PART A: SCHOOL INFORMATION

It is important to read through Part A of the handbook which provides specific information on the requirements of your particular programme of study.

You should contact your School in the first instance for any academic queries.

1 WELCOME AND INTRODUCTION

Welcome from the Principal of Heriot-Watt University

I am delighted you have chosen to study at our innovative and distinctive University. You are now part of an unparalleled community, which has since 1821 been at the forefront of pioneering education and future thinking.

Throughout your studies you will have the opportunity to thrive both personally and academically, and I would encourage you to take advantage of all that our campus, student societies and community has to offer you. Our approach to teaching and learning is focused on offering you the very best study programmes that apply knowledge to real world challenges. We do this by combining innovative learning technologies and ideas with our outstanding support and facilities, both on-campus and through our digital services.

As a University committed to preparing you for your future, we’re delighted to offer opportunities for students to gain a global perspective, whether at a single campus or abroad. Our Go Global programme offers inter-campus transfers and exchanges across our campuses in Dubai, Scotland and Malaysia, allowing you to study, socialise or experience new cultures and places.

Our graduates are sought by global professions and industries all over the world. The very nature of a Heriot-Watt education is one that allows you to benefit from our research-informed approach, underpinned by our rich heritage and values. We’re dedicated to providing you with the confidence and leadership skills to be a global citizen, and the expertise to one day become a leader in your chosen field or career.

So on behalf of all the staff, we look forward to supporting you to be a successful graduate of Heriot-Watt University.

Professor Richard A. Williams OBE
Principal and Vice-Chancellor
Welcome from Head of Department Actuarial Mathematics and Statistics

I am delighted to welcome you as students on behalf of all staff in the Department of Actuarial Mathematics and Statistics at Heriot-Watt University.

The Department of Actuarial Mathematics and Statistics is internationally renowned for teaching and research in these areas, and it was among the first universities in the UK to offer degree programmes in Actuarial Science. I would like to encourage you to explore the opportunities we offer. There are opportunities to spend a year abroad in Canada or Australia or on our campus in Malaysia. There are also opportunities to spend a year on an industrial placement. On your home campus, there are ample opportunities to attend talks and seminars including the annual conference and other events organised by the Students' Actuarial Society.

Once again we are delighted to welcome you as our students, and I very much hope the academic year ahead will be successful, inspiring, and enjoyable for you.

Prof Damian Clancy
Head of Department

1.1 Introduction

This guide provides a reference to degree programme structures and other departmental information for students on Actuarial Mathematics and Statistics (AMS) degrees. This guide is intended as a summary of AMS Programme Structures, but note that the University Regulations and Programme Structures take precedence in case of any discrepancy between them and the guide.

Information concerning examination timetables, University regulations and other general information can be found on the Academic Registry website at www.hw.ac.uk/registry. Further sources of information are the MACS web site at www.macs.hw.ac.uk/students and the MACS Organisation section on VISION (see Section 2.5.5).
1.2 Programmes Offered

The following undergraduate programmes are offered:

- F723 BSc in Actuarial Science
- F712 BSc in Actuarial Science and Diploma in Industrial Training 1
- F706 BSc in Actuarial Science and Diploma in Industrial Training 2 (F706 is no longer open to enrolment)
- F771 BSc in Financial Mathematics
- F713 BSc in Statistical Data Science

The degrees may be awarded at honours or ordinary level. Study for an honours degree usually takes four years, and for an ordinary degree, three years. For the programmes that include industrial training, study lasts an additional year because of the year-long work placement.

All the degrees are designed to make it easy in most cases to transfer from one to another during the first two years. In addition, the Heriot-Watt course scheme is compliant with the Scottish Credit and Qualifications Framework (SCQF). This makes credit transfers between Scottish universities easier.

2 KEY INFORMATION

2.1 Key Contacts

Professor Beatrice Pelloni is the Head of the School of Mathematical and Computer Sciences, and Professor Damian Clancy is the Head of the Department of Actuarial and Mathematical Statistics. They are supported by year level Year Co-ordinators and an experienced team of academic staff.

Year Co-ordinator 2018/19

First Year Dr Marcelo Pereyra M.Pereyra@hw.ac.uk
Second Year Ms Andrea Sneddon A.E.Sneddon@hw.ac.uk
Third Year Prof. George Streftaris G.Streftaris@hw.ac.uk
Fourth Year Mr John Phillips J.Philips@hw.ac.uk
2.2 Academic Staff

Students are encouraged to contact directly any member of staff whose lectures they have attended if further help or advice is needed. Staff can also be contacted through the MACS School Office (EM 1.25).

The AMS academic staff for 2018-19 are listed below, together with their offices and telephone extensions (prefix by 451 if calling from outside). E-mail addresses for staff consist of the initials and surname followed by @hw.ac.uk (e.g. A.J.G.Cairns@hw.ac.uk).

<table>
<thead>
<tr>
<th>Name</th>
<th>Room</th>
<th>Extension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professor A.J.G. Cairns</td>
<td>CM S.08</td>
<td>3245</td>
</tr>
<tr>
<td>Professor D. Clancy (Head of Department)</td>
<td>CM S.02</td>
<td>3208</td>
</tr>
<tr>
<td>Dr F. Daly</td>
<td>CM G.06</td>
<td>3212</td>
</tr>
<tr>
<td>Dr C. Donnelly</td>
<td>CM G.04</td>
<td>3251</td>
</tr>
<tr>
<td>Dr M. Fahrenwaldt</td>
<td>CM F.13</td>
<td>3664</td>
</tr>
<tr>
<td>Professor S. Foss</td>
<td>CM G.07</td>
<td>3238</td>
</tr>
<tr>
<td>Professor G. J. Gibson</td>
<td>CM G.18</td>
<td>3205</td>
</tr>
<tr>
<td>Dr Abdul-Lateef Haji-Ali</td>
<td>CM G.15</td>
<td>3206</td>
</tr>
<tr>
<td>Professor J. Hansen</td>
<td>CM S.05</td>
<td>3213</td>
</tr>
<tr>
<td>Dr T.C. Johnson</td>
<td>CM G.05</td>
<td>8343</td>
</tr>
<tr>
<td>Dr T. Kleinow</td>
<td>CM F.11</td>
<td>3252</td>
</tr>
<tr>
<td>Professor A.S. Macdonald</td>
<td>CM T.04</td>
<td>3209</td>
</tr>
<tr>
<td>Dr. M. Pereyra (1st Year Co-ordinator)</td>
<td>CM T.17</td>
<td>3211</td>
</tr>
<tr>
<td>Professor Gareth W. Peters</td>
<td>CM G.03</td>
<td>8211</td>
</tr>
<tr>
<td>Mr J. Phillips (4th Year Co-ordinator)</td>
<td>CM S.06</td>
<td>4376</td>
</tr>
<tr>
<td>Mr G.G. Reid</td>
<td>CM F.09</td>
<td>3075</td>
</tr>
<tr>
<td>Dr A. Repetti</td>
<td>CM T.19B</td>
<td>4359</td>
</tr>
<tr>
<td>Mr P. Ridges</td>
<td>CM F.16</td>
<td>3906</td>
</tr>
<tr>
<td>Dr I. Sharpe (Exemptions Officer)</td>
<td>CM F.18</td>
<td>3249</td>
</tr>
<tr>
<td>Dr V. Shneer</td>
<td>CM S.07</td>
<td>3902</td>
</tr>
<tr>
<td>Ms A.E. Sneddon (2nd Year Co-ordinator)</td>
<td>CM S.10</td>
<td>3226</td>
</tr>
<tr>
<td>Mr A.D. Stott</td>
<td>CM T.12</td>
<td>3937</td>
</tr>
<tr>
<td>Professor G. Streftaris (3rd Year Co-ordinator)</td>
<td>CM S.15</td>
<td>3679</td>
</tr>
<tr>
<td>Dr A. Wiese</td>
<td>CM T.13</td>
<td>3717</td>
</tr>
<tr>
<td>Dr J. Yao</td>
<td>CM S.11</td>
<td>3220</td>
</tr>
</tbody>
</table>
2.4 Administrative Staff

The Programmes are supported through the School Office. Staff in the office can help with administrative information and procedures such as registration issues, changes of address and many other issues.

Location: EM1.25  
Phone: 0131 451 3324  
Email: macs-schooloffice@hw.ac.uk

Updating personal information, such as a change of address, is done through the Student Self Service portal: (http://www.hw.ac.uk/selfservice).

2.4 Significant Dates in the Academic Year

HWU Edinburgh Campus session dates for 2019/2020

<table>
<thead>
<tr>
<th>Dates</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 September 2019 – 6 December 2019</td>
<td>Semester 1</td>
</tr>
<tr>
<td>9 December 2019 – 20 December 2019</td>
<td>Semester 1 exams</td>
</tr>
<tr>
<td>23 December 2019 – 10 January 2020</td>
<td>Semester 1 break</td>
</tr>
<tr>
<td>13 January 2020 – 3 April 2020</td>
<td>Semester 2</td>
</tr>
<tr>
<td>6 April 2020 – 24 April 2020</td>
<td>Semester 2 break</td>
</tr>
<tr>
<td>27 April 2020 – 22 May 2020</td>
<td>Semester 2 exams</td>
</tr>
<tr>
<td>25 May 2020 – 7 September 2020</td>
<td>Summer break</td>
</tr>
<tr>
<td>6 August 2020 – 14 August 2020</td>
<td>Resits</td>
</tr>
</tbody>
</table>

Please refer to the University’s websites at http://www.hw.ac.uk/ and http://www.hw.ac.uk/edinburgh.htm which contain detailed information about Heriot-Watt University and the Edinburgh Campus.
2.5. Communications

2.5.1 Contact Details

It is essential that the School and the University are kept informed of any changes to students’ contact details, particularly term-time and home addresses. It is the responsibility of the student to ensure that the University has the most up to date contact information.

Please inform the University of any changes to personal details to ensure that we hold up-to-date records.

If you wish to change your address, please login to Student Self Service (http://www.hw.ac.uk/selfservice).

If you require your name to be changed, please inform the Student Service Centre and provide the appropriate paperwork.

Please note that letters from the University are automatically sent to students’ term addresses as recorded on the student record system, so it is particularly important to ensure address details are kept up to date.

2.5.2 Mail & Notices

Mail (internal and external) for students is delivered to pigeon-holes inside the MACS office (EM1.25). Check yours regularly. Various announcements and notices are posted on VISION (see Section 2.5.5).

2.5.3 Lockers

Lockers are allocated for the duration of each academic year on a first-come, first-served basis. Keys for lockers in the EM Building are available from Mr I. A. McCrone (EM1.33) for a deposit of £10.

2.5.4 E-mail

New students will be issued with instructions on how to set up their e-mail account during enrolment. Returning students will have continued access to their e-mail.

Please note that students’ Heriot-Watt e-mail addresses are used by academic and administrative staff to send important information throughout the year.

Staff will only use official Heriot Watt e-mail addresses when writing to their students.

Students are expected to check your e-mail regularly (at least once a day) and to ensure that your in-box is regularly cleared.

More information regarding Heriot-Watt’s I.T. facilities and regulations can be found at: http://www.hw.ac.uk/is/.
2.5.5 VISION
Heriot Watt University has a Virtual Learning Environment (VLE) called VISION. Each of your courses will have a space on the VLE and your lecturers will use this space to post class materials, such as reading lists, details of assignments or announcements of revision sessions. You may also be required to use VISION to upload your work through Turnitin, a plagiarism detection programme which is in regular use by the Schools. Many courses will also include online assessment which is accessed and submitted through VISION.

Other important information, such as the AMS Code of Practice, can be found in the MACS Organisation section of VISION.

Once you have registered and have your username and password, you can access VISION here: http://vision.hw.ac.uk/.

2.5.6 Computing Facilities

All AMS students are issued with accounts on the University Desktop Service. For details of computer labs and availability see www.hw.ac.uk/schools/mathematical-computer-sciences/about/facilities.htm. Students are expected to use the computer facilities in an appropriate and considerate way. Abuse of the facilities is subject to various disciplinary measures, ranging from a ban on access to the facilities to, in extreme and flagrant cases, expulsion from the University. Examples of abuse include monopolising a terminal for non-academic related purposes, running excessively long or inappropriate print jobs, and displaying, circulating or printing offensive material on or from the Internet. Computer games and relay chat are specifically forbidden. Further information on policy regarding the abuse of computer facilities is available from Information Technology (IT) www.hw.ac.uk/documents/it-communications-facilities-acceptable-use.pdf.

2.5.7 Changes to Registration

Students should make any changes to course or degree registration through the relevant Year Co-ordinators (see Section 2.1). Any changes must be made before the end of week 3 of semester, or a fee will be incurred. Forms can be obtained from the MACS Office (EM1.25) or https://www.macs.hw.ac.uk/students/forms/.

2.5.8 Staff-Student Committee

The Staff-Student Committee provides an additional channel of communication between staff and students within the AMS department. It consists of the School Officer, the Year Co-ordinators, the President of the Students’ Actuarial Society and two student representatives from each of the four undergraduate years. Student representatives are elected annually.

The committee meets once or twice each semester. One of its major functions is to consider any concerns about current lecture courses, including teaching quality, and to take appropriate action for their resolution. Other matters of interest, such as the provision of computing facilities or the timing of lectures, may be discussed. Minutes of the meetings are available on VISION.
2.5.9 Course Evaluation

At the end of each course you take you will be asked to complete a course evaluation questionnaire, normally through VISION. Your views are important to us and the information gathered from these evaluations is analysed by the University and the resulting information is then fed into an annual review of the programme. Feedback will be provided through VISION as to how your views have been taken on board.

2.5.10 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.

2.6 Personal Tutors

Each student studying an Undergraduate Programme will be assigned to a member of the academic staff (the personal tutor) who can be consulted on all aspects of the University. Details on who your personal tutor is can be obtained through student self service.

You will normally retain the same personal tutor as long as you are registered on an AMS degree. The personal tutor is your main academic link with the University. Under certain circumstances, with the permission of the Head of AMS, it may be possible to change your personal tutor.

2.6.1 Regular Meetings

It is important that you see your personal tutor regularly. These meetings are particularly important for monitoring academic progress in the first and second years. All students must see their personal tutor at the start of Semester 1 and early in Semester 2. In addition, first and second year students must see their personal tutor in week 7 of Semester 1 and week 8 of Semester 2 and third year direct entrants must see their personal tutor in week 7 of Semester 1. Staff often arrange meetings via e-mail, or post notices on their office doors. It is your responsibility to find out what arrangements have been made. Remember to check your e-mail regularly.
2.6.2 Help and Advice

Every year a few students run into serious personal difficulties (e.g. family illness, accommodation, financial, etc.). As well as being generally supportive, your personal tutor can help in a number of practical ways. For example, if you are prevented from completing project work or sitting exams, your personal tutor can help with the Mitigating Circumstances process. 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 the difficulty affects your sitting Level 9 or 10 honours papers, as once taken there are no resits allowed for honours papers. Also, it is essential to submit a Mitigating Circumstances Form (see Section 2.7.2 Notification of Mitigating Circumstances).

With other problems, your personal tutor can put you in touch with the appropriate University support service (Chaplaincy, Medical Centre, Student Welfare Services or Student Union). Personal tutors are there to help; do not hesitate to contact yours if you need help.

2.6.3 Temporary Suspension of Studies

In certain situations it may be in your best interests to suspend your studies temporarily. It sometimes helps to take time out to deal with issues that are stopping you studying effectively – this might be a health or personal issue – and return to University at an agreed date. A Temporary Suspension of Studies (TSS) is when a student stops studying at the university for an extended period of time (usually no longer than one academic year), and then returns to resume their studies.

For further information see https://www.hw.ac.uk/students/studies/leaving/temporary-suspension-studies.htm.

If you are considering applying for a suspension of studies you should contact your personal tutor or Year Co-ordinator to discuss this with them.

2.7 Attendance

2.7.1 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).

Students who fail to satisfy course attendance requirements may, after due warning, be disallowed from presenting themselves for examination in the course (see https://www.hw.ac.uk/students/doc/compulsorywithdrawal.pdf)
2.7.2 Mitigating Circumstances

Should you have to miss a timetabled session due to ill health or other legitimate reasons, or there are any circumstances which could adversely affect your examination performance, it is very important that you notify your personal tutor as soon as possible.

You should also submit an application for consideration of Mitigating Circumstances (see https://www.hw.ac.uk/students/studies/examinations/mitigating-circumstances.htm), together with any supporting documents (e.g. medical certificates) to the MACS School Office (EM1.25).

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 as soon as possible after the mitigating circumstances have arisen, and certainly no later than the Examiners Meeting (usually at the end of the assessment period, or mid-August in the case of re-sits). Late notification will mean that either no account can be taken, or a formal appeal will need to be made. 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.

2.7.3 Examinations

It is the student’s responsibility to check all relevant examination timetables (including resits) on the Registry webpage https://www.hw.ac.uk/services/academic-registry.htm. Should you be required to resit any exams, you must be available to take them. Therefore do not book holidays or take on any other commitments during the resit diet. Note that students must take all examinations at the campus at which they are studying. Resits can only be taken at an overseas location in exceptional circumstances.

Any basic scientific calculator other than graphics calculators, programmable calculators, or those with text storage or retrievable facilities may be used in examinations. (Calculators are not provided.). Unless there are special circumstances, students are not allowed to use translation dictionaries in examinations.

Students are not allowed to have mobile phones or other communication devices on or about their persons during examinations. Phones may be left at the front of the exam but they must be switched off.

Cheating in an exam or other assessed work is considered to be a very serious offence.

Students should be aware that reading exam papers or communicating with other candidates prior to the start of an exam, or taking unauthorised material into an exam (even if you don’t use it), is considered to be an attempt to cheat. Do not take any material into the exam hall with you – put it in your bag or in the bin.

If a student is found cheating in an exam the Student Discipline policy will apply – see https://www.hw.ac.uk/students/doc/discguidelines.pdf.
2.7.4 Coursework and continuous assessment

As well as end of semester examinations, most courses on the AMS degree programmes involve some element of coursework or continuous assessment such as midterm tests. Students will be informed by the course lecturer of the important dates for tests and project submission and must ensure that they attend / submit at these times. These dates are fixed and cannot be altered for individual students. In addition the year co-ordinators will produce a coursework calander for each semester, which will be posted to VISION, containing all the coursework deadlines for that semester.

If you are unexpectedly unable to attend or submit due to circumstances beyond your control you should contact the course lecturer and your personal tutor as soon as possible, as well as submit an application for consideration of Mitigating Circumstances to the School Office (see Section 2.7.2 for more detail).

2.7.5 Submission of Coursework Policy

The University recognises that, on occasion, students may be unable to submit coursework and dissertations by the submission date. As such, the University has agreed a policy which states:

- No individual extensions are permitted under any circumstances (unless course coordinators decide to give an extension to an entire class).
- Standard 30% deduction from the mark awarded (maximum of five working days);

In the case where you submit coursework up to five working days late and you have valid mitigating circumstances, the mitigating circumstances policy will apply and appropriate mitigation will be applied.

Formative feedback will be provided on all coursework submitted up to five working days late. Any coursework submitted after five working days of the set submission date shall be automatically awarded a no grade with no formative feedback provided.

There will be no extensions granted to coursework (this includes undergraduate and postgraduate taught dissertations).

A link to the policy can be found here:
https://www.hw.ac.uk/services/docs/learning-teaching/policies/submissionofcoursework-policy.pdf.
2.8 PLAGIARISM, COLLUSION and CHEATING

Cheating in examinations and coursework, and plagiarism, that is, the presentation of another person’s ideas or work as one’s own, are very serious offences and are dealt with severely. They carry a range of penalties up to and including expulsion from the University. Students are responsible for familiarising themselves with the University policy on these matters.

The University website contains detailed explanation of what is meant by plagiarism with examples and consequences - see https://www.hw.ac.uk/students/studies/examinations/plagiarism.htm as well as Appendix B of this Guide, and Regulations 9 and 50 on the Registry’s website http://www1.hw.ac.uk/ordinances.

Your lecturer will always be very clear about the extent to which you can collaborate and share ideas with your classmates. It is never acceptable to share your electronic files with others.

2.9 Graduate Attributes

As a student of Heriot Watt you are part of a 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 the opportunity to develop skills, qualities and academic abilities during your time as a student. These are known as the Four Heriot Watt Graduate Attributes: Specialist, Creative, Global and Professional,

These Graduate Attributes can help you shape your experiences while studying and to present your skills and qualities effectively to employers. For more information see https://www.hw.ac.uk/services/docs/academic-registry/gradattributes-visual.pdf.

2.10 Professional Development & Careers Advice

Professional development planning (PDP) is incorporated in all four years of the AMS degrees. This is a structured process designed to help students reflect upon their own learning, performance and achievements. One of its main purposes is to support students in the planning of their professional, education and career development, keeping the University’s Graduate Attributes in mind.

In addition to taking a PDP course in 1st year, students will periodically attend seminars on developing these skills, given by, for example, prospective employers. In later years there will be opportunities to develop presentation and group working skills. Students are encouraged to take every opportunity to help develop their own skills.
Career guidance is available through the University's Careers Advisory Service, which gives a number of presentations on topics related to careers. Students are encouraged to contact Alan Smith there for advice.

2.11 Exchange opportunities

There are two exchange agreements which give AMS students the opportunity to study abroad, at either the University of Melbourne (Australia) or the University of Waterloo (Canada). To be eligible, students will have to be consistently in the top 20% of the class. For further information, see the link in VISION, under the AMS Undergraduate Degree Programme section within the MACS Organisation section. Note that the Institute and Faculty of Actuaries accreditation policy does not apply to exchange programmes: exemptions will be determined on a subject-by-subject basis (see Section 4.1.2).

Students on the Actuarial Science degree also have the opportunity to transfer to the University’s Malaysian campus. Short term transfers are available, for one or two semesters in Years 2 or 3 (and then return to Edinburgh), or students can permanently transfer to Malaysia in any of Years 2, 3 or 4. Further information about Inter-Campus Transfers is available on the Go Global site: https://www.hw.ac.uk/student-life/campus-life/go-global.htm.

2.12 Diploma in Industrial Training / Industrial Placements

The Department encourages all students to undertake a year-long actuarial or financial services-based paid work placement during their studies. This can be done through the Diploma in Industrial Training (for eligible BSc (Hons) Actuarial Science students only) or by temporarily suspending your studies. More information about the Diploma in Industrial Training can be found on the School VISION website, within the AMS Undergraduate Degree Programmes section within the MACS Organisation section.

In all cases the student is responsible for securing a work placement. The University's Careers Advisory Service can advise anyone interested on how to go about researching and applying for a placement. You are strongly advised to contact the Careers Advisory Service for help on writing CVs, online tests and assessment centres.
2.13 University Prizes and Bursaries

A number of prizes, for overall performance in each year, are available to AMS Students.

**Year 1**
- University Prize
- Standard Life Prize (may be shared)

**Year 2**
- University Prize
- Worshipful Company of Actuaries Prize (may be shared)

**Year 3**
- University Prize
- Scottish Widows Prize (may be shared)
- Longevitas Prize for Survival Models

**Year 4**
- Watt Club Medal for the Best Student
- IMA Prize
- Roger Gray Memorial Prize in Statistics

The Worshipful Company of Actuaries Charitable Trust offers a number of bursaries each year to final year honours students in Actuarial Science. Applicants are required to demonstrate need and reasonable progress on their degree, and should be seriously considering a career in the actuarial profession. Third year students who wish to apply should contact Peter Ridges at the beginning of second semester.
3 PROGRAMME STRUCTURES

The academic year is divided into two semesters. Each semester consists of 12 weeks teaching followed by an assessment period (2 weeks in Semester 1, and 4 weeks in Semester 2). Students must register for four courses each semester. These courses are listed in the relevant tables overleaf.

Each course has a five-character code; the first two characters indicate the department, the third is the level (0, 1 indicate Levels 10, 11 respectively). Usually, but not always, Level 7 courses are taken in the 1st year, Level 8 in the 2nd year and Level 9 and 10/11 courses in the 3rd and 4th years respectively.

A course is regarded as requiring 150 hours of student effort, and is worth 15 SCQF credits.

3.1 Assessment

Each course is awarded a grade in the range A-F: grade E is the minimum required for the award of credits, but at least a grade D is needed for progression to subsequent courses. Other grades are interpreted as follows:

   A - excellent, B - very good, C - good, F - inadequate. (See University Regulations for further details).

The minimum mark needed to gain a grade D is usually 40%. The correspondence between marks and other grades varies from course to course, but is approximately as follows: grade A, 70% or over; grade B, 60-69%; grade C, 50-59%; grade D, 40-49%.

3.2 Level 7 and 8 Courses

Course assessment is generally based on either coursework, an exam at the end of the semester, or a combination of both. Details for individual courses can be found in the relevant course description. If you do not obtain a grade D (or higher) in a Level 7 or 8 course at the first attempt, you are entitled to one further attempt.

3.3 Level 9, 10 and 11 Courses

Assessment of Level 9, 10 and 11 courses is generally as for Level 7 and 8. However, in some cases, the exam for a first semester course may take place at the end of the second semester. Also, note that some pairs of courses are synoptically linked; that is, both courses are assigned the same grade, based on the average mark for the individual courses. Details are in the relevant course description. All Level 9, 10 and 11 course marks count towards the final degree classification (see also Section 3.8.4 Final Degree Assessment).
### 3.4 Results and Progress Decisions

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 below.

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. The Year Co-ordinators will write to inform you if you must resit any exams. The Registry also makes the results available online.

### 3.5 First Year

#### 3.5.1 First Year Courses

<table>
<thead>
<tr>
<th>1st Semester Courses</th>
<th>Req’d</th>
<th>Opt.</th>
<th>Elect.</th>
</tr>
</thead>
<tbody>
<tr>
<td>F77SA  Introduction to Statistical Science A</td>
<td>AS,FM,SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F77CA  Calculus A</td>
<td>AS,FM,SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F17CC  An introduction to university mathematics</td>
<td>AS,FM,SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C27IE  Introductory Economics</td>
<td>FM</td>
<td>AS,SD</td>
<td></td>
</tr>
<tr>
<td>C37FA  Introduction to Accounting</td>
<td></td>
<td></td>
<td>AS</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2nd Semester Courses</th>
<th>Req’d</th>
<th>Opt.</th>
<th>Elect.</th>
</tr>
</thead>
<tbody>
<tr>
<td>F77SB  Introduction to Statistical Science B</td>
<td>AS,FM,SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F17CB  Calculus B</td>
<td>AS,FM,SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F77PD  Professional Development Planning</td>
<td>AS,FM,SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C37FF  Finance &amp; Financial Reporting</td>
<td>FM</td>
<td>AS,SD</td>
<td></td>
</tr>
</tbody>
</table>

AS-Actuarial Science   FM-Financial Mathematics   SD- Statistical Data Science
3.5.2 Degree Requirements

**Actuarial Science**
Three mandatory and one optional course each semester. Any level 7 course may be chosen as an option, subject to timetable constraints and the approval of the Year Co-ordinator.

Students should note that the options C37FF and C27IE can lead to exemptions from the CB1 and CB2 examinations of the Institute and Faculty of Actuaries (see Section 4 - Actuarial Exemptions).

**Financial Mathematics**
Eight mandatory courses.

**Statistical Data Science**
Three mandatory and one optional course each semester. Any level 7 course may be chosen as an option, subject to timetable constraints and the approval of the Year Co-ordinator.

3.5.3 Proceeding to 2nd Year

If you obtain a grade D or better in all eight courses at the first attempt, you may proceed to the 2nd year of any AMS degree for which you have fulfilled the prerequisites. Otherwise, progress is determined by the progression board on a case-by-case basis, and you may be required to resit some exams in August.

If you do not obtain D's at this second attempt, you may be required to transfer to another degree programme for which you have enough credit points (e.g. Combined Studies, Mathematics), or withdraw from the University. You will be advised of your options.
3.6 Second Year

3.6.1 Second Year Courses

<table>
<thead>
<tr>
<th>1st Semester Courses</th>
<th>Required</th>
<th>Optional</th>
</tr>
</thead>
<tbody>
<tr>
<td>F78PA Probability &amp; Statistics A</td>
<td>AS, FM, SD</td>
<td></td>
</tr>
<tr>
<td>F78AA Actuarial &amp; Financial Mathematics A</td>
<td>AS, FM, SD</td>
<td></td>
</tr>
<tr>
<td>F18CD Multivariable Calculus &amp; Real Analysis A</td>
<td>AS, FM, SD</td>
<td></td>
</tr>
<tr>
<td>F18CF Linear Algebra</td>
<td>AS, FM, SD</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2nd Semester Courses</th>
<th>Required</th>
<th>Optional</th>
</tr>
</thead>
<tbody>
<tr>
<td>F78PB Probability &amp; Statistics B</td>
<td>AS, FM, SD</td>
<td></td>
</tr>
<tr>
<td>F78AB Actuarial &amp; Financial Mathematics B</td>
<td>AS, FM, SD</td>
<td></td>
</tr>
<tr>
<td>F18CE Multivariable Calculus &amp; Real Analysis B</td>
<td>AS, FM, SD</td>
<td></td>
</tr>
<tr>
<td>F18NA Numerical Analysis A</td>
<td>AS, FM, SD</td>
<td></td>
</tr>
<tr>
<td>C37FF Finance &amp; Financial Reporting</td>
<td>AS, FM, SD</td>
<td></td>
</tr>
</tbody>
</table>

AS-Actuarial Science  FM-Financial Mathematics  SD- Statistical Data Science

3.6.2 Degree Requirements

**Actuarial Science, Financial Mathematics and Statistical Data Science**

Seven mandatory courses, plus one optional course in Semester 2.

Direct entrant AS students should note that C37FF can lead to exemption from the CB1 examination of the Institute and Faculty of Actuaries (see Section 4 - Actuarial Exemptions).

Direct entrant FM students must take C37FF to fulfil degree requirements.

SM students may choose any Level 7 or 8 course as an option, subject to timetable constraints and the approval of the Year Co-ordinator.
3.6.3 Proceeding to 3rd Year

If you obtain a grade D or better in all eight courses at the first you will be allowed to proceed to the 3rd year of any AMS degree for which you have fulfilled the prerequisites.

Otherwise, you will be required to resit some exams in August. If you do not obtain D or better at this second attempt, you may be required to transfer to another degree programme for which you have enough credit points (e.g. Combined Studies, Mathematics), or withdraw from the University. You will be advised of your options.
3.7 Third Year

3.7.1 Third Year Courses

<table>
<thead>
<tr>
<th>1st Semester Courses</th>
<th>Required</th>
<th>Optional</th>
</tr>
</thead>
<tbody>
<tr>
<td>F79MA Statistical Models A</td>
<td>AS, FM, SD</td>
<td></td>
</tr>
<tr>
<td>F79SP Stochastic Processes</td>
<td>AS, FM, SD</td>
<td></td>
</tr>
<tr>
<td>F79PS Statistics for Social Science</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>F70LA Life Insurance Mathematics A</td>
<td>AS</td>
<td></td>
</tr>
<tr>
<td>F79PA Portfolio Theory &amp; Asset Models</td>
<td>AS, FM</td>
<td>SD</td>
</tr>
<tr>
<td>C27IE Introductory Economics</td>
<td></td>
<td>FM</td>
</tr>
<tr>
<td>F19MV Vector Analysis</td>
<td></td>
<td>FM, SD</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2nd Semester Courses</th>
<th>Required</th>
<th>Optional</th>
</tr>
</thead>
<tbody>
<tr>
<td>F79MB Statistical Models B</td>
<td>AS, FM, SD</td>
<td></td>
</tr>
<tr>
<td>F79BI Bayesian Inference &amp; Computational Methods</td>
<td>SD</td>
<td>FM</td>
</tr>
<tr>
<td>F79SU Survival Models</td>
<td>AS, SD</td>
<td></td>
</tr>
<tr>
<td>F70LB Life Insurance Mathematics B</td>
<td>AS</td>
<td></td>
</tr>
<tr>
<td>F79DF Derivative Markets &amp; Discrete-time Finance</td>
<td>AS, FM</td>
<td>SD</td>
</tr>
<tr>
<td>F19MO Ordinary Differential Equations</td>
<td>FM</td>
<td>SD</td>
</tr>
<tr>
<td>F19NB Numerical Analysis B</td>
<td></td>
<td>FM</td>
</tr>
</tbody>
</table>

AS-Actuarial Science  FM-Financial Mathematics  SD- Statistical Data Science
3.7.2 Degree Requirements

**Actuarial Science**
Eight mandatory courses.

**Financial Mathematics**
Three mandatory and one optional course each semester. Direct entrant FM students must take C27IE to fulfil degree requirements.

**Statistical Data Science**
Three mandatory and one optional course each semester. SM students may choose any Level 7, 8 or 9 course as an option, subject to timetable constraints and the approval of the Year Co-ordinator. However, note that only Level 9 and 10 courses count towards the final degree assessment (see Section 3.8.4 - Final Degree Assessment).

3.7.3 Synoptic Links (see Section 3.3)

The following pairs of courses are synoptically linked:
F79MA and F79MB,
F79SP and F79SU (not FM degree),
F79PA and F79DF (not SD degree),
F70LA and F70LB.

3.7.4 Proceeding to 4th Year

Students who obtain a grade D or better in all eight courses, may be allowed to proceed to the 4th year.

If you obtain a grade D or better in at least six courses and have an average mark of at least 40%, you may be permitted, at the discretion of the examiners, to proceed to the 4th year of an AMS degree. In these cases you will be advised by the examiners of your options, and may be required to resit some papers in August, to satisfy the prerequisites for the 4th year courses.

However, note that otherwise, no resit is allowed for an Honours paper, and in all cases, it is the marks obtained at the first attempt that form part of the Final Degree Assessment (see Section 3.8.4). For further information, consult your personal tutor.

3.7.5 Ordinary Degrees

A candidate who obtains a grade D or better in at least four Level 9 courses and a total of at least 360 credits may be awarded the ordinary degree of B.Sc.
3.8 Fourth Year

3.8.1 Fourth Year Courses

<table>
<thead>
<tr>
<th>1st Semester Courses</th>
<th>Req’d</th>
<th>Opt.</th>
<th>Elect.</th>
</tr>
</thead>
<tbody>
<tr>
<td>F70DA  Statistics Dissertation A</td>
<td>SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F79PS  Statistics for Social Science</td>
<td></td>
<td>AS, FM</td>
<td></td>
</tr>
<tr>
<td>F70CF  Continuous-time Finance</td>
<td>FM</td>
<td>AS, SD</td>
<td></td>
</tr>
<tr>
<td>F70PE  Pensions</td>
<td>AS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F10MF  Functional Analysis</td>
<td>FM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F10MM  Optimisation</td>
<td>SD</td>
<td>AS, FM</td>
<td></td>
</tr>
<tr>
<td>F10AM  Mathematical Biology A</td>
<td>SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F10NC  Numerical Analysis C</td>
<td>FM, SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F20ML  Statistical Machine Learning</td>
<td>SD</td>
<td>AS, FM</td>
<td></td>
</tr>
<tr>
<td>C39SM  International Bond and Currency Markets</td>
<td>FM</td>
<td>AS</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2nd Semester Courses</th>
<th>Req’d</th>
<th>Opt.</th>
<th>Elect.</th>
</tr>
</thead>
<tbody>
<tr>
<td>F70DB  Statistics Dissertation B</td>
<td>SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F70TS  Time Series</td>
<td>SD</td>
<td>AS, FM</td>
<td></td>
</tr>
<tr>
<td>F79BI  Bayesian Inference &amp; Computational Methods</td>
<td>AS, FM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F70DP  Advanced Derivative Pricing</td>
<td>FM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F70RT  Risk Theory</td>
<td>AS, FM, SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F70LP  Life Office Practice</td>
<td>AS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F71CM  Credit Risk Modelling</td>
<td>FM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F71TT  Risk Management: Techniques &amp; Tools</td>
<td>AS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F19MO  Ordinary Differential Equations</td>
<td>AS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F10AN  Mathematical Biology B</td>
<td>SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F10ND  Numerical Analysis D</td>
<td>FM, SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C39TA  Taxation (Tax Law)</td>
<td>AS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

AS-Actuarial Science   FM-Financial Mathematics   SD-Statistical Data Science

3.8.2 Degree Requirements

Actuarial Science
At least three optional courses plus at most one elective course each semester. Students must take both F70PE and F70LP, or neither.

Direct entrants to AS may take C27IE and/or C37FF to obtain exemption from the CB2 and/or CB1 examinations of the Institute and Faculty of Actuaries

Direct entrants to 3rd year AS may take F71AB to obtain partial exemption from the CM1 examination of the Institute and Faculty of Actuaries. (See section 4)
Financial Mathematics
One mandatory course and three optional courses each semester. At least four option courses must be at Level 10 or above.

Statistical Data Science
Two mandatory courses plus at least one optional course and at most one elective each semester.
Students transferring to the SM degree from one of the other AMS degrees must take F79PS and F79BI (if not already taken).

3.8.3 Synoptic Links (see Section 3.3)
The following pairs of courses are synoptically linked:

- F70DA and F70DB,
- F70PE and F70LP.

3.8.4 Final Degree Assessment
The Examiners take into account all course marks at Level 9 and above in deciding the class of Honours: the final mark is the average of those marks (note that Level 7 and 8 course marks are not included). In broad terms, an average mark of over 70% for first class honours, 60% - 70% for upper second class honours, 50% - 60% for lower second class honours, and 40% - 50% for third class honours, would be required, subject to the agreement of the Examiners.

Note that 480 credits are required for the award of an honours degree.

In borderline cases, a positive view may be taken of an improving performance from third to fourth year.
4 ACTUARIAL EXEMPTIONS

4.1 Introduction

The Actuarial Science degree has been accredited by the Institute and Faculty of Actuaries (IFoA), which means that students can obtain exemption from some of the subjects in the IFoA’s examination system. There are two routes to gaining exemptions.

4.1.1 Accreditation

Students graduating with a good upper second class degree (normally an overall average of at least 65%) will be eligible for exemption from all Core subjects covered in their degree in which they have obtained the University pass mark in the relevant courses (normally 40%).

4.1.2 Individual Exemptions

Students who do not attain the accreditation threshold as above will be considered for exemption from individual subjects as described below. The exemption standard for each subject will be reviewed each year by the profession's Independent Examiners and may vary from year to year.

Note that the accreditation policy does not cover exchange arrangements; in this case, all exemptions will be recommended on a subject-by-subject basis, taking into account performance at Heriot-Watt and the exchange university.

4.2 Core Principles Stage

For almost all current students, we are now using the new Curriculum 2019 system for exemptions. Exceptions are the small number of students who in 2018/19 were on the Diploma in Industrial Training, or on a TSS, provided that they had already completed all stage 3 subjects. For these students, the rules for the class that graduated in 2019 will still apply.

For all other current students, the following system will apply. Exemptions will be based on performance in university examinations as follows.

<table>
<thead>
<tr>
<th>Subject in new and old IFoA system</th>
<th>Relevant university subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>CM1 = CT1 &amp; CT5</td>
<td>F78AA (weighted 1/4) &amp; F78AB (weighted 1/4)</td>
</tr>
<tr>
<td></td>
<td>F70LA (weighted 1/4), F70LB (weighted 1/4)</td>
</tr>
<tr>
<td>CB1 = CT2</td>
<td>C37FF</td>
</tr>
<tr>
<td>CS1 = CT3</td>
<td>F78PA (weighted ½), F78PB (weighted ½)</td>
</tr>
<tr>
<td>CS2 = CT4 &amp; CT6</td>
<td>F79SP (weighted 1/4), F79SU (weighted 1/4) &amp;</td>
</tr>
<tr>
<td></td>
<td>F70RT (weighted 1/4), F70TS (weighted 1/4)</td>
</tr>
<tr>
<td>CB2 = CT7</td>
<td>C27IE</td>
</tr>
<tr>
<td>CM2 = CT8</td>
<td>F79PA (weighted 1/3), F79DF (weighted 1/3), F70CF (weighted 1/3)</td>
</tr>
</tbody>
</table>
For 3rd year direct entrants, an exception is for CM1, where the calculation is based on F71AB (weighted ½), F70LA (weighted ¼) and F70LB (weighted ¼). These students can only get CS1 by block exemption, as described in section 4.1.1.

For Diploma in Industrial Training students, and exchange students, the CM2 exemption is usually achieved using a combination of F79PA and postgraduate course F71AJ (Financial Economics 2).

The IFoA assesses CB3 (Business Awareness) through an online test and does not grant exemption from this subject on the basis of university studies.

4.3 Later Stages of the Professional Syllabus

The later parts of the professional syllabus are divided into three stages: Core Practices, Specialist Principles, and Specialist Advanced. To qualify as a Fellow it is also necessary to fulfil the profession’s Personal and Professional Development (work experience) requirements and online professional skills courses.

The profession recommends that UK-based students taking a Specialist Advanced paper also take the corresponding UK Practice Module. UK Practice Modules are not required to qualify as a Fellow, but are required in order to practise in the UK in certain reserved roles.

No exemptions are available from the undergraduate course for the later stages of the professional syllabus, although some courses are relevant, as indicated in the brackets. Graduates who proceed to the MSc in Actuarial Management may obtain exemptions from later stages.

4.3.1 Core Practices Stage
Subject CP1 Actuarial Practice
Subject CP2 Modelling Practice
Subject CP3 Communications Practice

4.3.2 Specialist Principles Stage
Students choose two subjects.

Subject SP1 Health and Care
Subject SP2 Life Insurance (F70LP)
Subject SP4 Pensions and Other Benefits (F70PE)
Subject SP5 Investment and Finance
Subject SP6 Financial Derivatives (F70CF, F79DF)
Subject SP7 General Insurance: Reserving and Capital Modelling (F70RT)
Subject SP8 General Insurance: Pricing (F70RT)
Subject SP9 Enterprise Risk Management (F71RM)

It is also possible to pass one of two subjects from the Specialist Principles stage by writing a Master’s thesis in an actuarially relevant subject (Subject SP0).
4.3.3 Specialist Advanced Stage
Students choose one subject.

**Subject SA1** Health and Care

**Subject SA2** Life Insurance (F70LP)

**Subject SA3** General Insurance

**Subject SA4** Pensions and Other Benefits (F70PE)

**Subject SA7** Investment and Finance

It is also possible to pass the Specialist Advanced stage by writing a research dissertation (Subject SA0).

4.4 General Information

Some general points to note about the exemption system are:

4.4.1. The University cannot grant exemptions, the Independent Examiner appointed by the IFoA makes recommendations to the IFoA. Usually the recommendations are accepted.

4.4.2. Decisions regarding recommendations for exemptions are generally made on the basis of the student's performance at the first sitting of the relevant University exam. (Resits granted as a first attempt because of medical or other mitigating circumstances are usually counted as a first attempt for exemption purposes also.) The IFoA will only allow a student to resit a course for exemption purposes (in the absence of mitigating circumstances) if it is necessary to resit it for the purposes of progression or graduation, in which case the resit must be taken at the next reassessment opportunity, and the maximum mark that can be used for exemption purposes is the pass mark (40%). These resits are for subject-by-subject exemptions only, and will not alter your degree average, or your entitlement to exemptions from other courses under the accreditation agreement.

4.4.3. Decisions on a particular exemption are made at a meeting of staff and an independent examiner held at the end of the academic year in which the relevant information becomes available, following which students are informed of these decisions. However, the recommendations are not sent to the IFoA until the end of the academic year in which the student graduates. Graduating students will be issued with a letter confirming the recommendations, and advising on how to claim them upon joining the IFoA as a student member.

4.4.4. The IFoA will not grant any exemptions (or confirm that any will be granted) until a student has joined the profession, at which time you should complete an Exemptions Application Form, available from the IFoA. State clearly on the form that you are a graduate of the AMS Department at Heriot-Watt University; there will then be no need to supply details of syllabi or exam papers. Note there is a fee payable to the profession for each exemption granted.

4.4.5. There are frequent discussions between the AMS department and the IFoA about the rules and practices concerning exemptions. The above notes reflect the current position but it is possible that changes may occur without prior notice.

4.6 Further Information

Further information about the IFoA’s Education strategy can be found on their website ([www.actuaries.org.uk](http://www.actuaries.org.uk)).
5 COURSE DESCRIPTIONS

The aims and summary of the courses are provided in this section.

5.1 Level 7 Courses

F77SA INTRODUCTION TO STATISTICAL SCIENCE A

Lecturer: J. Phillips

Aims: To provide an introduction to the statistical issues associated with the collection, description, and interpretation of data, and in addition, to introduce computer-based methods for graphically describing and summarising data.

Summary: The aim of statistical analysis is to provide insight by means of numbers. This process usually involves three stages:

1. collecting data,
2. describing and presenting data,
3. drawing conclusions from the data (inference).

In this course, we will (primarily) consider the statistical principles and techniques used in the first two stages in an analysis. There will be some discussion of inference at the end of the course.

Book:


Assessment: 2-hour final exam (70%), continuous assessment consisting of a class test (up to 20%) and a project (minimum 10%).
INTRODUCTION TO STATISTICAL SCIENCE B

Lecturer: J. Hansen

Aims: To develop simple probability models for data and understand important features of these models.

Summary: This course provides an introduction to the probability models for inference. The main topics covered are:

1. models for statistical inference: introduction to discrete probability models including sample spaces, probability functions, axioms of probability and consequences of the axioms;
2. conditional probability, Partition Theorem, Bayes' Theorem and independence;
3. special probability models for random experiments;
4. discrete random variables, expectation and variance.

Book: (useful, but not essential)

Assessment: 2-hour final exam (80%), two marked assignments (10% each).

F77PD PROFESSIONAL DEVELOPMENT PLANNING

Lecturer: J. Phillips

Aims: To introduce students to the actuarial, statistical and financial mathematics professions and to improve their career planning. To help students build up a range of skills that will prepare them to cope well at the job interview stage and beyond.

Summary:

1. An analysis of the opportunities available to Actuarial Science, Financial Mathematics and Statistical Modelling graduates;
2. Case studies of career paths taken by graduates in these subject areas;
3. Professional Development Planning and the graduate selection process;
4. Using computer methods to solve problems of the type found in industry;
5. Taking part in games that simulate the business environment.

Assessment: Continuous assessment: group project analysing a particular company, presentation, written assignments and two computer projects.
F17CC  
AN INTRODUCTION TO UNIVERSITY MATHEMATICS  
Lecturer: M. Lawson

**Aims:** To provide a bridge between school and university mathematics, with a particular emphasis on the central role of proofs in mathematics.

**Summary:** The conceptual aspects of mathematics – what is mathematics? What is an argument? Abstraction and Rules, Problem-solving and the need for checking covering:
1. Combinatorics
2. Complex numbers and polynomials
3. Matrices
4. Vectors

**Assessment:** 2-hour final exam (at least 70%), continuous assessment such as class tests or project work (up to 30%).

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F17CA  
CALCULUS A  
Lecturer: R. Szabo

**Aims:**
A course on differential calculus with applications of differentiation and an introduction to integral calculus. It is designed for students who will specialize in mathematics, actuarial mathematics or statistics. The module builds on what the students learned at school but provides a greater depth of study and introduces new material and concepts.

**Syllabus**
- Functions
- Limits of functions.
- Introduction to Differentiation.
- Inverse Functions.
- Advanced Differentiation: Parametric differentiation, implicit differentiation.
- Derivatives of inverse functions, Inverse Trig functions. Hyperbolic functions and hyperbolic equations, Derivatives for hyperbolic functions and inverse hyperbolic functions.
- Introduction to Integration.
- Sequences and Series.

**Contact Hours:** 3 lectures and 1 tutorial per week.

**Assessment:** up to 20% by class tests or other continuous assessment at least 80% by end of semester 2-hour exam.
Aims: This course builds on the differential and integral calculus introduced in Calculus A, before moving on to introduce the basics of mathematical modelling techniques using first and second order ordinary differential equations. The course develops integration methods such as integration by parts and reduction formulae and describes some applications of integration. Solution methods for first and second order differential equations are introduced and used to investigate various physical problems.

Syllabus:
- Applications of differentiation
- Advanced Integration
- Differential Equations
- Modelling through first order equations
- Modelling through second order equations
- Recurrence relations

Contact Hours: 3 lectures and 1 tutorial per week.

Assessment: up to 20% by class tests or other continuous assessment. 80% by end of course 2-hour exam.

C27IE INTRODUCTORY ECONOMICS Lecturer: TBA

Aims: To equip students with knowledge and understanding of the fundamental principles and concepts of microeconomics and macroeconomics. By the end of the course students should be able to apply their knowledge and understanding in the analysis of a range of economic problems. Students who perform well in this course may be recommended for exemption from subject CB2.

Assessment: Continuous assessment and a 2-hour exam.

C37FF FINANCE AND FINANCIAL REPORTING Lecturer: TBA

Aims: To provide a basic understanding of issues in corporate finance and cover the syllabus of subject CB1.

Summary:
1. Instruments used by companies to raise finance
2. Management of financial risk
3. Personal and corporate taxation
4. Interpretation of financial statements of companies and financial institutions

Assessment: Continuous assessment (30%) and a 2-hour exam (70%).
5.2 Level 8 Courses

F78PA PROBABILITY & STATISTICS A Lecturer: G. Gibson

Summary: The main topics covered in this course are:
1. Probability models: sample spaces, events, probability measures, axioms of probability and related results.
2. Random variables and their distributions.
3. Expectation, variance, and standard deviation of random variables.
4. Important random variables including Binomial, Geometric, Hypergeometric, Poisson, Uniform, Normal, Exponential, Gamma variables.
5. Conditional probability and independence including the chain rule, the partition rule and Bayes' Theorem.
6. Joint probability distributions, marginal and conditional distributions.
7. Independent random variables and sums of independent random variables, generating functions, the weak law of large numbers and the Central Limit Theorem.
8. Expectation of a function of random variables, covariance and correlation.

Prerequisites: F77SA and F77SB (or equivalent).

Books: Some helpful reference books include:
   R.P. Dobrow, Probability with Applications and R (Wiley, 2014);
   S. Ross, A First Course in Probability (details are already in the guide)
   T. Cacoullos, Exercises in Probability (Springer-Verlag,1989);
   Verzani, Using R for Introductory Statistics (Chapman and Hall, 2005);

Assessment: 2-hour end-of-semester examination (85%), continuous assessment(15%).
F78PB    PROBABILITY & STATISTICS B    Lecturer: J. Phillips

**Aims:** To reinforce basic ideas related to the description and analysis of data, and provide the basis for the application of statistical modelling, estimation, hypothesis testing and regression.

**Summary:** This course follows on from Probability and Statistics A. It develops the basic ideas used in statistical analysis and inference, with an emphasis on how we learn from data using both graphical techniques and statistical methodology based on probability theory. Topics presented include: analysis of simple data; construction of statistical models; sampling distributions and properties of estimators; method of moments and introduction to maximum likelihood estimation; inference for data from one population; comparisons of data from two populations; confidence intervals with samples from one or two populations; hypothesis testing; issues related to association between two variables; linear regression; statistical computing.

**Prerequisites:** F77SA and F77SB (or equivalent).

**Books:**

**Assessment:** 2-hour end-of-semester examination (80%), continuous assessment (20%).

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F78AA    ACTUARIAL & FINANCIAL MATHEMATICS A    Lecturer: P. Ridges

**Aims:** The aim of this course, along with F78AB, is to give students a thorough understanding of basic actuarial techniques. Exemptions from Subject CM1 may be recommended for candidates who score sufficiently well in F78AA, F78AB, F70LA, and F70LB.

**Summary:** In this course, you will learn how to deal with questions involving cashflows at discrete time points, and the accumulation and discounting of payments over discrete time intervals. Topics include:
1. interest rates and some actuarial notation,
2. loan schedules,
3. yields,
4. fixed interest securities,
5. discounted cash flows.

There are three lectures per week. Students attend weekly tutorials and three computer labs during the semester.

**Books:** Useful reference:

Alternative reference with additional exercises:

**Assessment:** 2-hour end-of-semester examination (80%), continuous assessment
Aims:
1. To introduce the continuous-time concept of cash flows and interest,
2. develop skills in applying continuous-time models to financial contracts and transactions,
3. model interest rates as random variables and apply those models,
4. introduce the principle of no-arbitrage and how to price financial contracts and construct the term-structure of interest rates assuming no-arbitrage,
5. value inflation-indexed cashflows.

Summary: This course builds on and extends the ideas contained in the related course F78AA. The concepts of a continuously-payable cashflow and the force of interest are considered. We incorporate inflationary increases into cashflows and value index-linked bonds. We see how interest-rate risk can be managed through the use of Redington's immunisation theory. As rates of return can be random, we see how to model them using random variables. Using the no-arbitrage principle, we price forward contracts. This leads on to a wider discussion of the term-structure of interest rates and the yield curve.

Books:

Assessment: 2-hour end-of-semester examination (85%) and continuous assessment (15%).

Aims: This is a Level 8 course in Linear Algebra aimed at students specializing in Mathematics, Statistics, or Actuarial Mathematics. The course aims to provide sufficient knowledge of matrix theory and of the solution of systems of linear equations for use in later courses in mathematics and statistics; to give an understanding of the basic concepts of linear algebra; and to develop the ability to solve problems and prove theorems involving these concepts.

Summary:
Euclidean space: Vector spaces $\mathbb{R}^2$, $\mathbb{R}^3$ and $\mathbb{R}^n$, Matrices, Basic matrix operations, Determinants.
Systems of linear equations: Gaussian elimination, Results on homogeneous and inhomogeneous systems, Matrix inversion.
Vector spaces: Definition and examples of vector spaces, Subspaces, Span, Linear independence, Bases and dimension.
Inner product spaces: Scalar or Inner products, Cauchy-Schwartz inequality, Orthogonality, Orthogonal projection, Orthonormal bases, Gram - Schmidt process, Vector products.
Linear transformations: Row and Column rank of a matrix, Applications to systems of equations, Range, Kernel, Rank and Nullity, Invertibility of linear transformations, Linear transformations and matrices.
Eigenvalues and eigenvectors: Calculation of Eigenvalues and Eigenvectors, Symmetric matrices, Diagonalisation of a matrix, Cayley Hamilton theorem, Iterates of matrices, applications to quadratic forms.

**Assessment:** 30% by class tests or other continuous assessment. 70% by end of course 2-hour exam.

**MULTIVARIABLE CALCULUS & REAL ANALYSIS A**

**F18CD**

**Lecturer:** A. Konechny

**Aims:** The course aims to provide an introduction to the calculus for functions of several variables, which will provide sufficient expertise for use in various later courses. The students will also develop their general skills in differentiation, integration and algebraic manipulation.

**Summary:**
Partial differentiation: Functions of several variables, partial derivatives and higher order partial derivatives. Matrix ‘total’ derivatives. The chain rule, implicit differentiation.
Applications of partial differentiation: Taylor expansions, tangent places, maxima and minima, Lagrange multipliers. The inverse function theorem (in 1 and 2-dimensions).
Applications of integration: Areas, volumes.
Integrals over infinite regions: The definition of the convergence of integrals of functions on unbounded intervals. Comparison tests and absolute convergence tests of integrals.
Sequences: Define a sequence of real numbers. Define bounded and convergent sequences, and the limit of a convergent sequence.

**Assessment:** Up to 30% by class tests or other continuous assessment. At least 70% by end of course 2-hour exam.
Aims:
The course aims to introduce students to the idea of rigorous mathematical arguments and, in particular, to discuss the rigorous foundations of calculus. An important feature of the course is the use of careful, rigorous proofs of the theorems used and one of the aims of the course is to improve student's ability to understand such arguments and to develop such proofs for themselves. A central concept in analysis is the idea of convergence, either of sequences, series or of functions, and this course aims to introduce this concept and provide the basic results which will be used in later courses. In addition, it will give methods of obtaining inequalities and approximations (with precise estimates of how good the approximations are), tests for convergence of series and power series and ways of identifying functions defined by power series and characterisations of functions (over bounded and unbounded intervals) for which the concept of area under the graph of a function makes sense.

Summary:
Sequences: Briefly recall the idea of a sequence of real numbers, and of bounded and convergent sequences.
Suprema and infima: Sup and inf of sets of real numbers. The completeness axiom for real numbers.
Monotone sequences: Monotone sequences and the monotone convergence theorem. Use of the monotone convergence theorem to prove convergence of sequences without knowing the limit.
Subsequences: Subsequences and the Bolzano-Weierstrass theorem.
First means value theorem: Statement and proof of the first mean value theorem, applications to inequalities.
nth mean value theorem: Statement and proof of the nth mean value theorem, applications to approximations.
Series and power series: Convergence of series, the comparison, ratio zero, absolute convergence and alternating series tests for series, radius of convergence of a power series properties of functions defined by power series, convergence of standard power series.
Riemann integration and convergence of integrals: Partitions, upper and lower sums, Riemann integrable functions.

Assessment: 15% by class tests or other continuous assessment. 85% by end of course 2-hour exam.
Aims:
When solving problems in science, engineering or economics, a real-life situation is first converted into a mathematical model. This is often called the formulation of the problem and it is given in terms of mathematical equations. Only a handful of model equations can be solved in a neat analytical form. Hence we need numerical analysis, comprising a set of techniques for finding approximate solutions of these equations. This course provides an introduction to very basic methods in numerical analysis both from a theoretical and a practical perspective. It also provides an introduction to programming the scientific computing package Matlab.

Syllabus:
- Solving general non-linear scalar equations
- Solving smooth non-linear scalar equations
- Analysis of orders of convergence for fixed point iteration
- Interpolation
- Numerical Integration
- Convergence of the numerical integration methods
- Numerical differentiation
- Computer arithmetics
- Basics of Matlab Programming
- Iteration techniques in Matlab
- Integration and differentiation in Matlab

3 lectures + 1 tutorial or lab session per week

Assessment: 30% by class tests or other continuous assessment
70% by end of module 2-hour exam
5.3 Level 9 Courses

F79MA    STATISTICAL MODELS A    Lecturer: M. Pereyra

Aims: To describe and compare the main approaches to statistical inference, including classical and Bayesian, and to develop students' skills in practical, computer-based estimation and inference. This course also aims to develop students' independent research skills, and their report writing skills.

Summary: This course will consist of a mixture of lectures, tutorials, and project work. First and second year courses have discussed how to draw conclusions from data, and introduced some basic methods in an informal way. In this course we take a more fundamental approach to estimation and quantifying the accuracy of estimates.

In lectures we introduce the principles of classical and Bayesian inference discussing their different philosophical bases, and comparing the different solutions that each method gives to various problems of inference. The properties and fundamental importance of the likelihood are described, along with some important results on the sampling properties of estimators. The course will emphasise worked examples and there will be project work based on the computer implementation of the theory taught in lectures and tutorials. The statistical computer package R will be used for the project work.

Prerequisites: F78PA and F78PB (or equivalent).

Books:


Assessment: 2-hour exam on the lecture material in December (60%) and project work (40%). This course is synoptically linked with F79MB.

F79MB    STATISTICAL MODELS B    Lecturer: D. Clancy

Aims: To develop students abilities in understanding and solving statistical problems, and to teach them how to choose appropriate techniques, analyse data and present results, especially in applications related to linear and generalised linear models.

Summary: The course will consist of a mixture of lectures and practical work. The first part of the course will focus on statistical modelling, including the selection of appropriate models, the analysis and interpretation of results, and diagnostics. Exploratory and graphical techniques will be considered, as well as more formal statistical procedures. Both parametric and nonparametric methods will be discussed, as will modern robust techniques. There will be considerable emphasis on examples, applications and case studies, especially for continuous response variables. Some theory of multiple linear regression in matrix notation will be presented. The course will go on to consider the theory and techniques for the analysis of categorical data,
including the use of generalised linear models (log-linear and logistic regression models). Practical applications will be emphasised throughout and computing facilities, especially R, will be used extensively.

**Prerequisites:** F78PA and F78PB (or equivalent).

**Books:** The following textbooks are recommended:
- A.J. Dobson, *An Introduction to Generalized Linear Models*, 2nd ed. (Chapman & Hall, 2002);
- J. Faraway, *Linear models with R* (Chapman & Hall, 2005);
- J. Faraway, *Extending the Linear Model with R: Generalized Linear, Mixed Effects and Nonparametric Regression Models* (Chapman & Hall/CRC, 2006);
- J. Verzani, *Using R for Introductory Statistics* (Chapman & Hall/CRC, 2005) (back-ground);

**Assessment:** Two practical assignments, to be handed in at specified times during the semester. This course is synoptically linked with F79MA.

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**F79PS STATISTICS FOR SOCIAL SCIENCE. Lecturer: J. Phillips**

**Aims:** To introduce students to the main classical statistical methods that are commonly applied in psychology and other social sciences and to give hands-on experience of using more advanced techniques for exploring multivariate data.

**Summary:** In social sciences, such as psychology, experiments and surveys typically yield large quantities of high-dimensional data (e.g. in the form of questionnaire responses) from which we wish to extract simpler underlying relationships, or evidence of differences in subgroups in a population. The course will give students a grounding in the most common classical statistical methods used in analysing psychological data, the correct interpretation of results, and the application of methods to real data sets using the computer package SPSS. Topics covered will include: confidence intervals, hypotheses testing, parametric and non-parametric statistical methods, analysis of variance (incorporating one-way designs, planned and unplanned comparisons, factorial designs and interactions), principal components analysis and the interpretation and use of factor analysis.

**Prerequisites:** F78PA and F78PB, or F78SC (or equivalent).

**Books:**
- Brace, Kemp & Snelgar, *SPSS for Psychologists*, 3rd ed. (Palgrave Macmillan, 2006);
- H. Coolican, *Research Methods and Statistics in Psychology* (Hodder & Stoughton, 1999);

**Assessment:** 2-hour exam in December (70%) and a computer test and project work (30%).
F79SP  STOCHASTIC PROCESSES  Lecturer: S. Foss

**Aims:** To introduce fundamental stochastic processes which are useful in insurance, investment and stochastic modelling, and to develop techniques and methods for simulation and the analysis of the long term behaviour of these processes.

**Summary:** In this course, we develop methods for modelling systems or quantities which change randomly with time. Specifically, the evolution of a system is described by a collection \{X_t\} of random variables, where \(X_t\) denotes the state of the system at time \(t\).

Discrete-time processes studied include Markov chains. In particular, we consider branching processes, random walk processes, and more general countable state-space chains. Continuous-time processes studied include point processes, Poisson and compound Poisson processes; continuous time Markov processes; population, queueing and risk models.

**Prerequisites:** F78PA and F78PB (or equivalent).

**Books:** Useful reference books are
- P. Bremaud, An Introduction to Probabilistic Modeling, (Springer, 1997);
- Grimmett & Stirzaker, Probability and Random Processes, 3rd ed. (OUP, 2001);
- Grinstead & Snell, Introduction to Probability, (Amer. Math. Soc., 1997);

**Assessment:** 2-hour exam (80%) at the end of the 1st semester, project work (20%).
This course is synoptically linked to F79SU on all degrees except FM.

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F79BI  BAYESIAN INference & COMPUTATIONAL METHODS  Lecturer: G.J. Gibson,
G.Streftaris

**Aims:** To provide students with a knowledge of modern Bayesian statistical inference, an understanding of the theory and application of stochastic simulation methods including MCMC, and experience of implementing the Bayesian approach in practical situations.

**Summary:** The course will review subjective and frequentist probability, the role of likelihood as a basis for inference, and give a comparative treatment of Bayesian and frequentist approaches. The key concepts in practical Bayesian statistics will be covered including: likelihood formulation; the incorporation of prior knowledge or ignorance in the prior; the interpretation of the posterior distribution as the totality of knowledge and its use in prediction. Methods for assessing the goodness-of-fit of models in the Bayesian context will be considered. A range of stochastic simulation methods for investigating posterior distributions will be considered. Methods will include rejection sampling, and Markov chain methods such as the Metropolis-Hastings algorithm and the Gibbs sampler. The use of stochastic methods for inference for
partially observed processes will be discussed and students will gain experience of implementing methods in computer laboratory sessions.

**Prerequisites:** F78PA and F78PB (or equivalent).

**Books:**
- (useful) P.H. Garthwaite et al, Statistical Inference, 2nd ed. (Oxford Sc. Publ., 2002);
- W. M. Bolstad, Introduction to Bayesian statistics (John Wiley, 2007)
- S. M. Ross, A course in simulation (Macmillan, 1990)

**Assessment:** 2-hour exam (70%) and practical assignments (15% each).

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**PORTFOLIO THEORY & ASSET MODELS**

Lecturer: G. Peters

**F79PA**

**Aims:** To introduce asset pricing and portfolio selection models. This course covers the first third of the material in Subject CM2 of the Institute and Faculty of Actuaries examinations. Summary: This course covers the following topics:
- Utility theory,
- Stochastic dominance
- Measures of investment risk,
- Mean-variance portfolio theory,
- Models of asset returns,
- Behavioural economics, and
- Efficient markets hypothesis.

Students are expected to understand the basic mathematical skills of decision theory and apply them to various stochastic problems.

**Prerequisites:** F78PA and F78AB (or equivalent).

**Books:**
- (Main reference) Joshi & Paterson, Introduction to Mathematical Portfolio Theory, 1st ed. (CUP);
- Brown, Elton, Goetzman & Gruber, Modern Portfolio Theory and Investment Analysis, 9th ed. (Wiley, older editions are adequate).

**Assessment:** 2-hour exam (80%) at the end of the 1st semester, two assignments during semester each worth (10%). This course is synoptically linked to F79DF on all degrees except SM.
Aims: This course introduces students to derivatives, their use in financial markets and how they are priced and hedged in discrete time. It introduces the relationship between financial markets and stochastic analysis.

Summary: The course introduces the idea of derivative securities and why they exist, explaining the role of forward and option contracts in risk management, and discusses various investment strategies involving derivatives. The concept of arbitrage-free pricing (cash-and-carry pricing) is explained and developed into the fundamental theorem of asset pricing in discrete time. Pricing on the binomial tree (the CRR model) is explained, for both European- and American-style derivatives.

The course involves coding tasks that contribute 30% of the assessment. Competence in R is assumed.

This course covers some of the material in Subject CM2 of the Institute and Faculty of Actuaries examinations.

Prerequisites: F78PA and F78AB (or equivalent).

Books: Recommended texts are:
   A. Chatterjea & R.A. Jarrow, An Introduction to Derivative Securities, Financial Markets and Risk Management (W.W. Norton, 2013);

Assessment: 2-hour end-of-semester exam (70%), continuous assessment (30%). This course is synoptically linked to F79PA on all degrees except SM.
Aims:
1. To understand the use of mathematical models of mortality, illness and other life-history events in the study of processes of actuarial interest.
2. To be able to estimate the parameters in these models, mainly by maximum likelihood.
3. To describe and apply methods of smoothing rates of mortality and other actuarial statistics based on observed data.

Summary:
1. Estimation procedures for lifetime distributions: Kaplan-Meier estimate of the survival function, the Nelson-Aalen estimate of the cumulative hazard function and estimation for the Cox model for proportional hazards.
2. Statistical models for transfers between multiple states (e.g., alive, ill, dead), relationships between probabilities of transfer and transition intensities, and estimation for the parameters in these models.
5. Computing facilities, especially R, will be used extensively and this work will be assessed by practical assignments.

Prerequisites: F78PB (or equivalent).

Book:
I.D. Currie, Survival Models (Heriot-Watt University notes, supplied by the department).

Assessment: 2 hour exam (60%), project work (40%). This course is synoptically linked to F79SP (except on the FM degree).
5.4 Level 10 and 11 Courses

F70TS  TIME SERIES  Lecturer: F. Daly

Aims: To introduce many of the fundamental concepts required for modelling and forecasting time series data.

Summary: A time series is a set of data consisting of observations made one after another in time. The analysis of time series data is an area of practical importance in finance, business, economics, industry, medicine, life and physical sciences and many other fields.

The course begins with real data, and some descriptive methods for identifying, and removing if appropriate, trend and seasonal effects. We consider moving averages and exponential smoothing, along with other approaches. This leads into the important concepts of stationarity and autocorrelation.

The main body of the course consists of modelling the stochastic mechanism which gives rise to an observed series, and then using model-based forecasting procedures to predict future values of the series.

The models we consider are autoregressive moving average (ARMA) processes, and autoregressive integrated moving average (ARIMA) processes. Various methods of parameter estimation are considered, including the method of moments, least-squares, conditional least-squares, and maximum likelihood. We then perform residual analysis, and consider over-fitting and the principle of parsimony. The course ends with consideration of various forecasting methods.

Although the approach is mainly orientated to utilising time-dependence, we also consider the frequency aspects of series and study the periodogram and the spectral density. We relate the two approaches.

We will also present a short introduction to some topics in machine learning.

Prerequisites: F78PA and F78PB (or equivalent).

Books: Useful references are

- C. Chatfield, The Analysis of Time Series (Chapman Hall);
- P. Diggle, Time Series (OUP);
- P. Cowpertwait and A. Metcalfe, Introductory Time Series with R (Springer).

Assessment: 2-hour exam (80%) and project work (20%).
Aims: To extend the coverage of life assurance mathematics in F78AB to include some of the material for Subject CM1 of the Institute and Faculty of Actuaries examinations.

Summary: By combining the mathematics of finance and the mortality table, we can develop the functions necessary to value a wide range of benefits which may be payable on death or survival. Some of the functions will be clear extensions of those previously encountered, while others will be new. Such benefits are often provided by insurance policies. The course will study some of the essential calculations made by insurance companies in valuing their contracts and calculating premiums. You will learn how to deal with questions involving:

- selection and select life tables,
- actuarial functions using select life tables,
- with profits policies,
- net premiums and gross premiums,
- expenses and bonuses,
- net and gross premium policy values.

There will be three lectures, one tutorial per week. Also one computer lab (Microsoft Excel) in some weeks.

Prerequisites: F78AA and F78AB (or equivalent).

Books:

- Formulae and Tables for Actuarial Examinations – ESSENTIAL
- Dickson, Hardy & Waters, Actuarial Mathematics for Life Contingent Risks (CUP, 2009). An electronic version of this book is available in PDF format online. (F70LA covers material in the first seven chapters.)

Assessment: 2-hour exam (70%) at the end of the 1st semester and an Excel-based assignment (30%). This course is synoptically linked with F70LB.
F70LB       LIFE INSURANCE MATHEMATICS B      Lecturer: A.E. Sneddon

Aims: To extend the coverage of life assurance mathematics in F70LA to include further material for Subject CM1 of the Institute and Faculty of Actuaries examinations. Summary: In this course, you will learn how to deal with questions involving:

   Thiele's differential equation,
   Markov multiple-state models,
   risk reserves,
   insurances written on multiple lives,
   the features of disability and long-term care insurance contracts,
   heterogeneity and selection,
   single-figure indices,
   profit testing conventional and unit-linked insurance contracts.

There will be three lectures and one tutorial per week. Also one computer lab (Microsoft Excel) in some weeks.

Prerequisites & books: See F70LA.

Assessment: 2-hour exam (80%) at the end of the 2nd semester and an Excel-based assignment (20%). This course is synoptically linked with F70LA.

F70CF       CONTINUOUS-TIME FINANCE       Lecturer: T. Kleinow

Aims: This course develops the theory and practice of financial derivatives pricing in continuous time, following on from the course F79DF Derivatives Markets and Discrete-Time Finance.

Summary:

1. Theory of martingales in continuous time, Brownian motion, and its properties, stochastic integration, stochastic differential equations and Ito's formula, Girsanov's theorem and the Martingale Representation Theorem.

2. The Black-Scholes model, derivatives pricing using the martingale and PDE approaches, extensions to foreign currencies and dividend-paying stocks.

3. Portfolio risk management.

4. Interest rate models, and credit risk models.

5. Other models of security prices.

There will be weekly tutorial sessions, starting in the second week of term.

Prerequisites: F79SP and F79DF (or equivalent).

Books:

   M. Baxter & A. Rennie, Financial Calculus (CUP, 1996); R. Durrett, Stochastic Calculus (CRC Press);
   J. Hull, Options, Futures and Other Derivative Securities, 3rd/4th ed. (Prentice Hall, 1996);
   B. Oksendal, Stochastic Differential Equations (Springer, 1998); D. Williams, Probability with Martingales (CUP, 1997).

Assessment: 2-hour exam end of the 1st semester (90%) and coursework (10%).
**F70PE PENSIONS**  
Lecturer: A.E. Sneddon

**Aims:** To introduce fundamental practical and technical issues in the actuarial management of UK occupational pension schemes.

**Summary:** The foundations of actuarial mathematics have been covered in 2nd and 3rd year courses. This course takes some of that work and places it in a practical context.

A pension scheme is an arrangement whereby an employer invests money for the benefit of its employees and their dependents after they retire or on death before retirement. Some obvious questions arising are:

- What level of benefit is reasonable?
- How should the cost of the benefits to the employer be spread out? How should the fund be invested?
- How can the actuary be certain that the scheme will not run out of money, even if the employer does?

The course will discuss benefit design - that is, exactly what benefits could be offered. We will discuss how the actuary can assess the cost of the benefits, including how she/he might choose the interest, inflation, salary and service table assumptions necessary. We will discuss investment principles and practice for pension schemes, and we will cover briefly the tax and legislation issues relevant to UK pension schemes.

While some of the work will be technical in nature, we will also consider some more general issues surrounding pension schemes, including monitoring pensions issues currently in the news. Students will be expected to read the financial press regularly and will be required to give a short presentation to the class on a particular current issue. Most technical actuarial work involves computers and this course will include regular computer laboratory sessions.

**Prerequisites:** F70LA and F70LB (or equivalent).

**Assessment:** This course and F70LP will be examined together in a 3-hour exam (80%) at the end of the 2nd semester. Both courses will have an assessed project (10% each).
F70LP  LIFE OFFICE PRACTICE  Lecturer: A. Macdonald

**Aims:** The aim of this course is to introduce students to the practical issues arising in life insurance and the management of a life insurance company.

**Summary:** The course covers modern life office practice, e.g. types of policy and the risks to which an office is exposed in writing them (conventional and unitised with-profits, non-profit, unit-linked), premiums, actuarial bases (for premiums, experience and valuation), bonus systems for distributing profits, solvency, nature and valuation of assets and liabilities, and asset shares. More advanced topics are also covered, including stochastic modelling, hedging/matching, reserving requirements, capital requirements, orphan assets, financial strength, and guarantees. The course will involve practical work, tutorial and project work. Most technical actuarial work involves computers and this course will include regular computer laboratory sessions.

**Prerequisites:** F70LA and F70LB (or equivalent).

**Assessment:** This course and F70PE will be examined together in a 3-hour exam (80%) at the end of the 2nd semester. Both courses will have an assessed project (10% each).

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F70DP  ADVANCED DERIVATIVE PRICING  Lecturer: T.C. Johnson

**Aims:** The aim of this course is to introduce students to advanced and practical topics in derivative markets, which are essential preparation for a career in the financial industry. This course is available only to students on the BSc in Financial Mathematics.

**Summary:** The material develops ideas from F70CF and F79DF. The course begins with a review of some of the key concepts in stochastic calculus. It then moves on to applying these to the question of stochastic volatility, in pricing exotic options and in the interest rate markets. Numerical techniques for practical application of the theory are also covered. The course finishes with a discussion of structured products and synthetic securities and associated risk management issues.

**Prerequisites:** F79SP and F79DF (or equivalent).

**Books:**

- M. Joshi, The Concepts and Practice of Mathematical Finance (CUP, 2003); J.C. Hull, Options, Futures and Other Derivatives, 8th ed. (Prentice Hall, 2011);

**Assessment:** 2-hour exam (75%) and project work (25%).
F70RT  RISK THEORY  Lecturer: V. Shneer

Aims: To introduce and apply the statistical techniques used in the analysis of insurance processes, in particular for the assessment of premiums for short term insurance contracts, for reserving, and for assessing and managing solvency risk.

Summary: We look at some mathematical/statistical models and techniques which are useful in insurance, particularly short term insurance (for example motor, household, employers' liability).

We look at how to find the compound distribution of aggregate claims by combining the frequency of claims with the distribution of the amounts paid out on individual claims; we will consider how this might be used to set a premium, and how the insurers insure themselves through reinsurance.

We then study aspects of experience rating, which is a method of setting a premium for a policy which is affected by the claims history of that policy. We look at No Claims Discount systems.

The final four topics covered are:
1. ruin theory (we consider a stochastic model for the reserves of a general insurer and examine the probability that the reserves fall below zero);
2. run-off triangles (we study methods used to determine appropriate reserves for general insurance);
3. the use of copulas and extreme value theory;
4. simulation.

Prerequisites: F79MA(or equivalent).

Assessment: 2-hour exam at the end of the 2nd semester (85%), project work (15%).

F10MM  OPTIMISATION  Lecturer: D. Breit

Aims:
To present different methods of solving optimisation problems in the areas of linear and nonlinear programming, and classical calculus of variations. In addition, there will be an introduction to numerical methods.

Summary: The syllabus is as follows:
1. Introduction: simplified examples of common real world situations leading to optimisation problems.
2. Linear programming (optimisation of linear functions subject to linear constraints): basic theory, simplex method, duality, practical techniques.
5. Variational problems: Euler-Lagrange equation, boundary conditions constraints.
Prerequisites: F18CD and F18CF.

Books: The course is based on the following book:

Assessment: 2-hour exam at the end of the 1st semester.

F71CM  CREDIT RISK MODELLING  Lecturer: M. Fahrenwaldt

Aims: To introduce students to quantitative models for measuring and managing credit risk; to provide students with an understanding of the credit risk methodology used in the financial industry and the regulatory framework in which the credit risk models operate.

Summary: Topics covered include:
1. Introduction to credit risk: credit-risky instruments, defaults, ratings.
2. Merton's model of the default of a firm.
3. Common industry models (KMV, CreditMetrics, CreditRisk+).
4. Modelling dependence between defaults with factor models.
5. Mixture models of default.
6. The Basel II regulatory capital formula.
7. Calculating the portfolio credit loss distribution.
8. Calibration and statistical inference for credit risk models.

Books:

Assessment: 2-hour exam

F20ML  STATISTICAL MACHINE LEARNING  Lecturer: TBC

Aims: To provide students with an in-depth introduction to data mining and machine learning and to the mathematics underpinning these techniques. Topics will include generative and discriminative approaches, classification, clustering, regression, and supervised and unsupervised learning. Students will develop practical experience by using the WEKA software to apply a range of machine learning algorithms to benchmark datasets.

Summary:
Basic Concepts: classification, clustering, regression, supervised and unsupervised learning.

Generative Models: probabilistic graphical models; cluster analysis (k-means, expectation-maximisation, mixture models, hierarchical models); regression analysis.
Discriminative Learning: Instance-based learning and decision tree learning; artificial neural networks (perceptron, MLPs, back propagation, introduction to deep learning architectures); maximum entropy models; support vector machines; ensemble learning (bagging, boosting, stacking, random forests).

**Assessment:** 2-hour exam at the end of the 2nd semester (60%), project work (40%).

**F71TT Risk Management: Techniques and Tools**

**Lecturer:** A. Cairns

**Aims:** The aims of this course are:
- To equip students with a variety of tools to tackle problems involving univariate financial time series
- To provide a good grounding in the best practice of risk management within an organisation
- To understand economic measures of capital and capital allocation
- To have a thorough understanding of operational risk in its various forms
- To identify and measure risks and then to take actions to mitigate risks and exploit risky opportunities through good risk management strategies.

**Summary:** Topics covered include:
- Operational risk management
- Banking and insurance regulatory systems
- Risk management governance and culture
- ERM frameworks and assessment
- Risk appetite and risk tolerance
- Economic capital and capital allocation
- Credit risk management
- Modelling and assessment of market risk
- Market risk management
- Interest rate risk management
- How risks and risky opportunities affect the selection of strategy
- Advantages and disadvantages of different approaches to risk reduction; e.g., costs and benefits; information asymmetry; transparency; liquidity; basis risk; moral hazard
- Optimising risks and opportunities relative to the Board’s declared risk appetite and risk tolerances
- Case studies: examples of past disasters and examples of good practice

**Prerequisites:** None.

**Assessment:** 2-hour exam (80%) and coursework (20%).
Actuarial Mathematics and Statistics: Code of Practice

What you can expect from AMS Staff
Teaching is one of the most important duties for AMS staff. Although academic staff have research and administrative duties which also need our attention, we aim to provide:

- Commitment to helping you learn
- Politeness and respect
- Availability for face-to-face meetings, either during scheduled office hours or at pre-arranged times
- Timely feedback and marks for coursework
- A prompt response from your mentor
- A timely reply to general email questions
- An opportunity to see your exam script to see where you went wrong, either at scheduled feedback sessions or by applying at the School Office to see your script. 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 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.

If you have a problem...

For personal problems or any other problem that is interfering with your studying, please discuss it with your personal tutor. We are here to help. You can also discuss any personal problems with the staff in the Student Support Office.

For problems about a course, talk to the lecturer first. If that doesn't help, you can raise the matter with your Class Rep. or the Year Co-ordinator.
What staff can expect from AMS 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 and proactive. We understand that you may have other demands on your time, but as full-time students, your studies should come first. In addition, we expect:

- Commitment to your learning
- Politeness and respect, including switching off phones and other social media during classes.
- Attendance at classes. During the semester it is your responsibility to be available on campus to attend classes and in particular class tests.
- Preparation for classes as specified by your lecturers, such as studying lecture notes, working on tutorial questions and participating in online activities. For every hour of timetabled class, we expect you to spend 2-3 hours in private study.
- Persistance. Some topics and problems in mathematics are challenging and we expect you to make a sustained effort to master difficult topics. We are there to help you if you get stuck.
- 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.
- Attendance at any scheduled meeting with a staff member. If you can’t make a scheduled meeting with a staff member, please notify them in advance rather than just not turning up.
- Checking your email and logging into VISION at least every other day.
- A timely reply to email from staff.
- Willingness to learn from feedback on tutorial work, projects and exams, and an attempt to improve your work based on that feedback.
- Finally, we encourage you to keep yourself informed about new and interesting developments in your discipline (beyond what you learn in your courses). The department is full of experts in a wide range of areas who are happy to chat with you about topics of current interest. Seek them out!
STUDENT GUIDE TO PLAGIARISM

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

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1 The author acknowledges the following sources of information used in preparing this guide to Plagiarism:

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:

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

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

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

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

1.7.1. **Example 1: A Clear Case of Plagiarism**

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

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

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

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

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

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

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

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\(^2\) Extract from ‘Plagiarism at the University of Essex’ advice copyrighted and published by the Learning, Teaching and Quality Unit at the University of Essex (http://www.essex.ac.uk/plagiarism/reasons.html), reproduced with kind permission.
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 mentor, course leader or other appropriate member of academic staff. There are also many reference sources available in the University Library which will provide useful guidance on referencing styles.

**Managing Plagiarism**

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

*How you can ensure that you avoid plagiarism in your work:*  
- Take responsibility for applying the above principles of best practice and integrity within all of your work  
- Be aware that your written work will be checked for plagiarism and that all incidents of plagiarism, if found, are likely to result in severe disciplinary action by the University. The standard penalty is to annul all assessments taken in the same diet of examinations (for details please refer to Regulation 50 at [https://www.hw.ac.uk/documents/HWU-Regulations-WEB.pdf](https://www.hw.ac.uk/documents/HWU-Regulations-WEB.pdf) and to the Guidelines for Staff and Students on Discipline at [http://www.hw.ac.uk/students/studies/record/discipline.htm](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.
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.

Please note that the following sections are standard sources of information provided to all students. However, certain aspects are programme-specific and you should refer to Part A where directed. 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 you check the most recent version of the handbook for up-to-date information.

B1. Our Values

At Heriot-Watt, we have an established set of values that help us to nurture innovation and leadership and show our commitment to continuous development in all our activities. They are:

- **Belong** to a diverse, inclusive and international community working together across boundaries and cultures
- **Inspire** curiosity to learn and find solutions that transform lives
- **Collaborate** by working in partnership to shape the future whilst taking responsibility for our own actions
- **Celebrate** excellence and take pride in the achievements of our students, staff and alumni

Find out more about the Heriot-Watt values [https://strategy2025.hw.ac.uk/our-new-values/](https://strategy2025.hw.ac.uk/our-new-values/) and what they mean to us.

B2. Student Partnership Agreement

Heriot Watt University and the Heriot Watt University Student Representative Bodies work in partnership to develop a Student Partnership Agreement (SPA) each year. The Agreement identifies the main, agreed priorities for working in partnership each academic year and outlines an associated action plan.

Heriot-Watt University has a long and proud tradition of student engagement in institutional governance and decision-making and the Student Partnership Agreement sets out our ambition to continue to work in partnership across all of our campus locations, with the aim of increasing engagement with the institution, enhancing the student experience and engendering a sense of belonging to the University community.
B3. University Policies and Support Services

Heriot-Watt University has a detailed set of rules that 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 student must adhere to for all academic matters. Wherever practicable, University policy is designed to include all members of the University’s community, both within and outwith the main campus environments.

Read more about the University Policies, Ordinances and Regulations.

As part of your University enrolment, you signed the Student Declaration and agreed to abide by the regulations of the University and conform to its policies, procedures, ordinances and regulations that underpin the Ordinances and Regulations. During your time at Heriot-Watt, the following policies, procedures, reference information and support services may be relevant and useful guidance for you.

B4. Your Student Portal

The Student Portal brings together your services and relevant information in one place. Below is a summary of the services available to you via the portal:

- **Office 365 suite:** through single sign-on, all of your Office 365 services will be accessible through the Portal.
- **Library:** whether you want to search for books or view your loans & reservations, the Portal allows you to do this on your phone or desktop.
- **Vision:** your Portal will present you with announcements and tasks related to your course.
- **Student Information:** all university-level regulations and policies relating to your studies can be found on the Portal.
- **Campus and School News:** the Portal enables the University to promote events and experiences which will help you develop your skills.
- **Personalised:** You can hide, add and move tiles on your dashboard.
- **AskHWU:** You can find everything you need to help you navigate your time at HWU though the new AskHWU search tile. Ask questions of the University and enquire directly with members of staff to get information about exams, enrolment, careers, wellbeing services and much more.
- **Appointments:** Book Careers & Wellbeing appointments through your student portal
- **Need to speak to someone at the Student Service Centre? Use our app to join a queue to talk to our counter staff.

You can access your student portal here.
B5. Quick Finder Guide to Academic and Support Services

The following provides a guide to the academic and support services available to you during your studies which are arranged alphabetically under four heading:

- Learning and Teaching
- Our Community
- Supporting Success
- Developing Your Skills

Clicking on the subject heading allows you to find relevant information on the student web pages. Please make sure that you check myHWU the Student Portal, and the University web pages throughout the year for the most up-to-date information.

### Learning & Teaching

**Academic Appeals**

An academic appeal is a formal request by a student for the review of a decision made by the University on the student’s progression, assessment or academic award. There are valid and invalid grounds for an appeal. Appeals cannot be made on the basis of academic judgment (for example, thinking that your work deserves a higher grade). You are strongly advised to seek advice before starting an appeal, and to try and seek an informal resolution before making a formal appeal.

**Assessment**

Assessment is an essential part of learning at university. Make sure you are aware of the guidelines and regulations around University assessment.

**Assessment Feedback**

Heriot-Watt University aims to support students in becoming confident, independent learners; feedback is a key part of the student learning experience, as it is designed to help students to learn and improve. It’s also important to know what to do with the feedback when you receive it.

**Assessment Results:**

Once your course results have been released, you will automatically be sent an email (to your Heriot-Watt email address) to inform you that new assessment results are available online to view/download via the Student Self-Service (SSS).
Examinations & Examination Diets

There are three examination diets (assessment periods): December, Spring and the Resit Diet in the Summer.

Exam Conduct and Identity Checks

Make sure you know what is required and permitted within each of your exams and understand the University exam conduct.

Exam Timetables

Information on the exam timetable and when it will be available. Please note that exam timetables are subject to change so check regularly – we recommend checking the morning of each exam for any adjustments.

Exit Awards

You will receive an award if you successfully complete your programme of study, however, if you leave the University part way through your programme, you may still have met the required criteria for receiving a Certificate of Higher Education, a Diploma of Higher Education or an Ordinary/Bachelors Degree as an exit award (see also intermediate awards).

External Examiners Information

External Examiners ensure that students are judged fairly according to academic standards. In addition, they ensure that that the processes for assessment, examination and determination of awards are sound and fairly operated.

Heriot-Watt Assessment & Progression System (HAPS)

The Heriot-Watt Assessment and Progression System (HAPS) specifies the key assessment rules to be followed in taught programmes of study.

Intermediate Awards
Certificates given before your final award are known as intermediate awards. Certificates for intermediate awards are not issued automatically when you have obtained sufficient credits.

Learning and Teaching Matters

Across our campuses and global community of students, we are promoting learning and teaching with a series of key messages to provide you with advice and information at crucial points during your Heriot-Watt experience.

Periods of Study

Refer to the regulation(s) that are appropriate for your level of study. These regulations will explain the maximum time allowed to complete a degree and the circumstances where this may be extended.

Plagiarism

Plagiarism is the act of taking the ideas, writings or inventions of another person and using these as if they were your own, whether intentionally or not. Here you can find out more about plagiarism, how the University responds to it and guidance on how to avoid plagiarism in your academic work.

Reassessment

If you fail an assessment during the first or second semester of an academic year, then you will have to sit a reassessment for that course before being able to progress. This page contains information on reassessment procedures, how to register and pay for reassessments on your campus, reassessment diet dates, and information about additional reassessment opportunities.

Requirements for Awards

Refer to the regulation(s) that are appropriate for your level of study. These regulations explain the number of credits required to receive an award from the University.

Recognition of Prior Learning & Credit Transfer

If you have previously been in higher education, have passed courses or have academically relevant professional experience, then this could count as credit...
towards your Heriot-Watt degree. In the linked page, scroll down to ‘Recognition of Prior Learning & Credit Transfer to view the policy and procedures relating to this, as well as other information.

**Submission of Coursework Policy**

You will have a set submission deadline for each piece of coursework. This policy explains how the deadline works.

**Teaching Timetables**

Use the link above to find out when and where your lectures, tutorials, or labs will be taking place on your campus.

**Use of Calculators in Examinations**

Refer to the link above to find out when you can use a calculator in an examination, and what kind of calculators are permitted.

**Use of Dictionaries in Examinations**

Dictionaries are generally not permitted in exams. However, the following link details the exceptions and circumstances when a dictionary may be permitted.

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**Our Community**

**Alumni**

Information on the opportunities available to students after they graduate from Heriot-Watt. These include membership of The Watt Club (Heriot-Watt’s alumni association), how to network and connect with other alumni, and how alumni can give back to the University after they have left.

**Accommodation**

Information about student accommodation at each of our campuses
Accommodation (Dubai Campus)
Accommodation (Edinburgh Campus)
Accommodation (Malaysia Campus)
Accommodation (Scottish Borders Campus)
Accommodation (Orkney Campus)

Faith and Belief

Heriot-Watt University respects religious and cultural diversity and aims to support individuals in their religious and cultural observance.

Faith and Belief: Edinburgh Campus
Faith and Belief: Scottish Borders Campus
Faith and Belief: Orkney Campus
Faith and Belief: Dubai Campus
Faith and Belief: Malaysia Campus

Sport and Exercise

Opportunities for a range of sport and exercise activities are available at all our campuses

Sport and Exercise: Edinburgh Campus
Sport and Exercise: Scottish Borders Campus
Sport and Exercise: Orkney Campus
Sport and Exercise: Dubai Campus
Sport and Exercise: Malaysia Campus

Student Representation

All students have representative bodies for their campus who will also oversee clubs and societies and organise events for students.

Heriot-Watt University Student Union (Edinburgh, Orkney and Scottish Borders Campuses)
All Heriot-Watt students at Scottish campuses are a member of the Student Union. In addition to the wide range of societies, the Student Union offers volunteering opportunities for students to get involved in and make friends and connections during their time at university. The Union regularly hold events and host campaigns for good causes. The Student Union can also provide advice and support for all Heriot-Watt students via the Advice Hub.

Heriot-Watt University Dubai Student Council is the primary representative body for all students at Dubai campus. Further details can be found on the Student Council’s Facebook page.

Heriot-Watt University Malaysia Student Association represents students at Malaysia campus, manages clubs, implements welfare projects and organises events for students.

Supporting Success

Academic Registry

Academic registry is part of the professional services and covers information on Registry Operations and Academic Quality. Registry operations can help with student enrolment, examinations and assessment, graduation and timetabling. The academic quality service provide support on a number of policies across the University.

Amendment to Enrolment

Amendments can be made to a student’s enrolment at any point during their studies. This can include Temporary Suspension of Studies, extension of study period or amendment to study level or method.

Assistive Technology
We have a variety of assistive technology available at Heriot-Watt University. Our Technology Assistant is here to help you with the enabling technology that we have and can assist you with any queries or support needs.

**Assistive Technology at Edinburgh Campus**

**Assistive Technology at Scottish Borders Campus**

**Assistive Technology at Orkney Campus**

**Assistive Technology at Dubai Campus**

**Attendance and Absence**

It is extremely important that you keep the University informed if you are unable to attend classes. Absence may affect your academic progress, so you should discuss with your personal tutor whether you may need to temporarily suspend your studies or apply for Mitigating Circumstances. If you are unable to attend an exam or complete an assessment due to an unforeseen absence beyond your control, such as significant illness, you will need to make an application for consideration of Mitigating Circumstances in writing with supporting evidence.

**Big White Wall**

Big White Wall is an online support resource 24 hours a day every day which you can sign up to with your university email address then choose an anonymous username for your time on Big White Wall. You can use Big White Wall for help with a wide range of mental health and wellbeing issues.

**Care Experienced Students**

We recognise that individuals with care experience are under-represented in higher education and are committed to offering support for these applicants to study at Heriot-Watt. We can provide access to the advice, guidance, financial support and accommodation required to allow those with care experience the opportunity to succeed at university. We offer a named point of contact and support within the University, from pre-entry advice through to support during your time at the University.

**Caring Responsibilities**

Heriot-Watt University is committed to supporting students who are carers. A carer is anyone who cares, unpaid, for a friend or family member who due to illness, disability, a mental health problem or an addiction cannot cope without their support.
Change of Address

For legal, academic and administrative purposes it is very important that the information the University holds about you is correct and up to date, including your address details. You can check and amend your personal information by logging in to Student Self Service.

Childcare

There is a nursery based at Edinburgh campus run by an independent company called Pinocchio's. At Scottish Borders campus the Osito Nursery is near the campus and provides childcare for children aged between four weeks to eight years old. You are advised to ensure that any nursery or childminder you use is registered with the Care Commission. Information about childcare provision in your area is available from the Scottish Family Information Service. You may be eligible for help with childcare fees through the Childcare Fund. Students wishing to apply must be home students who are fulltime, undergraduate and eligible for student loan support. Students must have applied for the maximum student loan available.

Complaints

If for any reason you are unhappy with action taken (or not taken) by the University, or by the standard of service you have received, you may be able to make a formal complaint using the University’s Complaints Procedure.

Counselling

Being a student can be a very positive experience but there are also many challenges to deal with such as being away from home, being in a new country, exam pressures and building new relationships with friends. If you are worried about any issue or are thinking about dropping out of University we can offer you counselling, support, and information to help you deal with the difficulties you may face. It may be that you only need one appointment but can attend more if you wish.

Data Protection

Information about how the University uses and protects data.

Disability Support

The Disability Service can provide support and advice for students with a range of disabilities. It is important that you inform us if you have a disability so the
appropriate support can be arranged and you may be eligible for additional funding from the Disabled Students Allowance.

**Discipline**

The University can take action against any student if they have committed an academic offence (such as plagiarism, collusion or cheating in an exam) or a non-academic offense such as improper use of, or damage to, university property, or unacceptable behaviour.

**Discretionary Credit** (Please refer to the appropriate Regulation[s] for your level of study.)

A student who has not achieved the minimum number of credit points necessary to qualify for consideration of an award or the minimum number of credit points to progress from one stage to another may be awarded the requisite credit points at the discretion of the Award Board or Progression Board, as appropriate.

**Email**

Make sure you keep checking your Heriot-Watt email at least every day and use it if you need to contact the University. Sometimes mail from personal e-mail addresses is blocked by the University’s IT systems, so use your Heriot-Watt e-mail to be sure your message gets through to us.

**Enrolment**

Enrolment is the formal process of becoming a student of the University, agreeing to abide by its rules and accepting any liability for fees or other costs associated with your studies. All new and continuing students must be enrolled while studying at Heriot Watt University. The enrolment process must be completed online at the start of each new academic year.

**Equality and Diversity**

As well as meeting our legal requirements we make sure that people across the University Community understand how they contribute to a Culture of Inclusion for All. This holistic approach helps us maintain an open and accessible working, living and learning environment where all are supported to reach their full potential.
Erasmus+

Erasmus+ enables you to study or work in Europe as part of your degree programme, usually for a full academic year. At Heriot Watt students have the opportunity to study at a wide range of institutions in Europe.

Exchanges

An exchange can be arranged with an institution abroad. This can be arranged with your school Exchange Coordinator but it is the responsibility of the student to complete the application for that institution.

Failing a course

Failing a course may be a setback, but it is not necessarily a disastrous one. Students who have failed can go on to pass resits and still graduate with a good degree. If you fail a course it is important you discuss this with your personal tutor in the first instance. Your personal tutor will be able to offer advice on how to obtain detailed feedback and suggest sources of support.

Go Global

Go Global is the University’s inter-campus transfer opportunity and offers students the opportunity to study at a different Heriot-Watt campus.

Graduate Attributes

Through your experience at Heriot-Watt University you will develop the skills and qualities of the four graduate attributes: specialist, creative, professional and global.

Graduation

All the information you need to apply for and attend your graduation ceremony.

Guide to Student Life

This A to Z guide aims to provide you with essential information on a range of issues you may encounter.
Harassment and Bullying

Heriot-Watt University is committed to a working, learning and living environment that is free of discrimination and intimidation. If you feel that the

Health and Wellbeing

During your time at University it is important to look after yourself and use the resources available to help you with this, including Wellbeing Services, and medical and dental services.

Ill Health & Mitigating Circumstances

There are circumstances which, through no fault of your own, may have affected your performance in an assessment (exams or other assessment), meaning that the assessment has not accurately measured your ability. These circumstances are described as 'mitigating circumstances' (previously 'special circumstances'). You can submit an application to have mitigating circumstances taken into account.

Library Essentials

Library essentials covers how to navigate the library service across campuses at the University. If you need to borrow a book or book out a study space this can be accessed from the library essentials webpage.

Library Resources for your Subject

There is a dedicated Academic Support and Liaison Librarian for each School. See also the subject guides for useful information about books, journals, and online resources for each subject area.

Managing Your Money

As a student you will find there is a lot to think about financially. For some of you, studying at university will be the first time you have had to manage your money and keep your expenditure within a fixed budget. Advice and support on money matters is available at all Heriot-Watt campuses.

Maternity and Paternity
The University has a set of published guidelines to ensure that students who become pregnant during their studies know where to seek advice and support, including on matters such as returning to study following a period of maternity leave and on requests for shared leave or paternity leave.

**Mental Health**

If you experience a mental health difficulty while at the University you can discuss any issues and concerns with a professional counsellor or Student Advisor.

**Next Steps: Post result help**

Next Steps is a simple guide that can help you after you have received your course assessment results. The guide has information about importance of obtaining feedback from your assessments, and how to reflect and act on feedback to ensure you are more successful in your studies.

**People Finder**

Find a key person on campus by using People Finder.

**Personal Tutors**

Every student has a member of academic staff allocated to them as a personal tutor who is your first point of contact if you need advice on any issue, both academic and non-academic. Personal tutors can also advise you of other support sources as appropriate. The name of your personal tutor is available on Student Self Service.

**Sexual Misconduct**

The University is committed to providing a safe environment that allows you to work, study, and fulfil your potential without fear of sexual misconduct and has a policy to combat sexual misconduct.

**Student Success Advisors**

Nobody knows the challenges of being a Heriot-Watt student better than those who have been through it all themselves. With the benefit of recent experience
and successful study at Heriot-Watt, the Student Success Advisors will be able to offer advice to students based on their own experiences. They will also have an overview of the other support resources available at Heriot-Watt and point you in the right direction if you need it.

**Student Service Centre**

The Student Service Centre offers help and support relating to matters on enrolment, examinations, paying tuition fees, graduation, as well as advice for students holding a visa.

Dubai Campus: please contact
dubaistudentservices@hw.ac.uk

Edinburgh Campus

Malaysia Campus

**Student Fees, Funding and Additional Charges**

The University can give you advice about paying your tuition fees as well as information on scholarships and bursaries, and other means of financial support.

**Student Policies and Guidance**

Our list of student policies can give you information on University regulations and guidance relating to issues including attendance, mitigating circumstances, mental health, and programme transfer.

**Student Support Services**

Information on our Disability and Careers services, as well as information for students who are care experienced or have caring responsibilities.

**Student Surveys**

Feedback from students is extremely important as it allows the University to further improve and enhance what it offers to students. Surveys give students the opportunity to feedback their thoughts and opinions to the University.
**Students With Caring Responsibilities**

The University seeks to support students who care “unpaid, for a friend or family member who due to illness, disability, a mental health problem or an addiction cannot cope without their support”.

**Temporary Suspension of Studies**

In certain situations it may be in a student’s best interests for them to suspend their studies temporarily to enable them to deal with particular issues and return at an agreed date. A Temporary Suspension of Studies (TSS) can be applied for and approved on the basis of genuine medical, personal, financial reasons or military service.

**Thinking of Leaving**

If you are thinking about leaving university for whatever reason please talk through your decision with a member of staff at the university. Many students think about leaving university at some stage during their studies. If anything is bothering you or you are thinking about leaving, you can come along to a drop in to speak to a member of support staff to explore and understand all of your options.

**Visa Advice**

Advice on visa requirements for studying at Heriot-Watt is available at all our campuses.

- [Visa Advice: UK Campuses](#)
- [Visa Advice: Dubai Campus](#)
- [Visa Advice: Malaysia Campus](#)

**Virtual Learning Environment (Vision)**
Vision is Heriot-Watt’s Virtual Learning Environment (VLE) and is a vital learning and communication tool for you and your lecturers, so make sure you log in and check Vision every day. A Student Guide to VISION can be found here.

### Developing Your Skills

#### Careers

Careers advice and guidance is available to all students and recent graduates to help:

- Develop your employability skills
- Identify your potential career options
- Help you to find work experience/part time work
- Market yourself to employers

#### Careers: UK Campuses

Careers: Dubai Campus, contact Benita Maben, Careers Advisor, B.Maben@hw.ac.uk

Careers: Malaysia Campus, contact MYCareers@hw.ac.uk

#### Career Mentoring

Career Mentoring can connect a student with a professional working in a student’s area of interest. The programme gives students an opportunity to gain an insight into what it is like working in a certain field. A mentor will also be able to support a student with their long-term career planning. This programme is mostly aimed at students in their penultimate year, however all students are welcome to apply.

#### Enhanced Transcript

An Enhanced Transcript is a formal University document which will include not only details of your award and grades, but also a range of academic and extra-curricular activities undertaken whilst at University. The Transcript is designed to help you to maximise your employability as it records your University achievements in one document which you can share with prospective employers and postgraduate recruiters.

#### Skills Development
Studying at university gives you the opportunity to learn new skills or build on existing skills you already have. Information Services provide many workshops and resources to help you gain or develop the skills you will need to have a successful time at university.

**Study Spaces**

Heriot-Watt provide a large number of modern and contemporary study spaces for both individuals and groups in convenient locations. Some of these spaces are open late, and offer IT access as well as food and drink.

**Volunteering**

Volunteering offers you the opportunity to develop your skills and experience while helping your fellow students, your community or a charitable organisation. There are numerous opportunities for volunteering within and outside the University. The Careers service also provide advice on volunteering. Your experience as a volunteer can be logged and evidenced, and help enhance your employability.