School of Mathematical and Computer Sciences

Programme Handbook

BSc Computer Science

Dubai Campus

2016 – 2017

UK Quality Assured

Table of Contents

PART A – CAMPUS AND PROGRAMME INFORMATION

1 SUMMARY OF KEY INFORMATION

1.1 KEY CONTACTS

Professor Ammar Kaka is the Head of the Heriot-Watt University Dubai Campus (HWUDC). There are 8 Academic Schools functioning within the Heriot Watt University Dubai Campus and each of them is managed by the Associate Head of School based in Dubai. Each Academic programme is led by a Programme Coordinator, supported by an experienced academic staff team located at the University's campus at Dubai International Academic City. The address and contact details are noted overleaf. In the first instance, students should contact us via our Reception staff who will be pleased to help direct queries to the appropriate person.

Heriot-Watt University Dubai Campus
Dubai International Academic City
PO Box 294345
Dubai
UAE
Tel: +971 4 4358700/ 8701/ 8702
Fax: +971 4 4477344 Web: www.hw.ac.uk/dubai.htm

1.2 SIGNIFICANT DATES IN ACADEMIC YEAR

HWU operates a two twelve-week semester system as shown below:

Event	Start	End
Enrolment and Induction	Sunday 4 September 2016	Saturday 10 September 2016
Semester 1 - Teaching	Sunday 11 September 2016	Saturday 3 December 2016
Semester 1 - Examinations	Monday 5 December 2016	Friday 16 December 2016
Semester 1 - Break	Sunday 18th December 2016	Saturday 7 January 2017
Semester 2 - Teaching	Sunday 8 January 2017	Saturday 1 April 2017
Semester 2 - Break	Sunday 3 April 2017	Saturday 22 April 2017
Semester 2 - Examinations	Monday 24 April 2017	Friday 19 May 2017
Autumn Diet - Examinations (Resit)	Thursday 3 August 2017	Friday 11 August 2017
Graduation	November 2017 TBC	

The Teaching Timetable for each Semester would be published on the link http://www.hw.ac.uk/students/studies/timetables/dubai.htm before the start of each Semester.

All examinations take place during the assessment blocks. Resit examinations are scheduled during the summer vacation. Full details of examination timetabling are published at the campus and can be found at:
http://www.hw.ac.uk/students/studies/examinations/timetables.htm

OFFICIAL UAE LOCAL HOLIDAYS & HERIOT-WATT UNIVERSITY DUBAI CAMPUS CLOSED DAYS

The official National holidays in the United Arab Emirates (UAE) are listed below. The Heriot-Watt University Dubai Campus will be closed on the approximate dates mentioned below:

Local Holiday	Proposed HWU Dubai Campus closed days *
Arafat (haj) Day and Eid-al-Adha	10 September 2016
Al-Hijra (Islamic New Year)	2 October 2016
Commemoration Day	30 November 2016
UAE National Day	2 December 2016
Mouloud (Prophet's Birthday)	12 December 2016
New Year's Day	1 January 2017
Leilat al-Meiraj (Ascension of the Prophet)	24 April 2017
Eid-Al-Fitr (End of Ramadan)	26 June 2017

* All dates given, especially for Islamic holidays and special observations, are approximate dates only and will be confirmed nearer the time, along with any University closed days

1.3 LINKS TO FURTHER INFORMATION/SERVICES

Please refer to the University's websites at www.hw.ac.uk and http://www.hw.ac.uk/dubai.htm which contain detailed information about Heriot-Watt University and the Dubai Campus.

University Academic Registry :	http://www1.hw.ac.uk/registry/
Online Course Material:	http://vision.hw.ac.uk/
Student Self Service:	http://www.hw.ac.uk/selfservice
Online Enrolment:	http://www.hw.ac.uk/onlineenrolment
Online Results:	http://www.hw.ac.uk/selfservice
Forms:	http://www.hw.ac.uk/registry/forms.htm
Graduation:	http://www.hw.ac.uk/students/studies/graduation.htm

2 WELCOME AND INTRODUCTION

2.1 Welcome from the Principal

I would like to take this opportunity to welcome you to the Heriot-Watt University community!

We are delighted you have chosen to study at Heriot-Watt. We are an exciting and distinctive University, unique in terms of our global reach. As one of the most progressive and international institutions based in Scotland, we are confident you will have the opportunity to thrive, both personally and academically, during your time with us. Our learning environment offers the very best in terms of study programmes which apply knowledge to real world challenges, together with the latest learning technologies, and outstanding support and facilities.

We hope you will thoroughly enjoy the experience of being a Heriot-Watt student and we look forward to you commencing your studies with us.

Professor Richard A Williams OBE
University Principal and Vice-Chancellor

2.2 Welcome from the Head of Dubai Campus

It is with great pleasure that we welcome you to the University's Dubai Campus

Heriot-Watt University is proud to be here in the UAE, providing a range of high quality programmes, relevant to the Middle East region, to the UAE and to the aspirations of its people. Heriot-Watt has a long tradition of providing vocationally relevant academic programmes, with strong industry and research links. There are currently over 500 Heriot-Watt Alumni living and working in the UAE and the Gulf States as well as our current students, so you will be joining a successful and vibrant community!

We welcome you to your chosen degree programme either as a postgraduate or undergraduate student and look forward to working with you to help you achieve your personal ambitions and goals.

Professor Ammar Kaka
A Vice Principal of Heriot-Watt University and
Head of Heriot-Watt University Dubai Campus

2.3 Welcome from Head of School

I am delighted to echo my colleagues' welcome to our University and to our Dubai campus. It is also my pleasure to welcome you to the School of Mathematical and Computer Sciences. You are joining a thriving School with a strong tradition of research, scholarship and teaching in Computer Science and Information Technology. You are about to start on a well-established undergraduate programme leading to a highly regarded and internationally recognised qualification. As our student, you will enjoy the professionalism, enthusiasm and friendliness of our Dubai-based staff, confident that you are receiving the same high standards of teaching and assessment as your fellow students in Scotland.

I trust that you will find studying with us both stimulating and rewarding.

Professor Beatrice Pelloni
Head of the School of Mathematical & Computer Sciences

3 GENERAL INFORMATION ABOUT HERIOT-WATT UNIVERSITY AND THE DUBAI CAMPUS

Heriot-Watt University is an international university, based in Edinburgh, the capital of Scotland in the UK, with campuses in the north and south of Scotland, Dubai and Malaysia. The University also has a worldwide network of Learning Partners.

Wherever they are located, Heriot-Watt students have the opportunity to study programmes which will equip 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 Heriot-Watt University Dubai Campus is located in the Dubai International Academic City. The University is the first to operate from this rapidly-developing site, and is offering programmes that meet the demands of the region and beyond.

The Dubai Campus is certified and permitted by Knowledge and Human Development Authority (KHDA) which is part of the Dubai Government (UAE). Heriot-Watt is running all its Programmes and activities of higher education in UAE under the rules and regulations of KHDA.

4 KEY STAFF AND CONTACT DETAILS

4.1 Campus Contacts

Point of Contact	Responsible Staff Name	Tel Number
A Vice-Principal of Heriot-Watt University and Head of Dubai Campus	Professor Ammar Kaka	+971 4 4358666
Director of Administration & Registrar	Ms Sheelagh Wallace	+971 4 4358666
Student President	Mr Franklin Thankachan	+971 4 4358795
Reception	Mr Biju Prasad/ Ms Soleil Sanchez	+971 4 4358700
Recruitment and Admissions Office	Dr Kishore Sirnani	+971 4 4358605
Academic Administration Office	Mrs Nandini Raj	+971 4 4358644
Visa Office	Mr. Ilyas Abdul Wahab	+971 4 4358628
Finance Office	Mr Suresh Kumar	+971 4 4358675
Library	Dr Ramakanta Rath	+971 4 4358661
IT Office (Help Desk)	Mr Nidhish Cherian	+971 4 4358685
Transport and Accommodation Office	Mr Anil Kumar	+971 4 4358621
Careers Development officer	Ms Kathryn Taylor	+971 4 4358791
Effective Learning Advisor	Ms Allyson Noble	+971 4 4358797

4.2 Academic School Contacts

Point of Contact	Responsible Staff Name	Direct line/Email/ Office location
Dubai Campus		
Academic Head	Mr Steve Gill	+971 4 4358761 S.Gill@hw.ac.uk F44, 3rd floor
Postgraduate Director	Dr Hind Zantout	+971 4 4358764 H.Zantout@hw.ac.uk F43, 3rd floor
Undergraduate Director	Dr Hani Ragab Hassen	+971 4 4358727 H.RagabHassen@hw.ac.uk F67, 2nd floor
Edinburgh Campus		
Head of School	Professor Beatrice Pelloni	B.Pelloni@hw.ac.uk
Head of Computer Science	Professor Andrew Ireland	A.Ireland@hw.ac.uk
Undergraduate Administrator		
To January 2017	Ms Oliwia Kupinska	O.Kupinska@hw.ac.uk
From January 2017	Mrs Lisa Kinnaird	L.M.Kinnaird@hw.ac.uk

4.3 Academic Staff Contacts

Point of Contact	Responsible Staff ame	Direct line/Email/ Office location
First Year Supervisor & Personal Tutor	Dr Mohamed Abdelshafy	+971 4 4358650 M.Abdelshafy@hw.ac.uk F85, 2nd floor
Second Year Supervisor & Personal Tutor	Ms Smitha Kumar	+971 4 4358786 Smitha.Kumar@hw.ac.uk F68, 2nd floor
Third Year Supervisor & Personal Tutor	Mr Talal Shaikh	+971 4 4358762 T.A.G.Shaikh@hw.ac.uk F42, 3rd floor
Fourth Year Supervisor & Personal Tutor	Dr Hani Ragab Hassen	+971 4 4358727 H.RagabHassen@hw.ac.uk F67, 2nd floor
Director of Research	Dr Mohammad Hamdan	+971 4 4358789 M.Hamdan@hw.ac.uk F69, 2nd floor

4.4 Support Staff Contacts

Point of Contact	Responsible Staff Name	Direct line/Email/ Office location
IT Lab	IT Help Desk	+971 4 4358681 to 85 or 87 DubaiHelpdesk@hw.ac.uk 1st floor, left wing
PA to the Academic Head of Mathematical & Computer Sciences	Ms Resmi Nair	+971 4 4358668 N.Resmi@hw.ac.uk AAO, Ground floor
Senior Officer – Undergraduate, Academic Administration Office	Ms Aisha Albulooshi	+971 4 4358641 A.Albulooshi@hw.ac.uk AAO, Ground floor

Officer – Postgraduate, Academic Administration Office	Mr Roen Oducado	+971 4 4358639 R.Oducado@hw.ac.uk AAO, Ground floor
Academic Administration Office	Counter Service	+971 4 4358631 DubaiAAO@hw.ac.uk Ground floor

5 PROGRAMME OVERVIEW

Heriot-Watt University reserves the right to update materials from time to time and will ensure that advance notification concerning changes to materials is provided to students on the relevant section of the University website. It is the responsibility of students to check the website, particularly if they are returning to studies after a period during which their studies have been suspended.

6 PROGRAMME STRUCTURE AND DELIVERY

The University operates a Heriot-Watt Assessment and Progression System (HAPS) which specifies minimum progression requirements. Schools have the option to apply progression requirements above the minimum University requirement, which are approved by the Studies Committees. Students should refer to the programme specific information on progression requirements. This information is detailed later in this handbook.

Introduction

This programme specific handbook should be read in conjunction with the Undergraduate Programme Handbook for the School of Mathematical and Computer Sciences (MACS), which can be found on the School website http://www.macs.hw.ac.uk/students/

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

Further information for current undergraduate students can be found at:
http://www.macs.hw.ac.uk/students/cs/
http://www1.hw.ac.uk/registry/index.htm
https://www.hw.ac.uk/students/index.htm

Graduate Attributes

As a student of Heriot-Watt University, you are part of our global community. You will meet new people, discover new interests, develop your life skills and enhance your employability and career prospects.

The University will provide you with opportunities to develop skills, qualities and academic abilities during your time as a Heriot-Watt student. These are known as the **Four Heriot-Watt Graduate Attributes**:

- ***Specialist***
- ***Creative***
- ***Global***
- ***Professional***

Further information can be found at:
https://www.hw.ac.uk/students/doc/StudentGraduateAttributes.pdf

Degree 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 8 courses 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.

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.

The Course Descriptor

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.

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.

Staff/Student Expectations

What you can expect from staff

Teaching is one of the most important duties for staff. Although we have research and admin duties which need our attention too, we promise students:

- Commitment to helping you learn
- Politeness and respect
- A regular office hour slot for face to face meetings
- Written feedback and a mark for coursework within 15 working days after the hand-in time.
- A reply to general email questions within 5 working days
- A response from your personal tutor within 2 working days
- If you would like to see your exam script to see where you went wrong, send a signed letter to the Academic Head to request this. (It may take a bit of time to get the paper scanned if it has been sent to Edinburgh). You can also make an appointment with the lecturer to get further advice on how to improve your work.
- Sometimes staff members are away on university business (for example at a research project meeting outside the UK), and won't be able to respond as quickly as normal. If this happens, they will tell you about it (e.g. on an "out of office" message) and will advise you who to contact instead.

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 university you need to be independent and proactive. We understand that you have other demands on your time, such as paid employment, but as full time students, your studies should come first.

- Commitment to your learning
- Politeness and respect
- Attendance at classes, unless they are specifically identified as voluntary. During semester it is your responsibility to be available on campus to attend classes and in particular class tests.
- Attention, courtesy and participation during classes
- Preparation and practice for classes as specified by the lecturers, such as reading or coding. For every hour of timetabled class, we expect you to spend 2-3 hours in private study.

- Practice, practice practice! In order to become a good programmer, you need to program regularly. If you are having trouble we will help, but the most useful thing you can do for yourself is devote time to programming.
- Basic organisation skills, such as coming to classes with pen and paper ready to take notes, and using a calendar so you don't forget deadlines and appointments
- If you can't make a scheduled meeting with a staff member, please notify them in advance rather than just not turning up
- Check your email and logging into Vision at least every other day
- A reply to email from staff within 5 working days (if it requires a reply!)
- We expect you to pay attention to the feedback we give you, and to attempt to improve your work based on that feedback.
- We encourage you to keep yourself informed about new and interesting developments in computer science above and beyond what you learn in the taught courses. The department is full of experts in a wide range of areas who would love to chat to keen students about their research. Seek them out!
- If you have a problem which is interfering with your studying, please discuss it with your personal tutor. We are here to help.

Personal Tutor

You will be allocated a personal tutor when you arrive at the University and this is normally the year supervisor. Your personal tutor is your main academic link with the University, and will help you choose courses and register for courses at the beginning of the session. Under certain circumstances, with the permission of the Academic Head in Dubai, it may be possible to change your personal tutor.

Every year a few students run into personal difficulties (e.g. family illness, accommodation, financial, etc.). As well as being generally supportive, personal tutors can help in a number of practical ways. For example, if illness prevents you from completing project work or sitting examinations, your personal tutor can sometimes help with re-scheduling or making alternative arrangements for assessment. However, you *must* notify your personal tutor as soon as possible, or there is very little that can be done. This is particularly important if illness affects your Examinations. Also, it is essential to provide a medical certificate (see **Mitigating Circumstances**, p 14). With other problems, your personal tutor can put you in touch with the appropriate University support service. ***Personal tutors are there to help; do not hesitate to contact yours if you need them.***

Dubai Contacts:

Academic Head	Mr Steve Gill	S.Gill@hw.ac.uk
Undergraduate Director of Studies	Dr Hani Ragab Hassen	H.RagabHassen@hw.ac.uk

Further information on the role of personal tutors can be found at: https://www.hw.ac.uk/students/studies/personal-tutors.htm

Go Global

At Heriot-Watt, you have the opportunity to become a global student by taking part in an Inter-Campus Transfer, Erasmus+ or Exchange. Studying abroad is a unique opportunity and likely to provide some of your most memorable life experiences. Further information can be found at: https://www.hw.ac.uk/students/studies/go-global.htm

Staff-Student Liaison Meetings
Students are asked to elect a class representative at the start of every academic year. Your representative will keep the staff up to date with any problems which students in the year have identified, and they also keep students informed of actions taken by staff to address these problems. Also, every semester, staff and students meet regularly to discuss how the courses are going. We are keen to get feedback from students on how we could improve our teaching and facilities. The class representatives for each year will be present, as well as the year supervisor and the Director of Undergraduate Studies. All students from the relevant year groups are also very welcome to attend. Look out for emails with the dates and topics for these meetings.

If you have a complaint about a course, the first thing to do is to talk to the lecturer in question, or ask the class representative to do this for you. If that doesn't work, you can bring it to the consultation meetings.

Enrolment for Courses
You must be enrolled for the courses which you are studying. This will be done initially during on-line enrolment.

Any subsequent changes to optional choices must be agreed between you and your Director of Studies or personal tutor, and then recorded on a Change of Course Form available from Academic Administration Office. The form must then be returned to AAO for processing.

All course changes must be made by the end of week 3 of each semester. No changes can take place after week 5 of each semester.

Feedback
Feedback is a two-way process. Feedback is provided to students in a variety of ways in order to help you to reflect on and to evaluate your progress and to assist you to take steps to improve before the next relevant assessment. For most courses, students can expect feedback on assessed coursework within three teaching weeks of the coursework due date.

Feedback is sought from students via Student-Staff Liaison Committees and various surveys so that the School can continue to enhance the student learning experience. Your feedback is valued by the School, so please be sure to provide feedback whenever it is sought.

Attendance Requirements
In order to achieve course and programme learning outcomes, students are expected to attend all scheduled course learning sessions (e.g. timetabled lectures, tutorials, lab sessions, etc). Should you have to miss a timetabled session due to ill health or other legitimate reasons, you should submit a self-certification or medical certification or an application for consideration of Mitigating Circumstances – details can be found at:
https://www.hw.ac.uk/students/studies/examinations/mitigating-circumstances.htm

Students who fail to satisfy course attendance requirements may, after due warning, be disallowed from presenting themselves for examination in the course**.**

Coursework must be handed in by the stipulated dates, and students are required to see their personal tutors at agreed times. Students who fail to submit compulsory coursework may also be disallowed from presenting themselves for examination in the relevant courses.

All lectures, tutorials and laboratories are compulsory and registers of attendance may be taken.

If you are absent from class due to illness for four days or less, you should complete a self-certification form, obtainable from the Student Services and return it to the Student Services within a week of your return. If you are absent for more than four days, you must supply a medical certificate to the Student Services within a week of your return.

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 familiarizing themselves with University policy on these matters. For more detail, see the Student Guide to Plagiarism (page 78 of this handbook) and Regulation 9 on the Registry's website.

Submission of Coursework

Students are required to complete all coursework at a satisfactory level. Coursework must be submitted by the deadline given. The default policy of the School is that coursework submitted late should have its given mark reduced by 10% for each working day it is late. Lecturers will supply details of how coursework will be submitted for their course.

Students who have serious concerns about meeting submission dates for coursework should consult the Course Leader as soon as possible. Any extension to the submission deadline must be approved by the Course Leader, and the reason for the extension will be recorded. Applications for extensions made **after** the due submission date will not normally be approved.

Examinations

It is the student's responsibility to check all relevant examination information at: https://www.hw.ac.uk/students/studies/examinations.htm.

You must not **book holidays or take on any other commitments during the assessment diet**.

Should you be required to resit any exams, you must be available to take them during the re-assessment diet in August.

All examinations must be taken at the Dubai Campus.

Calculators, Dictionaries & Electronic Devices

Where a calculator is required for the completion of an examination, a student may use any basic scientific calculator, except the following: graphics calculator, programmable calculator and a calculator which features text storage or retrieval facilities. You must bring your own calculator to the examination as the University do not provide them.

No translation dictionaries are permitted in any of the University's examinations. The only exception to the policy is in the case of individual students who had been assessed by the University's Disability Service as requiring access to a translation dictionary.

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.

Unauthorised Material

You must not have any unauthorised pre-printed materials or electronic devices or in the examination room. Cheating in an examination is treated very seriously by the University. If you do have any material relevant to the exam which you have brought in by mistake, you must hand it over to an invigilator before the start of the examination. Invigilators will carry out checks on authorised materials and calculators.

Information on examinations, including timetables, re-assessment procedures etc can be found at: https://www.hw.ac.uk/students/studies/examinations.htm.

Past exam papers for can be found at:
http://www.macs.hw.ac.uk/students/cs/

Past exam papers are only accessible on-campus or if you use the VPN (http://vpn1.hw.ac.uk)

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

Assessment Results and Progression Decisions
The official mechanism for receiving all your assessment results is on-line. You can find out details at: https://www.hw.ac.uk/students/studies/examinations/results.htm

You will officially receive the provisional results of your semester 1 assessments in mid-January. You will receive the final results of your semester 1 & 2 assessments by 10 June (June graduating students) or 1 July (continuing or non-graduating students). Re-assessment results are released no later than 26 August.

The Progression Board meets at the end of the academic year to decide which students will be allowed to proceed to the next year of their degree programme. You will receive notification from the University when your on-line results and the Board's progression decision are available on-line, and whether you must resit any courses.

In years 1, 2 and 3 if you do not pass a course at the first attempt, you have one opportunity to resit the course during the resit diet in early August. In Year 3, re-assessment is for credit only and you cannot improve your overall average (which accounts for 20% of your final degree results) unless you are re-sitting because of mitigating circumstances. There are no re-sit opportunities for courses in Years 4.

If you receive a pass/proceed decision that allows you to progress at the Summer Progression Board you can enrol on-line from mid-August. If you have resits, and are able to progress following the Resit Progression Board, you may enrol on-line once you have received your Assessment Results.

Final Degree Assessment
The Award Board meets in the last week of May to consider the assessment marks and make recommendations on degree classifications.

Degree Specialism
To graduate with the degree BSc Computer Science (*Computer Games Programming)* candidates must take the mandatory courses F20GA 3D Graphics and Animation and F20GP Computer Games Programming and do at least one of F20SC Industrial Programming or F20AD Advanced Interaction Design and do an approved dissertation topic suitable for this specialism. You must inform the Academic Head, Steve Gill (S.Gill@hw.ac.uk), at the start of the honours/4th year if you want to exit with this degree specialism

Graduation
When you have completed your degree your award is conferred at a graduation ceremony. Details on graduation, including how to apply, deadlines for applying and the cost, can be found at: https://www.hw.ac.uk/students/studies/graduation.htm.

This website also includes details of gown hire and guest tickets.

Mitigating Circumstances
If you experience any Mitigating circumstances which affect your ability to complete your assessments you must notify us as soon as possible.

You should read the University's Policy on Mitigating Circumstances in Relation to Assessment and then complete the application form at: https://www.hw.ac.uk/students/studies/examinations/mitigating-circumstances.htm. This form along with any relevant evidence (eg medical certificates) should be submitted to the Academic Administration Office.

Evidence submitted after your results have been published cannot be taken into account.

It is **very important** that you notify your personal tutor **as soon as possible** of any mitigating circumstances, such as illness or bereavement, which could adversely affect your assessment performance. In the case of illness, medical evidence must be supplied to the Academic Administration Office. 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.

Thinking of Leaving
Many students think about leaving university at some stage during their studies. If anything is bothering you or you are thinking about leaving, please speak to a member of staff to explore and understand what you can do.

There may be other options such as additional help (perhaps advice on how to improve your academic skills), a temporary suspension of studies or transferring to another programme.

Further information is available at: https://www.hw.ac.uk/students/studies/leaving.htm

Complaints and Appeals
Our aim at Heriot-Watt is to ensure that your experience while studying with us is of the highest quality. However, we recognise that during your time at the University there may be circumstances that occur where you feel you need to make a complaint or to appeal a decision.

Further information is available at: https://www.hw.ac.uk/students/studies/complaints-appeals.htm

Undergraduate Programme Structure & Notes Template

1. Programme Code(s) (recruitment & exit awards) **F291-COS**	2. Programme Titles for all awards (unabbreviated) **Computer Science**	
3. Main Award(s) (to be recruited to) **BSc Honours**	4. Exit Awards (graduation only) **BSc Honours, BSc Ordinary**	5. Date of Production **05 April 2016**

6. MANDATORY COURSES

Edinburgh/ Orkney/SBC	HWUM	Dubai	ALP	IDL	Collaborative Partner	Stage	Semester	Phase (Part-time only)	Courses: *(Please highlight any new courses and include the course descriptors)* Code	Course Title	Credit Value SCQF	Credit Value MQA	SCQF Level	Notes
STAGE 1														
√		√				**1**	1		F27SA	Software Development 1	15		7	
√		√				**1**	1		F27IS	Interactive Systems	15		7	
√		√				**1**	1		F27PX	Praxis	15		7	
√		√				**1**	1		F17LP	Logic & Proof	15		7	
√		√				**1**	2		F27SB	Software Development 2	15		7	
√		√				**1**	2		F27SG	Software Development 3	15		7	
√		√				**1**	2		F27CS	Introduction to Computer Systems	15		7	
√		√				**1**	2		F27WD	Web Design & Databases	15		7	
STAGE 2														
√		√				**2**	1		F28IN	Interaction Design	15		8	
√		√				**2**	1		F28WP	Web Programming	15		8	
√		√				**2**	1		F28DA	Data Structures & Algorithms	15		8	
√		√				**2**	1		F28PL	Programming Languages	15		8	
√		√				**2**	2		F28SD	Software Design	15		8	
√		√				**2**	2		F28DM	Database Management Systems	15		8	
√		√				**2**	2		F28HS	Hardware-Software Interface	15		8	
√		√				**2**	2		F17SC	Discrete Mathematics	15		7	
STAGE 3														
√		√				**3**	1		F29SO	Software Engineering	15		9	
√		√				**3**	1		F29DC	Data Communications & Networking	15		9	
√		√				**3**	1		F29AI	Artificial Intelligence & Intelligent Agents	15		9	
√		√				**3**	1		F29FA	Foundations 1	15		9	
√		√				**3**	2		F29PD	Professional Development	15		9	
√		√				**3**	2		F29OC	Operating Systems & Concurrency	15		9	
√		√				**3**	2		F29LP	Language Processors	15		9	
√		√				**3**	2		F29FB	Foundations 2	15		9	
STAGE 4														
√		√				**4**	1		F20PA	Project: Research Methods & Requirements Engineering	15		10	
√		√				**4**	2		F20PB	Project: Design & Implementation	15		10	
√		√				**4**	2		F20PC	Project: Testing & Presentation	15		10	

7. OPTIONAL COURSES														
Edinburgh/ Orkney/SBC	HWUM	Dubai	ALP	IDL	Collaborative Partner	Stage	Semester	Phase (Part-time only)	Courses: *(Please highlight any new courses and include the course descriptors)* Code	Course Title	Credit Value SCQF	Credit Value MQA	SCQF Level	Notes
STAGE 4														
√						**4**	1		F20CL	Computing in the Classroom	15		10	Student choose 3 courses in semester 1 and 2 courses in semester 2
√						**4**	1		F20BC	Biologically Inspired Computation	15		10	
√		√				**4**	1		F20CN	Computer Network Security	15		10	
√						**4**	1		F20DL	Data Mining & Machine Learning	15		10	
√						**4**	1		F20DV	Data Visualisation and Analytics	15		10	
√		√				**4**	1		F20GA	3D Graphics and Animation	15		10	
√		√				**4**	1		F20IF	Information Systems Methodologies	15		10	
√		√				**4**	1		F20MC	Mobile Communications & Programming	15		10	
√		√				**4**	1		F20RS	Rigorous Methods for Software Eng.	15		10	
√		√				**4**	1		F20SC	Industrial Programming	15		10	
√		√				**4**	2		F20AD	Advanced Interaction Design	15		10	
√		√				**4**	2		F20AN	Advanced Network Security	15		10	
√		√				**4**	2		F20BD	Big Data Management	15		10	
√						**4**	2		F20CA	Conversational Agents & Spoken Language Processing	15		10	
√		√				**4**	2		F20DE	Digital and Knowledge Economy	15		10	
√						**4**	2		F20DP	Distributed and Parallel Technologies	15		10	
√						**4**	2		F20EC	E-Commerce Technology	15		10	
√		√				**4**	2		F20GP	Computer Games Programming	15		10	
√		√				**4**	2		F20NA	Network Applications	15		10	
√						**4**	2		F20RO	Intelligent Robotics	15		10	

8. ELECTIVES *(please provide a detailed description and course lists where possible)*	
Stage 1:	
Stage 2:	
Stage 3:	
Stage 4:	
Stage 5:	

PROGRAMME NOTES

9. COMPOSITION & STAGE NOTES *e.g. xx taught Courses (xx mandatory & xx optional)*	
Stage 1:	8 taught courses, all mandatory
Stage 2:	8 taught courses, all mandatory. Direct entrants to Stage 2 and internal transfers from other degrees will be expected have an appropriate background in programming and database technology
Stage 3:	8 taught courses, all mandatory Direct entrants to Stage 3 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).
Stage 4:	8 taught courses , 3 mandatory and 5 optional In any one year not all optional courses may be offered. Guidance in course choice will be given by academic mentors. Candidates are required to undertake an individual dissertation project (F20PA, F20PB, and F20PC) which shall run throughout the year.

10. NOMINAL PASS MARK/GRADE			**11. SUMMARY OF ASSESSMENT METHODS** *(Expressed as a percentage)*			
(Highlight any changes)	**Mark**	**Grade**	**Coursework:**	Varies in courses from 100% to 20%	**Examination:**	Varies in courses from 0% to 80%
Integrated Masters			**Variations in assessment methods across campuses/modes of study are as follows:**			
Honours	40%	D				
Ordinary	40%	D				
Diploma	40%	D				
Certificate	40%	D				

12. PROGRESSION REQUIREMENTS	
Part A. Minimum number of credits required to progress through each stage are as follows	
Stage 1 to 2:	120 credits (8 courses)
Stage 2 to 3:	240 credits (16 courses)
Stage 3 to 4:	360 credits (24 Courses) and an overall average of 50% or above at the first attempt
Stage 4 to 5:	
Part B. Minimum grade D required in the following courses: *(progression requirements exceeding a grade D must be qualified*)	
Stage 1:	Software Development (F27SA), Interactive Systems (F27IS), Logic & Proof (F17LP), Web Design & Databases (F27WD), Introduction to Computer Systems (F27CS), Software Development 2 (F27SB) and Software Development 3 (F27SG)
Stage 2:	Interaction Design (F28IN) Web Programming (F28WP), Data Structures & Algorithms (F28DA), Database Management Systems (F28DM), Software Design (F28SD), Programming Languages (F28PL), Discrete Maths (F17SC), Hardware-Software Interface (F28HS)
Stage 3:	6 courses including Software Engineering (F29SO) & Professional Development (F29PD). Re-assessment in Stage 3 is available for credit only and not to improve overall average
Stage 4:	

13. RE-ASSESSMENT OPPORTUNITIES	
The re-assessment policy for this programme is in line with University Regulations as set out below *(please tick)*	**Yes**

If you have selected "No" please amend the statement below and highlight changes.

1. A student who has been awarded a Grade E or a Grade F in a course may be re-assessed in that course.
2. A student shall be permitted only one re-assessment opportunity to be taken at the Resit diet of examinations following the first assessment of the course.
3. A student shall not be re-assessed in any qualifying course taken in the final stage of a course of study.
4. The Progression Board may permit a student to be re-assessed in any qualifying course not taken in the final stage in order to gain credits for the course, provided that the mark or grade obtained in the first assessment of any such course is used in determining the classification of the degree to be awarded.

14. AWARDS, CREDITS & LEVEL	
The awards, credits and level for this programme is in line with University Regulations as set out below *(please tick)*	**Yes**
If you have selected "No" please amend the statement below and highlight changes.	
Part A. Credit Requirements	
Integrated Masters	N/A
Honours Degree *(inc MA)*	480 SCQF credits including a minimum of 180 credits at Level 9 and 10 of which at least 90 credits at Level 10
Ordinary or General Degree	360 SCQF credits including a minimum of 60 credits at Level 9
Diploma of Higher Education	240 SCQF credits including a minimum of 90 credits at Level 8
Certificate of Higher Education	120 SCQF credits including a minimum of 90 credits at Level 7
Part B. Mark/Grade Requirements	
Integrated Masters	N/A
Honours Degree *(inc MA)*	1st: Weighted Average >=70% over all qualifying courses at grades A-D 2.1: Weighted Average >=60% over all qualifying courses at grades A-D 2.2: Weighted Average >=50% over all qualifying courses at grades A-D 3rd: Weighted Average >=40% over all qualifying courses at grades A-D These are default marks/grades. The Board of Examiners may exercise some discretion in accordance to University Regulations
Ordinary or General Degree	Minimum of grade D in all pre-requisite courses These are default marks/grades. The Board of Examiners may exercise some discretion in accordance to University Regulations
Diploma of Higher Education	Minimum of grade D in all pre-requisite courses These are default marks/grades. The Board of Examiners may exercise some discretion in accordance to University Regulations
Certificate of Higher Education	Minimum of grade D in all pre-requisite courses These are default marks/grades. The Board of Examiners may exercise some discretion in accordance to University Regulations
Part C. Additional Award Requirements	
Honours degree classification is determined by performance in: • Stage 3 averaged over all 8 courses (20%) at the first attempt • The 5 assessed courses in Stage 4 (50%) • The individual dissertation project in Stage 4 (30%)	

15. ADDITIONAL PROGRAMME INFORMATION

16. Programme Accredited by	**British Computer Society**	**17. QAA Subject Benchmarking Group(s)**	**Computing**	**18. UCAS Code(s)**	G400

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Heriot-Watt University – Programme Description Template

1. Programme Code(s) (*recruitment & exit awards)*	2. Programme Titles for all awards *(unabbreviated)*	3. Main Award(s) *(to be recruited to)*	4. Exit Awards *(for graduation only)*
F291-COS	**Computer Science**	**BSc (F291-COS)**	**BSc (Hons) (F291-YYY)**

5. Type	6. Programme Accredited by	7. UCAS Code	8. School	9. QAA Subject Benchmarking Group(s)	10. Date of Production/ Revision
School specialist degree	British Computer Society	G400	Mathematical & Computer Sciences	Computing	13 March 2009

11. Educational Aims of the Programme

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.

12. The Programme 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.

Personal Abilities

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.

13. 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 evalautive* 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 module descriptors.

14. 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 module descriptors.

BSc Computer Science

Course Descriptors

Year 1, Semester 1

The University reserves the right to withdraw or modify the content of any course

Course Code: F27PX	Course Title: Praxis	Course Co-ordinator: S Gill
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 ♦ To present skills that students could useful use to become successful students	
Syllabus:	♦ Writing reports; sources and referencing; group presentation; the matter of plagiarism ♦ Current departmental research ♦ Exploration of the departmental computer system ♦ Study skills	
Learning Outcomes: **Subject Mastery**	*Understanding, Knowledge and Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* ♦ 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:**	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ Undertaking responsibility for self-directed research ♦ Assimilating information from multiple sources ♦ Analysing results to formulate conclusions ♦ Writing reports to professional standards ♦ Constructively evaluating the work of peers ♦ Reacting sensibly to peer evaluation ♦ Re-writing work in response to criticism ♦ Co-operating in a group to investigate a complex topic ♦ Making spoken and visual presentations ♦ Acquiring study skills that can be used for both academic studies and later in a professional context	
Assessment Methods:	Assessment: Coursework: (weighting – 100%)	Re-assessment: Coursework: 100%

Course Code: F27SA	Course Title: Software Development 1	Course Co-ordinator: M Hamdan
Pre-requisites:	None	
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 Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* ♦ 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:**	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ 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 – 50%) Coursework: (weighting – 50%)	Re-assessment: Examination: (weighting – 100%)

Course Code: F27IS	Course Title: Interactive Systems	Course Co-ordinator: S Kumar
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 Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* ♦ 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:**	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ 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: Coursework: (weighting – 100%)	Re-assessment: Coursework: (weighting – 100%)

Course Code: **F17LP**	**Course Title:** **Logic & Proof**	**Course Co-ordinator:** **H Zantout**
Pre-requisites:	None	
Aims:	To give an introduction to and an appreciation of the basic principles and techniques of logic and proof fundamental to Computer Science.	
Syllabus:	♦ Logic and proof ♦ Propositional calculus ♦ Truth tables, predicate calculus ♦ Inference rules ♦ Soundness ♦ completeness ♦ Validity ♦ Satisfiability ♦ Reasoning and calculating with propositions ♦ Practical applications	
Learning Outcomes: **Subject Mastery**	*Understanding, Knowledge and Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* ♦ To demonstrate an understanding of the principles of propositional and predicate calculus. ♦ To foresee the role of argument in logical reasoning. ♦ To be able to formulate statements as well formed formulae in propositional and predicate calculus. ♦ To be able to construct formal proofs of logical arguments.	
Learning Outcomes: **Personal Abilities**	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ 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 – 70%) Coursework: (weighting – 30%)	Re-assessment: Examination: (weighting – 100%)

BSc Computer Science

Course Descriptors

Year 1, Semester 2

Course Code: F27SB	Course Title: Software Development 2	Course Co-ordinator: S Kumar
Pre-requisites:	None	
Aims:	♦ To impart further techniques of object orientation ♦ To introduce simple data structures and algorithms	
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 ♦ Error-handling: defensive programming, exceptions, assertions, JUnit tests ♦ Collection classes	
Learning Outcomes: **Subject Mastery**	*Understanding, Knowledge and Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* ♦ 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:**	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ Possession of fundamental skills in computer science, applicable throughout the remainder of the degree ♦ Understand challenges in developing , designing and maintaining code. ♦ Understanding of the importance of regular working habits (pdp) ♦ Understanding of the use of chatboards and other devices to learn from and instruct others in the class (pdp) ♦ Ability to compare and evaluate the applicability of simple data structures and code design choices to relevant problems (pdp)	
Assessment Methods:	Assessment: Examination: (weighting – 50%) Coursework: (weighting – 50%)	Re-assessment: Examination: (weighting – 100%)

Course Code: **F27CS**	**Course Title:** **Introduction to Computer Systems**	**Course Co-ordinator:** **H Ragab Hassen** **M Abdelshafy**
Pre-requisites:	None	
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 Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* ♦ 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:**	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ Appreciation of significance of hardware & system software in supporting computer applications ♦ Basic ability to understand hardware and software specifications	
Assessment Methods:	Assessment: Examination: (weighting – 70%) Class tests: (weighting - 20%) Coursework: (weighting -10%)	Re-assessment: Examination: (weighting – 100%)

Course Code: F27WD	Course Title: Web Design and Databases	Course Co-ordinator: T Shaikh
Pre-requisites:	None	
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 web development. ♦ Information architecture. ♦ Web design and usability. ♦ Fundamentals of Mark-up and CSS. ♦ Introduction to database systems. ♦ Databases and Information Systems. ♦ Modelling of data/entity-relationship modelling. ♦ The relational data model. ♦ The Structured Query Language (SQL). ♦ Web-based database applications including the use of PHP.	
Learning Outcomes: **Subject Mastery**	*Understanding, Knowledge and Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* ♦ 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:**	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ 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 – 60%) Coursework: (weighting – 40%)	Re-assessment: Examination: (weighting – 100%)

Course Code: F27SG	Course Title: Software Development 3	Course Co-ordinator: M Abdelshafy
Pre-requisites:	None	
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 Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* ♦ 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:**	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ 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 – 50%) Coursework: (weighting – 50%)	Re-assessment: Examination: (weighting – 100%)

BSc Computer Science

Course Descriptors

Year 2, Semester 1

Course Code: **F28IN**	**Course Title:** **Interaction Design**	**Course Co-ordinator:** **TBC**
Pre-requisites:	F27IS 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 Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* ♦ 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**	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ 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 – 60%) Coursework: (weighting – 40%)	Re-assessment: Examination: (weighting – 100%)

Course Code: F28PL	Course Title: Programming Languages	Course Co-ordinator: M Abdelshafy
Pre-requisites:	Software Development 3 (F27SG), Introduction to Computer Systems (F27CS) *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 paradigms	
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. o scripting: e.g. Python o declarative/functional: e.g. SML o declarative/logic: e.g. Prolog	
Learning Outcomes: **Subject Mastery**	*Understanding, Knowledge and Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* ♦ 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**	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ Understanding of how to choose an appropriate language for different problem domains	
Assessment Methods:	Assessment: Examination: (weighting – 70%) Coursework: (weighting – 30%)	Re-assessment: Examination: (weighting – 100%)

Course Code: F28DA	Course Title: Data Structures & Algorithms	Course Co-ordinator: M Hamdan
Pre-requisites:	F27SB Software Development 2 *or equivalent*	
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 Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* ♦ 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	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ 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 – 60%) Coursework: (weighting – 40%)	Re-assessment: Examination: (weighting – 100%)

Course Code: F28WP	Course Title: Web Programming	Course Co-ordinator: S Kumar
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 Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* ♦ 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:	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ 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 – 50%) Coursework: (weighting – 50%)	Re-assessment: Examination: (weighting – 100%)

BSc Computer Science

Course Descriptors

Year 2, Semester 2

Course Code: F28SD	Course Title: Software Design	Course Co-ordinator: S Kumar
Pre-requisites:	F27SA – Software Development 1 OR *equivalent*	
Aims:	♦ An introduction to a range of processes and methods that promote the design of high quaility 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 Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* ♦ 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 demonstarte 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**	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ 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 – 60%) Coursework: (weighting – 40%)	Re-assessment: Examination: (weighting – 100%)

Course Code: F28HS	Course Title: Hardware-Software Interface	Course Co-ordinator: H Ragab Hassen
Pre-requisites:	Introduction to Computer Systems (F27CS)	
Aims:	♦ To gain an understanding of low-level, hardware-oriented and systems programming. ♦ To develop skills in resource-conscious programming. ♦ To develop programming skills in such languages.	
Syllabus:	♦ Low-level, assembler programming ♦ Low-level, C programming ♦ Advanced computer architecture issues impacting software performance (caches, multi-cores, etc) ♦ Operating system interfaces for low-level software ♦ Operating system concepts such as device handling, interrupts, BIOS etc ♦ Embedded systems programming ♦ Resource-conscious programming techniques (memory, performance; programming techniques, tools, monitoring)	
Learning Outcomes: **Subject Mastery**	*Understanding, Knowledge and Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* ♦ Critical understanding of computer architecture concepts and their performance implication for low-level software. ♦ Detailed theoretical and practical understanding of hardware and operating system concepts, interfacing to low-level software. ♦ Ability to develop efficient, resource-conscious code, interfacing to hardware components. ♦ Practical skills in low-level, systems programming, with effective resource management.	
Learning Outcomes: **Personal Abilities**	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ Ability to articulate system-level operations and to identify performance implications of given systems	
Assessment Methods:	Assessment: Examination: (weighting – 60%) Coursework: (weighting – 40%)	Re-assessment: Examination: (weighting – 100%)

Course Code: F28DM	Course Title: Database Management Systems	Course Co-ordinator: T Shaikh
Pre-requisites:	F27WD Web Design & 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, integration with programming application **Query execution and optimisation:** data storage principles, file organisation, indexing, indexes in commercial DBMSs, 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:** data warehousing, distributed databases, and alternative database models such as XML, document, object, and graph stores	
Learning Outcomes: **Subject Mastery**	*Understanding, Knowledge and Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* ♦ 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**	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ Practice in working on a development project in small groups (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 – 70%) Coursework: (weighting – 30%)	Re-assessment: Examination: (weighting – 100%)

Course Code: F17SC	Course Title: Discrete Mathematics	Course Co-ordinator: H Zantout
Pre-requisites:	None	
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, Basic graph 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 Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* ♦ 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:**	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ Understand and use abstract mathematical concepts ♦ Use logical reasoning to prove theorems ♦ Communicate mathematical orally and in writing	
Assessment Methods:	Assessment: Examination: (weighting – 70%) Coursework: (weighting – 30%)	Re-assessment: Examination: (weighting – 100%)

BSc Computer Science

Course Descriptors

Year 3, Semester 1

Course Code: F29AI	Course Title: Artificial Intelligence & Intelligent Agents	Course Co-ordinator: T Shaikh
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 Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* ♦ 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**	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ Identification, representation and solution of problems ♦ Time management and resource organisation ♦ Research skills and report writing ♦ Practice in the use of ICT, numeracy and presentation skills	
Assessment Methods:	**Assessment:** Examination: (weighting– 70%) Coursework: (weighting – 30%)	**Re-assessment:** Examination: (weighting – 100%)

<table>
<tr><td>Course Code:
F29SO</td><td colspan="2">Course Title:
Software Engineering</td><td>Course Co-ordinator:
T Shaikh</td></tr>
<tr><td>Pre-requisites:</td><td colspan="3">F28SD Software Design, F28DM Database Management, F28IN Interaction Design</td></tr>
<tr><td>Aims:</td><td colspan="3">♦ 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.</td></tr>
<tr><td>Syllabus:</td><td colspan="3">♦ 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</td></tr>
<tr><td>Learning Outcomes:
Subject Mastery</td><td colspan="3">Understanding, Knowledge and Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)

♦ 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</td></tr>
<tr><td>Learning Outcomes:
Personal Abilities:</td><td colspan="3">Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT

♦ 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</td></tr>
<tr><td>Assessment Methods:</td><td colspan="2">Assessment:
Group Project: (weighting – 50%)
Examination: (weighting – 40%)
2 hour synoptic Examination with F29PD
Coursework: (weighting – 10%)</td><td>Re-assessment:
Coursework: (weighting – 100%)</td></tr>
</table>

Course Code: F29DC	Course Title: Data Communications & Networking	Course Co-ordinator: H Ragab Hassen M Abdelshafy
Pre-requisites:	F28WP Web Programming	
Aims:	♦ Introduction to data communications and computer networking ♦ Understanding of the structure of Internet ♦ Understanding of concepts of connection oriented and connectionless communication, and principles of data communication protocols	
Syllabus:	♦ Internet history and organisation, OSI and Internet reference models. ♦ Link level communications, data transparency, error detection, sliding window protocols ♦ Network layer protocols, IP, ICMP ♦ network routing, routers ♦ Transport protocols, TCP, UDP ♦ Congestion control ♦ Higher level protocols e.g. HTTP (simple example only)	
Learning Outcomes: **Subject Mastery**	*Understanding, Knowledge and Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* ♦ Understanding of data communication protocols, ♦ Appreciation of necessity for formal specification and verification of protocols. ♦ Appreciation of complexity of network infrastructure and sensitivity to parameter choices .	
Learning Outcomes: **Personal Abilities**	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* *Professional Development* ♦ Appreciation of role of standards in networking ♦ Appreciation of precision and need for validation in specification of data communication protocols *Practical Expertise* ♦ Ability to analyse and explain basic issues relating to communication and networking technologies ♦ Practice in ICT, numeracy and report writing, team working	
Assessment Methods:	Assessment: Examination: (weighting– 75%) Coursework: (weighting – 25%)	Re-assessment: Examination: (weighting – 100%)

Course Code: **F29FA**	**Course Title:** **Foundations 1**	**Course Co-ordinator:** **TBC**
Pre-requisites:		
Aims:	♦ To give an introduction to and an appreciation of the basic principles and techniques of logic and proof fundamental to Computer Science. ♦ Introduce the λ-calculus, how computable functions are represented in the λ-calculus, basic theoretical properties of the λ-calculus, and the relevance of the λ-calculus to computer science.	
Syllabus:	♦ Logic & proof: propositional calculus – truth tables, predicate calculus, inference rules, soundness, completeness, validity, satisfiability, reasoning and calculating with propositions. ♦ Lambda calculus: syntax, notation, bound & free variables and α-conversion and substitution, reduction and computation, representing computable functions, theoretical properties.	
Learning Outcomes: **Subject Mastery**	*Understanding, Knowledge and Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* ♦ To demonstrate an understanding of the principles of propositional and predicate calculus. ♦ To foresee the role of argument in logical reasoning. ♦ Practice in formulating and proving arguments using formal logic ♦ Knowledge of lambda calculus ♦ Understanding of different variable techniques (de Bruijn indices, combinator variables) ♦ Understanding of variable binding and capture-free substitution ♦ Knowledge of how to represent computations in the λ-calculus	
Learning Outcomes:: **Personal Abilities**	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ To be able to formulate statements as well formed formulae in propositional and predicate calculus. ♦ To be able to express arguments/problems in propositional and predicate calculus. ♦ To be able to construct formal proofs of logical arguments. ♦ To be able to think about the meaning of programs mathematically	
Assessment Methods:	Assessment: Examination: (weighting – 70%) Coursework: (weighting – 30%)	Re-assessment: Examination: (weighting – 100%)

BSc Computer Science

Course Descriptors

Year 3, Semester 2

Course Code: F29PD	Course Title: Professional Development	Course Co-ordinator: S Gill
Pre-requisites:	F29SO Software Engineering (Synoptic)	
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 Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* Broad and integrated knowledge and understanding of: ♦ **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 ♦ Critical understanding and detailed knowledge of: ♦ 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:	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ 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 – 40%) **2 hour synoptic Examination with F29SO** Coursework: (weighting – 10%)	Re-assessment: Coursework: (weighting – 100%)

Course Code: F29OC	Course Title: Operating Systems & Concurrency	Course Co-ordinator: M Abdelshafy
Pre-requisites:	None	
Aims:	♦ For the Operating system 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 system part: overview on operating systems concepts and structures, processes, threads, classical inter-process communication problems, memory management ♦ For the Concurrency part: Concurrency, Parallelism, Pthreads. Parallelism Pattern: Pipelining, Data-Parallelism, Nested Data-Parallelism, Flattening, Task-Parallelism, Data-Flow.	
Learning Outcomes: Subject Mastery	*Understanding, Knowledge and Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* ***For the Operating systems part:*** ♦ Understanding of the concepts and structures present in modern operating systems. ***For the Concurrency part:*** ♦ Broad and integrated knowledge and understanding of concurrency concepts, techniques and problems ♦ Critical understanding of predominant concurrency pattern and their implementation on modern architectures ♦ Hands-on experience	
Learning Outcomes: Personal Abilities:	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ Critically evaluate the problematic and concepts related to operating systems. ♦ Analysis of the different possible solutions to leveraging concurrency for parallel execution.	
Assessment Methods	Assessment: Examination: (weighting– 60%) Coursework: (weighting – 40%)	Re-assessment: Examination: (weighting – 100%)

Course Code: F29LP	Course Title: Language Processors	Course Co-ordinator: M Hamdan
Pre-requisites:	F28PL Programming Languages	
Aims:	♦ To develop skills in programming language definition ♦ To develop skills in programming language implementation	
Syllabus:	Language definition: ♦ lexicon: non-terminal & terminal symbols, type 3 grammars, regular expressions, finite state automata, Moore & Mealey machines, left & right recursion ♦ concrete syntax: type 2 grammars & BNF, factoring grammars, converting left to right recursion, LL(K) & LR(K) grammars, push down automata, parsing ♦ abstract syntax: abstract syntax from concrete syntax ♦ static semantics: types ♦ dynamic semantics: overviews of axiomatic, denotational & operational semantics; introduction to structural operational semantics (SOS) for declarations, expressions, statements Language implementation: ♦ lexical analysis ♦ syntax analysis: recursive descent for LL(1) ♦ abstract syntax tree (AST) construction ♦ AST pretty printing ♦ overview of interpreter/abstract machine ♦ AST interpretation ♦ static analysis of AST: e.g. type checking, identifier resolution ♦ code generation e.g.: register/memory allocation, structured constructs as test/jump, structured data as structured memory sequences, stack discipline for blocks/subroutines, parameter passing ♦ run time environment: e.g. heap allocation, garbage collection, debugging support ♦ compiler construction tools e.g. Lex, Yacc, JavaCC Based on simple imperative language	
Learning Outcomes: Subject Mastery	*Understanding, Knowledge and Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* ♦ Ability to construct & manipulate lexical & syntactic definitions ♦ Understanding of relationship between grammars & automata ♦ Ability to construct lexical & syntactic analysers from definitions ♦ Familiarity with static & dynamic semantics, and associated formalisms ♦ Ability to generate & traverse ASTs ♦ Ability to construct AST-based analysers, interpreters & code generators for simple languages ♦ Understanding of run-time environments ♦ Ability to use compiler construction tools	
Learning Outcomes: Personal Abilities	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ Appreciation of problem solving as language definition & implementation ♦ Ability to apply appropriate language oriented formalisms, tools & techniques in solving problems ♦ Skills in engineering complex software artefacts	
Assessment Methods:	Assessment: Examination: (weighting– 60%) Coursework: (weighting – 40%)	Re-assessment: Examination: (weighting – 100%)

Course Code: F29FB	Course Title: Foundations 2	Course Co-ordinator: TBC
Pre-requisites:	F17SC Discrete Maths	
Aims:	♦ To introduce basic notions of computability. ♦ To understand two models of computability: the lambda-calculus and Turing machines. ♦ To understand which functions can be computed.	
Syllabus:	Enumerability; countability and non-countability; Goedel numbering; Turing machines; review of the lambda-calculus; computable and non computable functions; Turing computability; Solvability and reduction of decision problems; Church's thesis and effective computability	
Learning Outcomes: **Subject Mastery**	*Understanding, Knowledge and Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* Become competent with enumerability, Turing machines, encoding functions with the lambda-calculus, Goedel numbering, & computability	
Learning Outcomes:: **Personal Abilities**	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ Understand basic mathematical thinking as it applies to computability. ♦ Become aware of limits of computing.	
Assessment Methods:	Assessment: Examination: (weighting – 70%) Coursework: (weighting – 30%)	Re-assessment: Examination: (weighting – 100%)

BSc Computer Science

Course Descriptors

Year 4, Semester 1

Not all final year optional courses may run in a given year

For 2016/2017 F20GA 3D Graphics & Animation will not be running

Course Code: F20PA	Course Title: Research Methods & Requirements Engineering	Course Co-ordinator: H Ragab Hassen
Pre-requisites:	None	
Aims:	Development of project research method and requirement analysis skills.	
Syllabus:	Requirements analysis of software development project Researching current state of art in this area Library resources and their use, Web and online database searching	
Learning Outcomes: Subject Mastery	*Understanding, Knowledge and Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* ♦ Understanding of research or development based problem related to a substantial software development topic ♦ Requirements specification and background research skills for it ♦ Ability to plan a significant project of research, investigation or development	
Learning Outcomes: Personal Abilities	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ Ability to research and undertake critical review and evaluation of data and supplied literature ♦ Project planning skills ♦ Written communication skills ♦ Time management	
Assessment Methods:	Assessment: Coursework: (weighting – 100%) Synoptic with F20PB & F20PC	Re-assessment: None

Course Code: F20CN	Course Title: Computer Network Security	Course Co-ordinator: H Ragab Hassen
Pre-requisites:	Fundamental knowledge of computer networking, formal methods and Java programming	
Aims:	♦ Impart critical understanding of key concepts, issues, theories and principles of computer network security. ♦ Develop detailed theoretical and practical knowledge of foundational issues in computer network security. ♦ Provide detailed understanding and practical experience with key services and tools used for computer network security purposes. ♦ Give practical experience of analysing requirements, designing, implementing and testing security solutions for computer network applications	
Syllabus:	♦ Security concepts and definitions, basics of cryptography (concepts, definitions, steganography), symmetric cryptography (historical, hash functions, MACs, block and stream encryption), asymmetric cryptography (basic number theory, RSA, DH, digital signatures), cryptographic key management, operating system security (concepts, memory management, buffer overflow, race conditions, file/disk encryption), security-enhanced Linux, authentication & access control (biometrics, passwords, role- and capability-based), as well as some Linux-based security tools (e.g., GPG, openssl). ♦ Computer network security concepts, X.800 model - attacks, mechanisms, services. Computer network layers, reference model, TCP/IP and its vulnerabilities. Network service fundamentals - sockets, services, threads and their protection. Digests – MD5, symmetric ciphers, JCE. Digital signatures, public key certificates. X.509 certificates, certificate authorities and hierarchical trust models. Secure key exchange – Diffie Hellman, SSL/TLS, SSH. Applets, Java security model and tools, signing applets with CA keys. PGP public keys, OpenPGP, web of trust, network security tools - VPNs, Firewalls, Intrusion Detection Systems, malware scanners.	
Learning Outcomes: Subject Mastery	*Understanding, Knowledge and Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* ♦ Detailed and critical understanding of the concepts, issues, principles and theories of computer network security ♦ Critical theoretical and detailed practical knowledge of a range of computer network security technologies as well as network security tools and services ♦ Practical experience of analysing, designing, implementing and validating solutions to computer network security challenges using common network security tools and formal methods	
Learning Outcomes: Personal Abilities	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ Ability to deal with complex issues and make informed judgements about network security in the absence of complete or consistent data. ♦ Exercise substantial autonomy and initiative in addressing computer network security challenges. ♦ Showing initiative and team working skills in shared computer network security application development. (PDP) ♦ Demonstrate critical reflection on network security issues. (PDP)learning through case studies ♦ Report writing and demonstrating argument development ♦ Use of VLE as a means of learning, contributing and discussing	
Assessment Methods:	Assessment: Examination: (weighting– 60%) Coursework: (weighting – 40%)	Re-assessment: None

Course Code: F20GA	Course Title: 3D Graphics and Animation	Course Co-ordinator: TBC
Pre-requisites:	F27SG Software Development 3 *or equivalent* (object-orientated programming).	
Aims:	Investigate Computer Graphics theory and develop programming skills in 2D/3D Graphics and Animation.	
Syllabus:	♦ Computer Graphics concepts and practical introduction to Graphics Programming. ♦ Vertices, triangles, meshes, display lists and models. ♦ Hierarchical modelling and scene graphs understanding and representation. ♦ 2D and 3D transformations, homogeneous co-ordinates, matrices multiplication. ♦ Model, world, camera, scene and projection spaces. ♦ Instancing and tessellation. ♦ Materials, texture mapping and shading. ♦ Lighting and global illumination models. ♦ Shadows, occlusions and reflections. ♦ Real-time and offline rendering pipelines. ♦ Basics of procedural and physical animations. ♦ Animation systems and concepts. ♦ Animation skeletons, poses, clips, skinning and blending. ♦ Tools, environments, coding practices and industrial applications. ♦ Course summary and review.	
Learning Outcomes: **Subject Mastery**	*Understanding, Knowledge and Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* ♦ Understanding and categorising Computer Graphics concepts. ♦ Ability to identify core 3D elements and structures. ♦ Investigation of scene graphs, hierarchical models, and spaces. ♦ Understanding and research into transformations, modelling, and projection concepts. ♦ Ability to contrasts different material, lighting and shadowing models. ♦ Develop and implement animation concepts and systems. ♦ Ability to design, understand and implement a small-scale rendering and animation system.	
Learning Outcomes: **Personal Abilities**	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ Ability to think, plan, and construct in three dimensions. ♦ Representation of, planning for, and solution of problems. ♦ Ability to plan, design and implement a rendering and animation system. ♦ Skills integrating graphics and animation in various industries.	
Assessment Methods	Assessment: Class Test (weighting - 40%) Coursework: (weighting – 60%)	Re-assessment: None

Course Code: F20IF	Course Title: Information Systems Methodologies	Course Co-ordinator: S Gill
Pre-requisites:	F29SO – Software Engineering & F29PD – Professional Development *or equivalent*	
Aims:	This course explores a range of issues concerning advanced contemporary methodological approaches to information systems development. The aim is to enable students to develop critical faculties and techniques in relation to the selection and application of these methodological approaches.	
Syllabus:	There is a growing requirement in industry for engineers and scientists with good and appropriate analytical skills when considering the development and evolution of systems, in particular information systems. This module develops further the knowledge and skills students should have already gained in the Information Systems and Software Engineering modules in topics such as: ♦ General Systems Principles; ♦ Systems Classification and Taxonomy Models; ♦ Information Systems Life Cycle and Functions; ♦ Paradigmatic Approach to Methodology Classification; ♦ Framework for Analysis and Comparison of Methodologies (NIMSAD & Fitzgerald's); ♦ Process Improvement Models;	
Learning Outcomes: Subject Mastery	*Understanding, Knowledge and Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* This course develops further the knowledge and skills students should have already gained in the Information Systems and Software Engineering courses. It will enable students to: ♦ Determine alternative approached to gathering requirements and systems development ♦ Compare methodologies for use in organisations using a standardised Framework ♦ Rationalise systems development to prepare a more relevant system ♦ Assimilate their knowledge and understanding of the ways in which Information Systems are developed, including a range of established techniques of enquiry or research methodologies	
Learning Outcomes: Personal Abilities	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ Critical reading and reviewing works in the field ♦ Evaluating Methods under an agreed Framework ♦ Structuring an argument (PDP) ♦ Use of VLE as a means of learning	
Assessment Methods	Assessment: Examination: (weighting– 60%) Coursework: (weighting – 40%)	Re-assessment: None

Course Code: F20MC	Course Title: Mobile Communications and Programming	Course Co-ordinator: M Abdelshafy
Pre-requisites:	Knowledge of network communications and object oriented programming	
Aims:	♦ To introduce students to the particular problems of building networks which include mobile computing devices and to explain how they may be overcome using current technology ♦ To introduce students to the issues surrounding ad hoc networking and give an understanding of how these can be addressed ♦ To introduce students to programmable mobile and handheld devices ♦ To develop students' skills in developing applications for mobile and handheld devices	
Syllabus:	Fixed node IP routing - routing techniques for conventional wired networks Mobile IP routing - routing for wireless mobiles to IP Ad hoc networks and routing Security protocols - identification and authorisation, infra structure security Small device characteristics - screen size, memory, power consumption, input mechanisms Current devices - tablet PC, mobile phone, PDA Application development environments - Java APIs, C# and .NET	
Learning Outcomes: **Subject Mastery**	*Understanding, Knowledge and Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* ♦ To understand and apply the principles of secure, effective communication over networks including mobile elements. ♦ To be able to explain the operation of current and proposed protocols for communication over networks which include mobile elements ♦ To understand the issues introduced by ad-hoc networking. ♦ To have knowledge of common ad-hoc routing protocols ♦ To explain evaluate current and proposed mobile devices ♦ To design applications for mobile devices including use of wireless communications where appropriate. ♦ To program such applications using current application development environments	
Learning Outcomes: **Personal Abilities**	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ To be able to select and apply suitable techniques of analysis in assessing the effectiveness of a technical solution ♦ To be able to critically review the issues of security and privacy relating to networking ♦ To be able to write good technical documents in support of problem solving within the domains of mobile networking and of mobile and handheld device solutions.	
Assessment Methods	Assessment: Examination: (weighting– 80%) Coursework: (weighting – 20%)	Re-assessment: None

Course Code: F20RS	Course Title: Rigorous Methods for Software Engineering	Course Co-ordinator: H Zantout
Pre-requisites:	F28SD Software Design *or equivalent*.	
Aims:	To provide knowledge and understanding of tools and techniques which support rigorous software engineering	
Syllabus:	♦ The course addresses the challenges of engineering and modelling safe and secure software systems. ♦ It covers a range of rigorous processes and formal methods that support the development of high integrity software systems. ♦ From modelling and reasoning about designs through to code, students will experience a range of state-of-the-art static analysis tools and techniques. ♦ While theory based, the course has a strong practical element, drawing upon industrial case study material where appropriate.	
Learning Outcomes: Subject Mastery	*Understanding, Knowledge and Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* ♦ Knowledge and understanding of a range of rigorous processes and formal methods that support the development of high integrity software systems. ♦ Critical understanding of the relationship between code level annotations and high-level formal specifications. ♦ Knowledge of the mechanisms that underlie advanced modelling and static analysis techniques. ♦ To be able to demonstrate a critical understanding of the relationship between code level annotations and flow analysis techniques. ♦ To be able to demonstarte a critical understanding of program proof and how it can be used to provide strong formal correctness guarantees.	
Learning Outcomes: Personal Abilities	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ Conceptualize and define new abstract problems within the context of automated software development. ♦ Make informed judgements in situations in the absence of complete or consistent data. ♦ Exercise autonomy, initiative and creativity in the application of software engineering techniques. ♦ Demonstrate critical reflection. (PDP) ♦ Communicate with professional level peers, senior colleagues and specialists. (PDP)	
Assessment Methods	Assessment: Examination: (weighting– 60%) Coursework: (weighting – 40%)	Re-assessment: None

Course Code: F20SC	Course Title: Industrial Programming	Course Co-ordinator: S Kumar
Pre-requisites:	Programming skills in a language such as C or Java.	
Aims:	♦ To develop proficiency in contemporary industrial programming languages and platforms ♦ To enable the elaboration and combination of system components in different languages ♦ To enable an agile and flexible response to changes in industrial practices ♦ To enable participation by industrial practitioners to provide context and applicability	
Syllabus:	♦ Programming in a modern general purpose language e.g. C#, C++11 ♦ Programming for concurrency using state-of-the-art libraries and language extensions ♦ Rapid prototyping in a major scripting language with associated libraries and frameworks e.g. Python, PHP, Ruby, Lua ♦ Coverage of advanced language features where languages have been met in earlier courses ♦ Foresight of emerging programming language technologies ♦ Practical experience with standard environments (Unix, Windows), virtual machines (.NET) and tools (e.g. compilers, debuggers, libraries, shell)	
Learning Outcomes: **Subject Mastery**	*Understanding, Knowledge and Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* ♦ Basic appreciation of role of different programming paradigms in programming/managing systems ♦ Understanding of core characteristics of contemporary operating systems ♦ Knowledge of key abstractions across programming languages ♦ Technical proficiency in advanced language techniques in different programming paradigms	
Learning Outcomes: **Personal Abilities**	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ Ability to choose/deploy/combine appropriate languages, architectures and tools ♦ Ability to employ an agile approach to software development.	
Assessment Methods	Assessment: Coursework: (weighting – 100%)	Re-assessment: None

BSc Computer Systems

Course Descriptors

Year 4, Semester 2

Course Code: F20PB	Course Title: Project: Design & Implementation	Course Co-ordinator: H Ragab Hassen
Pre-requisites:	None	
Aims:	Development of project design and implementation skills	
Syllabus:	♦ Software and/or experimental design and its documentation ♦ Relevant commercial practice in applied design of software	
Learning Outcomes: **Subject Mastery**	*Understanding, Knowledge and Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* ♦ Software design and implementation skills	
Learning Outcomes:: **Personal Abilities**	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ Time management ♦ Project Management	
Assessment Methods:	Assessment: Coursework (weighting – 100%) Synoptic with F20PA & F20PC	Re-assessment: None

Course Code: F20PC	Course Title: Project: Testing & Presentation	Course Co-ordinator: H Ragab Hassen
Pre-requisites:	None	
Aims:	Development of knowledge and skills for testing and evaluating a software project	
Syllabus:	♦ Testing of Software ♦ Evaluation of Software ♦ Report Writing	
Learning Outcomes: **Subject Mastery**	*Understanding, Knowledge and Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* ♦ Testing and evaluation of software development projects ♦ Documenting Software projects	
Learning Outcomes:: **Personal Abilities**	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ Awareness and experience of methods and tools for validation and verification in professional practice ♦ Practical skills in testing and evaluation ♦ Documentation skills	
Assessment Methods:	Assessment: Coursework (weighting – 100%) Synoptic with F20PA & F20PB	Re-assessment: None

Course Code: F20AD	Course Title: Advanced Interaction Design	Course Co-ordinator: TBC
Pre-requisites:	F28IN Interaction Design *or equivalent*	
Aims:	The course aims to give students the opportunity to develop: ♦ A detailed and critical knowledge of requirements gathering, design and evaluation techniques in interaction design. ♦ An awareness of current research and emerging issues in the field of interaction design. ♦ A range of specialised skills, and research methods involved in working with users.	
Syllabus:	Current and emerging topics in Interaction Design including: user demographics, patterns in technology adoption, interaction design lifecycles, user interface design patterns, prototyping methods, a range of qualitative and quantitative data gathering and analysis techniques, accessibility, and a range of research case studies covering issues in the field	
Learning Outcomes: Subject Mastery	*Understanding, Knowledge and Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* Students will develop skills in the following areas: ♦ Review, analyse, and evaluate previous research projects in the field of interaction design ♦ Propose solutions in response to analysis of users' requirements. ♦ Make informed judgements about appropriate methodologies for developing and evaluating technologies suitable for user demographics and background experience.	
Learning Outcomes: Personal Abilities	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ Use discipline appropriate software for data analysis, prototyping and learning. ♦ Present, analyse and interpret numerical and graphical data gathered as part of evaluation studies. ♦ Communicate effectively to knowledgeable audiences by preparing formal and informal presentations and written reports. ♦ Exercise autonomy and initiative by planning and managing their own work; develop strategies for independently solving problems and taking the initiative. ♦ Take responsibility for their own and other's work by contributing effectively and conscientiously to the work of a group, actively maintaining good working relationships with group members, and leading the direction of the group where appropriate. ♦ Reflect on roles and responsibilities by critically reflecting on their own and others' roles and responsibilities. ♦ Develop an awareness of professional and ethical issues including working with human subjects and wider issues relating to technology in society	
Assessment Methods	Assessment: Examination (weighting - 50%) Coursework: (weighting – 50%)	Re-assessment: None

Course Code: F20AN	Course Title: Advanced Network Security	Course Co-ordinator: H Ragab Hassen
Pre-requisites:	F29DC (Data Communication and Networking) or equivalent. Good understanding of fundamental security topics.	
Aims:	♦ Improve students' analysis skills and allow them to identify network security threats in a systematic way. ♦ Give practical experience of exploiting vulnerabilities in commons computer system architectures. ♦ Impart a good understanding of common techniques to implement countermeasures. ♦ Provide the student with in-depth understanding of penetration testing concepts and methodologies.	
Syllabus:	♦ Internet Security: review of some TCP/IP stack Protocols and their known vulnerabilities. ♦ Wireless Security: Wired Equivalent Privacy (WEP) vulnerabilities, Wireless Protected Access (WPA) and IEEE802.11i ♦ ISO27001: Information Security Management. Security Policy, Organisational Security, Asset Classification and Control, Personal Security, Physical and Environmental Security, Communications and Operations Security, Access Control, System Development and Maintenance, Business Continuity Management, and Compliance. ♦ Penetration testing: penetration testing process: Reconnaissance, Scanning, Gaining access, Maintaining access, and Covering tracks. ♦ Digital Forensics: introduction, EnCase and open source tools. ♦ Privacy and P3P.	
Learning Outcomes: Subject Mastery	*Understanding, Knowledge and Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* At the end of this course, the students will be able to: ♦ Identify and explain vulnerabilities of network protocols vulnerabilities. ♦ Design countermeasures to protect a network from unauthorised network access. ♦ Identify threats and measures to protect against threats in wireless networks. ♦ Test and evaluate the security of an IT infrastructure.	
Learning Outcomes: Personal Abilities	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ Ability to appraise the security of an IT infrastructure. ♦ Showing teamwork skills and being an effective member of a penetration testing team. ♦ Develop a set of ethical best practices for a security career. ♦ Ability to make decisions regarding how to secure a system in absence of a complete picture of its configuration.	
Assessment Methods	Assessment: Examination (weighting - 60%) Coursework: (weighting – 40%)	Re-assessment: None

Course Code: F20BD	Course Title: Big Data Management	Course Co-ordinator: H Zantout
Pre-requisites:	Academic knowledge of fundamentals of databases and logic.	
Aims:	♦ Review principle abstractions, methods and techniques for the management of large and complex data sets ("Big Data"). ♦ Develop an understanding of the foundations and tools of the Semantic Web. ♦ Enable students to appreciate critically a range of data integration solutions.	
Syllabus:	**Complex data sets:** RDF, triple stores, SPARQL, Big Data vs Smart Data vs Broad Data, NoSQL, indexing data. **Semantic Web Foundations:** RDFS, OWL, Ontologies, Reasoning, Protégé. **Data Integration:** Linked Data, Mash-ups, Ontology mapping, Data Provenance.	
Learning Outcomes: **Subject Mastery**	*Understanding, Knowledge and Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* ♦ Knowledge and understanding of a range of data representation and data management techniques for big data sets. ♦ Critical understanding of the role of semantic web technologies in the context of big data management. ♦ Knowledge of the mechanisms that underlie data integration techniques. ♦ To be able to demonstrate a critical understanding of appropriateness and effectiveness of different techniques	
Learning Outcomes: **Personal Abilities**	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ Conceptualize and define new abstract problems within the context of complex data sets. ♦ Make informed judgements about the applicability of semantic web solutions to big data questions. ♦ Exercise autonomy, initiative and creativity in the application of data integration techniques. ♦ Demonstrate critical reflection. (PDP) ♦ Communicate with professional level peers, senior colleagues and specialists. (PDP)	
Assessment Methods	Assessment: Examination (weighting - 70%) Coursework: (weighting – 30%)	Re-assessment: None

Course Code: F20DE	Course Title: Digital & Knowledge Economy	Course Co-ordinator: TBC
Pre-requisites:	Fundamentals of logic, grasp of computational thinking	
Aims:	♦ To provide an overview of advanced topics in Digital and Knowledge Economy, including current developments and future trends in developed economies resulting from deploying new technologies and utilising emerging knowledge. ♦ To discuss e-Business, as a new breed of modern business model that leverages technical advancements to create economic growth. ♦ To provide a high level description of business and technological issues related to Digital and Knowledge Economy. ♦ To introduce technologies and methodologies so as to provide a deep understanding of the Digital and Knowledge Economy, including business, organisational, knowledge and technology based issues. ♦ To impart rigorous technical modelling and analytical methodologies for working with complex problems in this area. ♦ To facilitate the dialogue between business and computing personnel, and translate business requirements to computing ones and vice versa. ♦ To impart deep understanding of the motivation and rationale behind the conversations between business and IT, as well as other relevant technologies and future trends - so that students can recommend them and/or participate in the decision making process for future planning.	
Syllabus:	♦ Introduction to Digital and Knowledge Economy o Introduction to Digital and Knowledge Economy o Its relevance to e-Business ♦ Topics in Digital Economy o An overview of technologies and tools for e-Business o What is a business model? What are the different types of business models? o What are the relationships between business models and innovative/disruptive technologies? o Current development and future trends in Digital and Knowledge Economy o Relevant technology offerings, e.g. Bitcoin, IBM's cloud computing platform ♦ Knowledge based technologies in Knowledge Economy o introduction to knowledge management, knowledge modelling technologies, including ontologies o Introduction to logic, Intelligent Systems and related technologies, including semantic web based technologies o Case studies of Intelligent Systems and Future trends ♦ Supply Chain Management and its relation to Digital Economy o What is SCM? What are the standard practices in SCM, e.g. SCOR? o Introduction to process modelling, business operations and SCM. o What is global SCM? Case studies, e.g. IKEA's global SCM; Current and future trends ♦ Business Intelligence: Fundamentals issues and technologies	
Learning Outcomes: **Subject Mastery**	*Understanding, Knowledge and Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* ♦ Understanding of key issues in Digital and Knowledge Economy. ♦ Understanding of ontologies, conceptual and knowledge modelling technologies, in terms of design, critical evaluation and suitable practical uses. ♦ Understanding of issues in intelligent systems, supply chain management and business intelligence and the roles technologies may play.	

	♦ Understanding of issues and the motivation and rationale of business and technical problems in Digital and Knowledge Economy. ♦ Ability to select and construct conceptual models, including ontologies, and can create appropriate evaluation criteria to assess them. ♦ Ability to take self-initiatives to review relevant literature independently in Digital and Knowledge Economy.	
Learning Outcomes: Personal Abilities	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ Analytical skills in conceptual modelling methods, including ontologies, process and knowledge modelling, for business problems. ♦ Ability to make well-informed evidence-based arguments towards supporting or rejecting technologies to solve business problems. ♦ Ability to deal with complex issues and make informed judgements, e.g. about ontologies, knowledge modelling, intelligent and business systems in the absence of complete or consistent data. ♦ Exercise autonomy and initiative in addressing digital and knowledge economy challenges. ♦ Demonstrate reflection on digital and knowledge economy. ♦ Ability to judge technology hypes and develop personal opinions on future trends	
Assessment Methods	Assessment: Examination (weighting – 70%) Coursework: (weighting – 30%)	Re-assessment: None

Course Code: F20GP	Course Title: Computer Games Programming	Course Co-ordinator: M Hamdan
Pre-requisites:	C++ programming skills	
Aims:	To develop programming skills and techniques specific to the area of 2D and 3D computer games	
Syllabus:	♦ Computer Games Design Concepts (Genres, Narrative and Fun). ♦ Elements of Game Design (Formal, Dramatic and System Dynamics). ♦ Character and World Design. ♦ Design Programming Patterns (Input, loops, structures, objects and optimisation). ♦ Games Creation Concepts (Conceptualisation, Prototyping, Playtesting). ♦ Game-state, simulator, renderer, (hierarchical) controllers. ♦ Tools, environments and coding practices– e.g. graphics, C++ and engines. ♦ 2D and 3D game programming techniques. ♦ Physically-based modelling, particle systems, flocking. ♦ Obstacle avoidance and path planning. ♦ Group movement. ♦ Learning and adaptation in games. ♦ Action and behaviour selection. ♦ Procedural Generation. ♦ Course summary and review.	
Learning Outcomes: **Subject Mastery**	*Understanding, Knowledge and Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* ♦ Understanding of game theory and computer game history, genres and impact ♦ Understanding of game design concepts, elements and characters. ♦ Understanding of available tools and their application ♦ Knowledge of algorithms for path planning and navigation ♦ Knowledge of physically-based modelling in games and selection of techniques ♦ Knowledge of AI techniques in games and selection of techniques ♦ Ability to understand, design and implement a small-scale game using 2D and 3D tools ♦ Practical skills in graphics and AI programming in the computer games context	
Learning Outcomes: **Personal Abilities**	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ Representation of, planning for, and solution of problems. ♦ Ability to plan, design, prototype and communicate a game. ♦ Ability to think and plan in three dimensions. ♦ Team working skills.	
Assessment Methods	Assessment: Examination (weighting - 50%) Coursework: (weighting – 50%)	Re-assessment: None

Course Code: F20NA	Course Title: Network Applications	Course Co-ordinator: T Shaikh
Pre-requisites:	Either F28WP Web Programming and F27SB Software Development 2 or reasonable software development skills in Java and basic knowledge of data communications and the web	
Aims:	♦ To impart knowledge and understanding of the theories, principles and protocols underlying the primary network applications on the Internet ♦ To develop the ability to appreciate critically the range of network application technologies and standards ♦ To give students significant development skills in a range of the principal network technologies, to grasp the main design and practical issues faced in their application, and confer the ability to select and apply relevant techniques for a given network application development problem. ♦ To have students creatively develop in teams a substantial network application involving web and application server technologies to an original design of their own	
Syllabus:	Network services – service styles and models, Internet, DNS, sockets, implementing services; e-mail - MIME, SMTP, POP, IMAP; web protocols - URIs, HTTP versions and characteristics; web content - HTML, XML, XHTML, HTML 5, forms, tables, embedded objects; CSS style properties; JavaScript – object prototypes, standalone and web client programming; DOM versions, CSS 3, DHTML, AngularJS; web server programming in Java and JavaScript - REST web services, CGI, servlets, JSP, Node.js, web frameworks; asynchronous use of HTTP - AJAX, JSON, JSONP; textual conferencing - IM, IRC, web chat via short and long polling, HTTP streaming, applet sockets and web sockets; web sessions – URL rewriting, web storage, cookies; HTTP authentication	
Learning Outcomes: **Subject Mastery**	*Understanding, Knowledge and Cognitive Skills; Scholarship, Enquiry and Research (Research-Informed Learning)* ♦ Extensive, detailed and critical knowledge and understanding of the theories, techniques and principles underlying the design of network applications and the range of their application ♦ Theoretical and practical knowledge of the major network application types including email, web and chat applications and services ♦ Critical awareness of protocols and standards underlying key network applications especially the web and of enabling technologies for network applications such as sockets, DNS, XML ♦ Ability to design and develop useful network applications including web, email and chat software using apt technologies and languages: HTML, XML, JavaScript, CSS, Java applets, CGI, servlets, active web server pages, REST web services etc. to professional standards	
Learning Outcomes: **Personal Abilities**	*Industrial, Commercial & Professional Practice; Autonomy, Accountability & Working with Others; Communication, Numeracy & ICT* ♦ Skills in selecting, applying and evaluating apt technologies in a professional way given a problem requiring network interaction ♦ Ability to build on initial skills and knowledge by independent research using online resources ♦ Showing initiative, creativity and team working skills in shared network application development	
Assessment Methods	Assessment: Examination (weighting - 60%) Coursework: (weighting – 40%)	Re-assessment: None

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.
It is important to read through Part A of the Handbook which provides more specific information of the requirements of your particular programme of study. Students should contact the appropriate School in the first instance for any academic query or assistance. However, any queries relating to Part B should be directed to Miss Jenny Tough, Registry Officer (Quality and External Partnerships), Academic Registry, and this will be directed to the relevant staff.
Email: J.Tough@hw.ac.uk
Tel: + 44 (0)131 451 3292

Students are advised that the University will make changes to study programmes and progression requirements from time to time in accordance with strategic developments and it is therefore important to ensure that students check the most recent version of their handbook for up-to-date information.

Please note that any references to the Campus or School Office contained within Part B apply to the Dubai Campus.

B1. UNIVERSITY POLICY AND GUIDANCE

The University publishes 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://www1.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/staff/policies-governance/procedures/charter-statutes-ordinances-regulations.htm

B3. QUICK FINDER GUIDE TO ACADEMIC SUPPORT SERVICES

How to use this guide.

The following guide lists academic support services and resources and provides appropriate weblinks. The guide is divided into 10 sections:

1. Academic Support
2. Enrolment Attendance and Periods of Study
3. Guidance of Assessment
4. Examination and Re-assessment Procedures
5. Grading Awards and Qualifications
6. Graduation
7. Conduct, Discipline and Appeals
8. Complaints
9. Suspension, Withdrawal and Exit Award
10. Student Fees and Charges

1. Academic Support		
1.1	**Personal Tutoring**	http://www.hw.ac.uk/students/studies/personal-tutors.htm ***Please refer to the programme-specific information in Part A of this handbook for further details on Personal Tutoring.***
1.2	**Professional Development Planning**	http://www.hw.ac.uk/careers/pdp/index.php ***Please refer to the programme-specific information in Part A of this handbook for further details on Professional Development Planning.***
1.3	**Student Feedback**	http://www.hwunion.com/ ***Please refer to the programme-specific information in Part A of this handbook for further details on Student Feedback.***
1.4	**Learning and Teaching Matters**	http://www.hw.ac.uk/students/studies/learning-teaching.htm
2. Enrolment, Attendance and Periods of Study		
2.1	**Attendance/ Absence from the University**	Student Attendance: http://www.hw.ac.uk/students/studies/record/attendance.htm Withdrawal from the University: http://www.hw.ac.uk/students/studies/leaving.htm http://www.hw.ac.uk/staff/policies-governance/procedures/charter-statutes-ordinances-regulations.htm **Regulation 1 –** General Regulation, paragraph 6 **Regulation 3** – Modular First Degrees, paragraph 10

		Regulation 4 – Postgraduate Diplomas and Graduate Diplomas, paragraph 12 **Regulation 18 –** Postgraduate Certificates and Graduate Certificates, paragraph 12 **Regulation 48 –** Higher Degrees of Master (Taught), paragraph 12
2.2	**Recognition of Prior Learning and Credit Transfer**	http://www.hw.ac.uk/staff/policies-governance/procedures/charter-statutes-ordinances-regulations.htm **Regulation 46** – Accreditation of Prior Learning (APL) Policies and Procedures: http://www.hw.ac.uk/services/academic-registry/quality/learning-teaching/policy-bank.htm
2.3	**Amendment to Enrolment**	Amendment to Enrolment: http://www.hw.ac.uk/students/studies/record/amending-your-enrolment.htm
2.4	**Change of Address**	Please login to Student Self Service www.hw.ac.uk/selfservice
2.5	**Enrolment**	http://www.hw.ac.uk/students/studies/enrolment.htm ***Please refer to the Heriot-Watt University Dubai Campus Guide to Student Services, Freshers Guide for further details on enrolment***
2.6	**Periods of Study**	http://www.hw.ac.uk/staff/policies-governance/procedures/charter-statutes-ordinances-regulations.htm **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 48 –** Higher Degrees of Master (Taught), paragraph 10
2.7	**Student Personal Information (Data Protection)**	http://www.hw.ac.uk/about/policies/data-protection.htm
2.8	**Suspension of Studies**	Students are advised to consult with their personal tutor /Year Co-ordinator/Director of Studies in the first instance Further information and details of how to apply can be found here: http://www.hw.ac.uk/students/studies/leaving/temporary-suspension-studies.htm
2.9	**Teaching Timetables**	http://www.hw.ac.uk/students/studies/timetables.htm
3. Guidance on Assessment		
3.1	**Assessment**	http://www.hw.ac.uk/staff/policies-governance/procedures/charter-statutes-ordinances-regulations.htm **Regulation 3** – Modular First Degrees, Paragraphs 13-19 **Regulation 4 –** Postgraduate Diplomas and Graduate Diplomas, paragraphs 13

		– 19 **Regulation 18 –** Postgraduate Certificates and Graduate Certificates, paragraphs 13 – 19 **Regulation 48 –** Higher Degrees of Master (Taught), paragraphs 13-19 **Regulation 51** - Degree Entry Programme (Dubai), paragraphs 19-21
3.2	**Heriot-Watt Assessment and Progression System (HAPS)**	HAPS Policy: http://www.hw.ac.uk/services/academic-registry/quality/learning-teaching/policy-bank.htm ***The University operates a Heriot-Watt Assessment and Progression System (HAPS) which specifies minimum progression requirements. Schools have the option to apply progression requirements above the minimum University requirement, which are approved by the Studies Committees. Please refer to the programme-specific information in Part A of this handbook for further details on progression requirements.***
3.3	**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.***
3.4	**Ill Health and Mitigating Circumstances - Assessment**	http://www.hw.ac.uk/staff/policies-governance/procedures/charter-statutes-ordinances-regulations.htm **Regulation 1** – General Regulation, paragraph 6 **Regulation 3 –** Modular First Degrees, paragraph 10, 15, 25 **Regulation 4 –** Postgraduate Diplomas and Graduate Diplomas, paragraph 12, 17, 21 **Regulation 9 –** Assessment and Examinations, paragraph 9, 12 **Regulation 18 –** Postgraduate Certificates and Graduate Certificates, paragraph 12, 17, 21 **Regulation 48 –** Higher Degrees of Master (Taught), paragraph 12, 17, 22 **Regulation 51** – Degree Entry Programme (Dubai), paragraph 21 http://www.hw.ac.uk/students/studies/examinations/mitigating-circumstances.htm
3.5	**Non-Submission of Assessment**	***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.***
3.6	**Submission of Assessment**	***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.***
4. Examination and Re-assessment Procedures		
4.1	**Assessment Results**	http://www.hw.ac.uk/students/studies/examinations/results.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/staff/policies-governance/procedures/charter-statutes-ordinances-regulations.htm

		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/students/studies/examinations.htm ***Please refer to the programme-specific information in Part A of this handbook for further details on examinations.***
4.4	**Examination Diets**	http://www.hw.ac.uk/students/studies/examinations.htm ***Please refer to the programme-specific information in Part A of this handbook for further details on examinations diets.***
4.5	**Examination Timetables**	http://www.hw.ac.uk/students/studies/examinations/timetables.htm ***Please refer to the programme-specific information in Part A of this handbook for further details on examination timetables .***
4.6	**External Examiners Information and Reports**	Students can find details of the External Examiners for their programme on the web: http://www.hw.ac.uk/students/studies/examinations.htm Students can request the External Examiners Report for their Programme by emailing J.Stewart@hw.ac.uk Further guidance on the sharing of External Examiners Reports can be found at: http://www.hw.ac.uk/services/academic-registry/quality/qa/external-examiners.htm
4.7	**Examination Conduct**	http://www.hw.ac.uk/students/studies/examinations/exam-conduct-id-checks.htm
4.8	**Ill Health and Mitigating Circumstances – Examinations**	http://www.hw.ac.uk/staff/policies-governance/procedures/charter-statutes-ordinances-regulations.htm **Regulation 1** – General Regulation, paragraph 6 **Regulation 3** – Modular First Degrees, paragraph 10, 15, 25 **Regulation 4 –** Postgraduate Diplomas and Graduate Diplomas, paragraph 12, 17, 21 **Regulation 9** – Assessment and Examinations, paragraphs 9, 12 **Regulation 18 –** Postgraduate Certificates and Graduate Certificates, paragraph 12, 17, 21 **Regulation 48 –** Higher Degrees of Master (Taught), paragraph 12, 17, 22 **Regulation 51** – Degree Entry Programme (Dubai), paragraph 21 http://www.hw.ac.uk/students/studies/examinations/mitigating-circumstances.htm
4.9	**Examination in Different Time Zones**	Policy: http://www.hw.ac.uk/services/academic-registry/quality/learning-teaching/policy-bank.htm

4.10	**Re-assessment**	**Information on re-assessment can be found:** http://www.hw.ac.uk/students/studies/examinations/reassessment/what-if-i-fail-.htm http://www.hw.ac.uk/staff/policies-governance/procedures/charter-statutes-ordinances-regulations.htm **Regulation 51** – Degree Entry Programme (Dubai), paragraph 21 Reassessment Procedures: http://www.hw.ac.uk/students/studies/examinations/re-assessment.htm **Students who study on one of the University's campuses are reminded of the University policy that examinations must be taken at the campus at which the student is studying. Students must note that this includes examinations during the December and Spring diets, and Resit examinations scheduled during the Autumn diet (ie the diet which takes place over the summer vacation).** ***Please refer to the programme-specific information in Part A of this handbook for further details on re-assessment.***
4.11	**Information on Student Fees and Charges**	Information on student fees and charges: http://www.hw.ac.uk/students/money/tuition-fees.htm http://www.hw.ac.uk/staff/policies-governance/procedures/charter-statutes-ordinances-regulations.htm **Ordinance 2** – Fees, Charges, Fines and Debts
4.12	**Use of Calculators in Examinations**	Policy on the Use of Calculators: http://www.hw.ac.uk/services/academic-registry/quality/learning-teaching/policy-bank.htm For further information please refer to: http://www.hw.ac.uk/staff/policies-governance/procedures/charter-statutes-ordinances-regulations.htm **Regulation 9** – Assessments and Examinations, paragraph 8
4.13	**Use of Dictionaries**	**Dictionaries are not permitted in any examinations, wherever or whenever the examination is held.** http://www.hw.ac.uk/services/academic-registry/quality/learning-teaching/policy-bank.htm
5. Grading, Awards and Qualifications		
5.1	**Intermediate Awards**	http://www.hw.ac.uk/students/studies/record/awards.htm
5.2	**Requirements for Awards**	http://www.hw.ac.uk/staff/policies-governance/procedures/charter-statutes-ordinances-regulations.htm **Regulation 3** – Modular First Degree, paragraph 14, 20, 23 **Regulation 4 –** Postgraduate Diplomas and Graduate Diplomas, paragraph 15, 19, 21 **Regulation 18 –** Postgraduate Certificates and Graduate Certificates, paragra 15, 19, 21

		Regulation 48 – Higher Degrees of Master (Taught), paragraph 15, 16, 20, 22
5.3	**Undergraduate Honours Classification and Awards Grading**	http://www.hw.ac.uk/staff/policies-governance/procedures/charter-statutes-ordinances-regulations.htm **Regulation 3** – Modular First Degrees, paragraph 14, 20, 25
6. Graduation		
6.1	**Graduation Information**	http://www.hw.ac.uk/students/studies/graduation.htm
7. Conduct, Discipline and Appeals		
7.1	**Academic Conduct (including copying, plagiarism and collusion)**	Further Information is available from: http://www.hw.ac.uk/staff/policies-governance/procedures/charter-statutes-ordinances-regulations.htm **Regulation 9** – Assessment and Examinations, Paragraph 8 **Regulation 50** – Student Discipline **Student Discipline Policy and Procedures:** http://www.hw.ac.uk/students/studies/record/discipline.htm **Examination Conduct:** http://www.hw.ac.uk/students/studies/examinations/exam-conduct-id-checks.htm
7.2	**Appeals**	Further Information is available at: http://www.hw.ac.uk/students/studies/complaints/student-appeals.htm Student Academic Appeal Policy and Procedures **Regulation 36** - Student Academic Appeals Appeals relating to all disciplinary matters are located within the Student Discipline Policy and Procedures: http://www.hw.ac.uk/students/studies/record/discipline.htm
7.3	**Detection of Plagiarism**	http://www.hw.ac.uk/students/studies/examinations/plagiarism.htm
7.4	**Student Discipline Policy and Procedures**	The purpose of the Student Discipline Policy and Procedures is to regulate student behaviour in order to secure the proper working of the University in the broadest sense. These procedures cover both academic and non-academic misconduct. Further information is available from: http://www.hw.ac.uk/students/studies/record/discipline.htm Misconduct and Law At any time during enrolment a student is cautioned or arrested for, or charges with a criminal offence, including motoring offences (see exceptions) the student is required to report this immediately to the Academic Registrar. The Academic Registrar must also be kept informed of any criminal or court proceedings.

		For further information on Misconduct and the Law see: http://www.hw.ac.uk/students/studies/record/discipline.htm
7	**Plagiarism**	Further Information is available from: http://www.hw.ac.uk/students/studies/examinations/plagiarism.htm Plagiarism Guide: For an English language version, please refer to http://www.hw.ac.uk/services/academic-registry/quality/learning-teaching/policy-bank.htm (this document is attached in Appendix B) For the Chinese language version, please refer to http://www.hw.ac.uk/services/academic-registry/quality/learning-teaching/policy-bank.htm For the Arabic language version, please refer to http://www.hw.ac.uk/services/academic-registry/quality/learning-teaching/policy-bank.htm
7.6	**Unauthorised Equipment in Examinations**	http://www.hw.ac.uk/staff/policies-governance/procedures/charter-statutes-ordinances-regulations.htm **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/students/studies/complaints/complaints.htm
9. Suspension, Withdrawal and Exit Award		
9.1	**Temporary Suspension of Studies**	Students are advised to consult with their personal tutor /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 Application forms are available on the Registry website, http://www.hw.ac.uk/students/studies/record/amending-your-enrolment.htm Further Information is available from: http://www.hw.ac.uk/staff/policies-governance/procedures/charter-statutes-ordinances-regulations.htm **Regulation 1 –** General Regulation, paragraph 6 **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 Degrees of Master (Taught), paragraph 10
9.2	**Withdrawal**	Thinking of leaving: http://www.hw.ac.uk/students/studies/leaving.htm Application Form to withdraw from studies is available form: http://www.hw.ac.uk/students/studies/leaving/withdrawing-from-university.htm
9.3	**Exit Awards**	http://www.hw.ac.uk/students/studies/record/awards.htm
10. Student Fees and Charges		
10.1	**Charges for Transcripts, Certifications, Late Enrolment and Student Identity Cards**	Follow the link for Additional Notes on Fees at: http://www.hw.ac.uk/students/doc/additionalfees-dubai.pdf
10.2	**Fees Status Enquiry Form**	http://www.hw.ac.uk/student-life/scholarships/tuition-fees/undergraduate.htm
10.3	**Information on Student Fees and charges**	Information on Tuition Fees: http://www.hw.ac.uk/student-life/scholarships/dubai-campus-tuition-fees.htm Information on Additional Fees and Charges: http://www.hw.ac.uk/students/doc/additionalfees-dubai.pdf Further information available from: http://www.hw.ac.uk/staff/policies-governance/procedures/charter-statutes-ordinances-regulations.htm **Ordinance E1** *(previously Ordinance 2)* **–** Fees, Charges, Fines and Debts
10.4	**Re-assessment Fees and Procedures**	http://www.hw.ac.uk/students/studies/examinations/re-assessment.htm

B4. QUICK FINDER GUIDE TO STUDENT ADMINISTRATION AND SUPPORT SERVICES

Much of the detail this handbook provides guidance and links for the academic operations of a complex institution like Heriot-Watt University. However, as well as helping to inform students, the University also hopes to ensure that students are happy members of a vibrant community.

This section outlines the range of services available for students to help them get the most out of their time here and to assist with any problems they may experience along the way.

Student Administration and Support Service		
1	**Academic Registry**	http://www.hw.ac.uk/services/academic-registry.htm
2	**Careers Service**	http://www.hw.ac.uk/careers/
3	**Information Services**	**General IT information**: http://www.hw.ac.uk/is/
4	**Development and Alumni Office**	http://www.hw.ac.uk/alumni.htm
5	**Heriot Watt University Students' Union**	http://HWUnion.com or contact info@hwunion.com
6	**Religious Services**	***There is a prayer room for students within the Dubai Campus. In addition to the multi-denominational Chaplaincy, a Muslim Prayer Room is provided for students at the main University campus Edinburgh.***
7	**Student Support and Accommodation**	http://www.hw.ac.uk/student-life/campus-life/student-support.htm ***Please refer to the Campus Office for further advice***

HERIOT WATT UNIVERSITY

STUDENT LEARNING CODE OF PRACTICE for those studying on campus

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:

- 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
- Full engagement and attendance on time for lectures, laboratories, seminars and tutorials: during the semester it is your responsibility to be available to attend classes and, in particular, class tests
- 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
- 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
- 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
- Commitment to your learning and a professional approach to your academic work
- 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
- 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
- To keep yourself informed about new and interesting developments in your discipline (beyond what is covered in your courses)
- Full referencing of all work *
- Adherence with regulations and requirements, including health and safety
- Politeness and respect for all members of the Heriot-Watt University community (http://www.hw.ac.uk/about/careers/culture/our-values.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
- Appropriate supervision of project/dissertation work
- Clear information and guidance on assessment requirements
- 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 personal tutor
- A timely response to general email questions
- Guidance on specific regulations and requirements including those related to health and safety
- Politeness and respect (http://www.hw.ac.uk/about/careers/culture/our-values.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 personal tutor. We are here to help. You can also discuss any personal problems including counselling, disability and financial difficulties with the staff in the Student Support (and Accommodation) Office (http://www.hw.ac.uk/student-life/campus-life/student-support.htm, 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; rev January 2014

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/students/studies/examinations/plagiarism.htm **for 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 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:

[1] The author acknowledges the following sources of information used in preparing this guide to Plagiarism:
"Plagiarism – A Good Practice Guide", Carroll, J and Appleton, J (2001) and various extracts from Student/Course Handbooks 2004/2005, Schools at Heriot-Watt University

- **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"

[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.

- "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.

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
- Title of Book
- Place of Publication
- Publishers Name
- All Page Numbers cited
- 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 personal tutor, 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/staff/policies-governance/procedures/charter-statutes-ordinances-regulations.htm and to the Guidelines for Staff and Students on Discipline at http://www.hw.ac.uk/students/studies/record/discipline.htm).

How your School 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.
- 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 and to you
- Alert you and staff in your School 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.