry/examinations/reassessmentprocedures.htm
10.3	**Repeat and Additional Courses**	http://www.hw.ac.uk/student-life/scholarships/tuition-fees.htm

B4. QUICK FINDER GUIDE TO STUDENT ADMINISTRATION AND SUPPORT SERVICES

The following information describes a range of services aimed at helping students to get the most out of their time on Heriot-Watt University programmes and to assist with, and remedy any problems experienced along the way.

Students are encouraged to refer to the University Flexible and Distributed Learning Code of Practice:

http://www.hw.ac.uk/quality/resources/fdl-cop.pdf

Students study for Heriot-Watt awards from all over the world and the University is therefore committed to providing a range of online support services which will be available to any student who requires it. In doing so, the University will attempt to ensure that all students receive high quality and relevant services that support their studies.

The main student support services are summarised below. For further information on each of the services, please refer to the Academic Registry Online Enrolment page:
http://www.hw.ac.uk/registry/enrolment_fresher.php

Student Administration and Support Service		
1	Academic Counselling and Skills Coaching	http://www.hw.ac.uk/sbc/library/academic_skills/index.htm
2	Academic Registry	http://www.hw.ac.uk/registry
3	Careers Advisory Service	http://www.hw.ac.uk/careers
4	Computing Services	**Regulation 29 'Use of Computing Facilities':** http://www.hw.ac.uk/it/Rules_%20Regulations/conditionsofuse.html **General IT information and help**: http://www.hw.ac.uk/it/Help_Support/index.html or contact IT Help on +44 (0)130 451 4045 **Freewire**: http://www.freewiretv.com/hw
5	Development and Alumni Office	http://www.hw.ac.uk/alumni.htm
6	Heriot-WattUniversity Students' Union	http://HWUnion.com or contacthwusa@hw.ac.uk
8	Student Service Centre (Edinburgh Campus)	http://www.hw.ac.uk/studentcentre
9	Student Support and Accommodation	http://www.hw.ac.uk/student-life/campus-life/student-support.htm or contact: studentsupport@hw.ac.uk *Please refer to the Campus Office for further advice.*

APPENDIX A: STUDENT LEARNING CODE OF PRACTICE

What staff can expect from students

Most importantly, we expect you to take charge of your own learning. This is your degree; to get the most of your time at the University you need to be independent, self-motivated and proactive in your studies. We understand that you may have other demands on your time, but your studies should come first. In addition, we expect:

- Commitment to your learning and a professional approach to your academic work
- Preparation for classes as specified by your lecturers, including studying lecture notes, working on tutorial questions and participating in online activities
- To do well in your studies you will need to undertake a significant amount of private study in addition to attending your timetabled classes
- Basic organisational skills, including coming to classes with pen and paper ready to take notes or with equipment for electronic note-taking, and using a calendar so that you don't forget deadlines and appointments
- Full engagement and attendance on time for lectures, laboratories, seminars and tutorials: during the semester it is your responsibility to be available on campus to attend classes and, in particular, class tests
- Attention, courtesy and participation during classes; this includes asking and answering questions in lectures and tutorials
- Respecting deadlines for any assignments
- Taking responsibility for your work, whether completed individually or as part of a group
- All work must be fully referenced *
- Determination and persistence; some topics and problems will be challenging and we expect you to make a sustained effort to master difficult topics. Lecturers are there to help if you need it
- Attendance at any scheduled meetings with a member of staff. If you can't make a scheduled meeting, please notify the member of staff in advance rather than just not attending
- Checking your University email, providing timely responses to emails from members of staff
- Provision of feedback on your courses and programme
- Self-reflection on progress and willingness to learn from feedback on tutorial work, projects, exams, and trying to improve your work based on that feedback
- To keep yourself informed about new and interesting developments in your discipline (beyond what you learn in your courses). Your academic department is full of experts in a wide range of areas who are happy to chat with you about topics of interest. Seek them out!
- Adherence with health and safety regulations and requirements
- Politeness and respect for all members of the Heriot-Watt University community (www.hw.ac.uk/equality/Values/Values%20Index.htm) and for the facilities/ services provided. This includes switching off your phones and other social media during classes

* Full referencing is required in accordance with the conventions of your subject area/discipline. Guidance on referencing and the use of sources is available from your subject librarian and the Effective Learning Service (http://www.hw.ac.uk/is/skills-development/study-support.htm). Remember that plagiarism is an academic offence even if it is unintentional; you need to take care to avoid it.

What students can expect from staff

Teaching is one of the most important duties for members of staff. Although members of academic staff have research and administrative duties which also require attention, we aim to provide:

- Commitment to helping you learn, with support, encouragement and technical back-up to help you develop your skills
- Research informed teaching and high quality delivery of learning materials in accordance with the syllabus
- Advice and support on course content at tutorials, laboratories and through pre-arranged meetings
- High quality supervision of project/dissertation work
- Availability for face-to-face meetings, either during scheduled office hours or at pre-arranged times
- Timely oral and written feedback
- Timely provision of marks/grades for coursework and exams
- A prompt response from your mentor
- A timely response to general email questions
- Guidance on specific regulations and requirements relating to health and safety
- Politeness and respect (www.hw.ac.uk/equality/Values/Values%20Index.htm)

Sometimes members of staff are away on University business and are not able to respond as quickly as normal. If this happens, they will leave an "out-of-office" message and will advise you who to contact instead.

If you have a problem

If you have a personal or any other type of problem that is having an adverse effect on your studies, please discuss it with your mentor. We are here to help. You can also discuss any personal problems with the staff in the Student Support (and Accommodation) Office (www.hw.ac.uk/support, or email studentsupport@hw.ac.uk).

For problems about your course or study programme, talk to the lecturer first. If that doesn't help, you can raise the matter with your Class Representative or the Year Director of Studies.

Academic Registrar and Deputy Secretary
September 2013

APPENDIX B: STUDENT GUIDE TO PLAGIARISM[1]

Plagiarism is intellectual theft and is a major offence which the University takes seriously in all cases. Students must therefore avoid committing acts of plagiarism by following these guidelines and speaking to academic staff if they are uncertain about what plagiarism means. Those who are found to have plagiarised will be subject to the University's disciplinary procedures, which may result in penalties ranging from the deduction of credits and modules already achieved by students to compulsory termination of studies. Students are advised to refer to Regulation 50 at http://www.hw.ac.uk/ordinances/regulations.pdf and to the Guidelines for Staff and Students on Discipline at http://www.hw.ac.uk/registry/Discipline.phpfor further details of how the University deals with all acts of plagiarism.

Introduction

1.1.   This guide is intended to provide students at Heriot-Watt University with a clear definition of plagiarism and examples of how to avoid it.

1.2.   The guide may also be of use to members of staff who seek to advise students on the various issues outlined below.

Definition

1.3.   Plagiarism involves the act of taking the ideas, writings or inventions of another person and using these as if they were one's own, whether intentionally or not. Plagiarism occurs where there is no acknowledgement that the writings or ideas belong to or have come from another source.

1.4.   Most academic writing involves building on the work of others and this is acceptable as long as their contribution is identified and fully acknowledged. It is not wrong in itself to use the ideas, writings or inventions of others, provided that whoever does so is honest about acknowledging the source of that information. Many aspects of plagiarism can be simply avoided through proper referencing. However, plagiarism extends beyond minor errors in referencing the work of others and also includes the reproduction of an entire paper or passage of work or of the ideas and views contained in such pieces of work.

Good Practice

1.5.   Academic work is almost always drawn from other published information supplemented by the writer's own ideas, results or findings. Thus drawing from other work is entirely acceptable, but it is unacceptable not to acknowledge such work. Conventions or methods for making acknowledgements can vary slightly from subject to subject, and students should seek the advice of staff in their own School/Institute about ways of doing this. Generally, referencing systems fall into the Harvard (where the text citation is by author and date) and numeric (where the text citation is by using a number). Both systems refer readers to a list at the end of the piece of work where sufficient information is provided to enable the reader to locate the source for themselves.

1.6.   When a student undertakes a piece of work that involves drawing on the writings or ideas of others, they must ensure that they acknowledge each contribution in the following manner:

- **Citations**: when a direct quotation, a figure, a general idea or other piece of information is taken from another source, the work and its source must be acknowledged and identified where it occurs in the text;

- **Quotations**: inverted commas must always be used to identify direct quotations, and the source of the quotation must be cited;

- **References**: the full details of all references and other sources must be listed in a section at the end of any piece of work, such as an essay, together with the full publication details. This is normally referred to as a "List of References" and it must include details of any and all sources of information that the student has referred to in producing their work. (This is slightly different to a Bibliography, which may also contain references and sources which, although not directly referred to in your work, you consulted in producing your work).

1.7.   Students may wish to refer to the following examples which illustrate the basic principles of plagiarism and how students might avoid it in their work by using some very simple techniques:

1.7.1. Example 1: A Clear Case of Plagiarism

Examine the following example in which a student has simply inserted a passage of text (*in italics)* into their work directly from a book they have read:

> University and college managers should consider implementing strategic frameworks if they wish to embrace good management standards. *One of the key problems in setting a strategic framework for a college or university is that the individual institution has both positive and negative constraints placed upon its freedom of action.* Managers are employed to resolve these issues effectively.

This is an example of bad practice as the student makes no attempt to distinguish the passage they have inserted from their own work. Thus, this constitutes a clear case of plagiarism. Simply changing a few key words in such a passage of text (e.g. replace '*problems'* with '*difficulties'*) does not make it the student's work and it is still considered to be an act of plagiarism.

1.7.2. Common Mistakes

Students may also find the following examples[2] of common plagiarism mistakes made by other students useful when reflecting on their own work:

- "I thought it would be okay as long as I included the source in my bibliography" [without indicating a quotation had been used in the text]
- "I made lots of notes for my essay and couldn't remember where I found the information"
- "I thought it would be okay to use material that I had purchased online"
- "I thought it would be okay to copy the text if I changed some of the words into my own"
- "I thought that plagiarism only applied to essays, I didn't know that it also applies to oral presentations/group projects etc"
- "I thought it would be okay just to use my tutor's notes"
- "I didn't think that you needed to reference material found on the web"
- "I left it too late and just didn't have time to reference my sources"

None of the above are acceptable reasons for failing to acknowledge the use of others' work and thereby constitute plagiarism.

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[2] Extract from 'Plagiarism at the University of Essex' advice copyrighted and published by the Learning, Teaching and Quality Unit at the University of Essex (http://www.essex.ac.uk/plagiarism/reasons.html), reproduced with kind permission.

1.8.   What follows are examples of the measures that students should employ in order to correctly cite the words, thought or ideas of others that have influenced their work:

1.8.1. Example 2: Quoting the work of others

If a student wishes to cite a passage of text in order to support their own work, the correct way of doing so is to use quotation marks (e.g. " ") to show that the passage is someone else's work, as follows:

"One of the key problems in setting a strategic framework for a college or university is that the individual institution has both positive and negative constraints placed upon its freedom of action".

1.8.2. Example 3: Referencing the work of others

In addition to using quotation marks as above, students must also use a text citation. If the work being cited is a book, page numbers would also normally be required. Thus, using the Harvard system for a book:

"One of the key problems in setting a strategic framework for a college or university is that the individual institution has both positive and negative constraints placed upon its freedom of action" (Jones, 2001, p121).

The same reference could also be made to a book using the numeric system:

"One of the key problems in setting a strategic framework for a college or university is that the individual institution has both positive and negative constraints placed upon its freedom of action" (Ref.1, p121).

More often, a piece of work will have multiple references and this serves to show an examiner that the student is drawing from a number of sources. For example, articles by Brown and by Smith may be cited as follows in the Harvard system

"It has been asserted that Higher Education in the United Kingdom continued to be poorly funded during the 1980's [Brown, 1991], whereas more modern writers [Smith, 2002] argue that the HE sector actually received, in real terms, more funding during this period than the thirty year period immediately preceding it".

or as follows using the numeric system:

"It has been asserted that Higher Education in the United Kingdom continued to be poorly funded during the 1980's [Ref 1], whereas more modern writers [Ref 2] argue that the HE sector actually received, in real terms, more funding during this period than the thirty year period immediately preceding it".

1.8.3. Example 4: Use of reference lists

Whichever system is used, a list must be included at the end, which allows the reader to locate the works cited for themselves. The Internet is also an increasingly popular source of information for students and details must again be provided. You should adhere to the following guidelines in all cases where you reference the work of others:

If the source is a book, the required information is as follows:

- Author's name(s)
- Year of Publication
- Publishers Name
- All Page Numbers cited

- Title of Book
- Place of Publication
- Edition (if more than one, e.g. 3rd edition, 2001)

If the source is an article in a journal or periodical, the required information is as follows:

- Author's name(s)
- Year of Publication
- Title of Journal
- Volume and part number
- Page numbers for the article

If the source is from the Internet, the required information is as follows:

- Author's or Institution's name ("Anon", if not known)
- Title of Document
- Date last accessed by student
- Full URL (e.g. http://www.lib.utk.edu /instruction/plagiarism/)
- Affiliation of author, if given (e.g. University of Tennessee)

The way in which the information is organised can vary, and there are some types of work (for example edited volumes and conference proceedings) where the required information is slightly different. Essentially, though, it is your responsibility to make it clear where you are citing references within your work and what the source is within your reference list. **Failure to do so is an act of plagiarism.**

1.9.   Students are encouraged to use a style of acknowledgement that is appropriate to their own academic discipline and should seek advice from their mentor, course leader or other appropriate member of academic staff. There are also many reference sources available in the University Library which will provide useful guidance on referencing styles.

Managing Plagiarism

1.10.   Students, supervisors and institutions have a joint role in ensuring that plagiarism is avoided in all areas of academic activity. Each role is outlined below as follows:

How you can ensure that you avoid plagiarism in your work:

- Take responsibility for applying the above principles of best practice and integrity within all of your work
- Be aware that your written work will be checked for plagiarism and that all incidents of plagiarism, if found, are likely to result in severe disciplinary action by the University. The standard penalty is to annul all assessments taken in the same diet of examinations (for details please refer to Regulation 50 at http://www.hw.ac.uk/ordinances/regulations.pdf and to the Guidelines for Staff and Students on Discipline at http://www.hw.ac.uk/registry/discipline.htm).

How your School/Institute will help you to avoid plagiarism:

- Highlight written guidance on how you can avoid plagiarism and provide you with supplementary, verbal guidance wherever appropriate
- Regularly check student work to ensure that plagiarism has not taken place. This may involve both manual and electronic methods of checking. A number of plagiarism detection packages are in use at Heriot-Watt University, one example being the Joint Information Systems Committee (JISC) "TurnitIn" plagiarism detection software. See http://www.hw.ac.uk/is/info-skills-learn.html for more information on how this software package works.
- Alert you to the procedures that will apply should you be found to have committed or be suspected of having committed an act of plagiarism and explain how further action will be taken in accordance with University policy and procedures.

How the University will endeavour to reduce student plagiarism:

- Provide clear written guidance on what constitutes plagiarism and how to avoid it directly to your School/Institute and to you
- Alert you and staff in your School/Institute to the penalties employed when dealing with plagiarism cases
- Take steps to ensure that a consistent approach is applied when dealing with cases of suspected plagiarism across the institution
- Take the issue of academic dishonesty very seriously and routinely investigate cases where students have plagiarised and apply appropriate penalties in all proven cases.