PROGRAMME DETAILS
Programme Code: F111-MAT
Department: Mathematics
Main Award: BSCH - Bachelor of Science Honours
Full Award Title: Bachelor of Science in Mathematics
Level: Undergraduate

LOCATION OF STUDY
| Edinburgh   | Y | Scottish Borders | N | Orkney   | N |
| Dubai       | N | Malaysia         | N | Approved Learning Partner | N |
| Independent Distance Learners | N | Collaborative Learning Partner | N | Other | N |

ASSOCIATED AWARDS

<table>
<thead>
<tr>
<th>Programme Code</th>
<th>Award</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>F111-MAT</td>
<td>BSCH</td>
<td>Bachelor of Science in Mathematics</td>
</tr>
<tr>
<td>F111-ZZZ</td>
<td>BSCO</td>
<td>Bachelor of Science in Mathematics</td>
</tr>
</tbody>
</table>

ACCREDITIATION
N/A

LEARNING OUTCOMES – SUBJECT MASTERY
Understanding, Knowledge and Cognitive Skills

On completion of the programme students should be able to:

- demonstrate an understanding across a broad range of mathematics
- demonstrate a detailed knowledge and understanding in certain specific areas of mathematics
- demonstrate an understanding of the power of abstraction and of the notions of proof and logical reasoning
- demonstrate an appreciation of the usefulness of mathematics over a wide range of applications

Scholarship, Enquiry and Research (Research Informed Learning)

On completion of the programme students should be able to:

- demonstrate a good level of skill in calculation and in mathematical manipulation
- demonstrate the ability to present rigorous arguments
- model real-life situations in mathematical terms and analyse the resulting models
- demonstrate computational skills involving the use of a range of software packages

LEARNING OUTCOMES – PERSONAL ABILITIES

Industrial, Commercial and Professional Practice
On completion of the programme, students will have the knowledge and skills for the development, application and consequent analysis of mathematics and mathematical models as currently required in modern industrial sectors, including IT, finance, engineering, and general science and technology. They will be able to identify, analyse and solve problems, and discuss issues at a professional level; they will also be able to critically review existing practices and will be in a strong position to move on to a professional environment, with sound knowledge, confidence and awareness of the nature of that environment and the demands it will make.

**Autonomy, Accountability and Working With Others**

On completion of the programme students will be able to:

- plan and organise their own learning through self management and time management
- demonstrate the ability to work with relatively little guidance or support, to undertake self-directed work and to meet deadlines
- communicate effectively at all levels and using a range of media
- interact effectively with professionals from a wide and diverse range of areas

**Communication, Numeracy & Information and Communications Technology**

On completion of the programme, students will be numerate, able to make presentations on specialised topics and able to communicate well with peers and other colleagues. They will have extensive IT knowledge and skills and will be able to use them confidently. They will also have the necessary background to enable them to be ready and able to communicate on technical and general matters with peers and senior colleagues.

**APPROACHES TO TEACHING AND LEARNING**

The following teaching methods are used: lectures, tutorials, computing laboratory work, coursework, projects. Teaching on the programme is student-focussed, with students encouraged to take responsibility for their own learning and development. In addition, students learn through structured group work in problems solving, collaborative student presentations, and independent study and technical project work. Resource-based and problem-based teaching styles are used to facilitate the motivational and assimilative phases of the learning process. The level and type of support available via VISION will vary between the courses as is appropriate for the subject matter.

Approaches to learning and teaching are continually reviewed and developed with the aim of matching them to the abilities and experiences of the students.

**EDUCATIONAL AIMS OF THE PROGRAMME**

The principal aims of the programme are to
• provide high-quality undergraduate education in a wide range of subjects in modern mathematics
• enable students to develop detailed knowledge and critical understanding of both theoretical and applied elements of mathematics
• provide students with training and practical experience of modelling, analysing and interpreting mathematical and real-world problems
• enable students to communicate and work effectively with peers and academic staff, demonstrating appropriate levels of autonomy, initiative, and responsibility
• provide students at the undergraduate level with the opportunity to plan and write a dissertation requiring detailed and critical understanding in an area of mathematics
• equip students with the grounding in mathematics necessary to go onto to further study or straight into graduate jobs

ASSESSMENT POLICIES

The assessment policy for the programme incorporates a range of assessment types. Continuous assessment during some courses and summative assessment at the conclusion of courses both contribute to the overall assessment and are used to formally measure achievement in specified learning outcomes. Understanding, knowledge and subject-specific skills are assessed by coursework assignments and written examinations. Formative assessment is used to provide feedback and to inform student learning.

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

PROGRAMME STRUCTURE

Mandatory Courses

<table>
<thead>
<tr>
<th>Edinburgh</th>
<th>SBC</th>
<th>Okney</th>
<th>Dubai</th>
<th>HWUM</th>
<th>IDL</th>
<th>Coll. Partner</th>
<th>ALP</th>
<th>Other</th>
<th>Stage</th>
<th>Semester</th>
<th>Cours e Code</th>
<th>CourseTitle</th>
<th>SCQF Cr</th>
<th>SCQF Lvl</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>F17CA</td>
<td>Calculus A</td>
<td>15</td>
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<td>F17CC</td>
<td>Introduction to University Mathematics</td>
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<td>7</td>
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<tr>
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<td>F77SA</td>
<td>Introduction to Statistical Science A</td>
<td>15</td>
<td>7</td>
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<tr>
<td>X</td>
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<td>2</td>
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<td>F17GA</td>
<td>Problem Solving</td>
<td>15</td>
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<td>X</td>
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<td>2</td>
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<td>F77SB</td>
<td>Introduction to Statistical Science B</td>
<td>15</td>
<td>7</td>
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<tr>
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<td>F18CD</td>
<td>Multivariable Calculus and Real Analysis A</td>
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</table>
### F11-MAT Bachelor of Science in Mathematics

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>SCQF Cr</th>
<th>SCQF Lvl</th>
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<tbody>
<tr>
<td>X 1 1 F17GC</td>
<td>Mathematics in Context</td>
<td>15</td>
<td>7</td>
</tr>
<tr>
<td>X 1 2 F17SC</td>
<td>Discrete Mathematics</td>
<td>15</td>
<td>7</td>
</tr>
<tr>
<td>X 2 1 B28PO</td>
<td>Photonics and Optics</td>
<td>15</td>
<td>8</td>
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<tr>
<td>X 2 1 B28PQ</td>
<td>Photonics and Quantum Mechanics</td>
<td>15</td>
<td>8</td>
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<tr>
<td>X 2 1 C38FM</td>
<td>Financial Markets Theory</td>
<td>15</td>
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<td>X 2 1 C38FR</td>
<td>Financial Reporting</td>
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<td>X 2 1 F17LP</td>
<td>Logic and Proof</td>
<td>15</td>
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<tr>
<td>X 2 1 F18GD</td>
<td>Mathematics for Direct Entrants</td>
<td>15</td>
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<tr>
<td>X 2 1 F27IS</td>
<td>Interactive Systems</td>
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<tr>
<td>X 2 1 F78PA</td>
<td>Probability and Statistics A</td>
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<tr>
<td>X 2 2 B28TP</td>
<td>Thermal Physics and Properties of Matter</td>
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<td>X 2 2 B28TR</td>
<td>Thermal Physics and Relativity</td>
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<td>X 2 2 C28EP</td>
<td>Contemporary Economic Policy and Institutions</td>
<td>15</td>
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<td>X 2 2 C38FN</td>
<td>Corporate Financial Theory</td>
<td>15</td>
<td>8</td>
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<tr>
<td>X 2 2 C38MO</td>
<td>Management Accounting in Organisations</td>
<td>15</td>
<td>8</td>
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<tr>
<td>X 2 2 C38SE</td>
<td>Social and Environmental Accounting</td>
<td>15</td>
<td>8</td>
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<tr>
<td>X 2 2 F17SC</td>
<td>Discrete Mathematics</td>
<td>15</td>
<td>7</td>
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<tr>
<td>X 2 2 F18GW</td>
<td>Mathematics Workshop</td>
<td>15</td>
<td>8</td>
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<tr>
<td>X 2 2 F27WD</td>
<td>Web Design and Databases</td>
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<td>7</td>
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<tr>
<td>X 2 2 F78PB</td>
<td>Probability and Statistics B</td>
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<tr>
<td>X 2 2 F78SC</td>
<td>Statistics for Science</td>
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<td>X 3 1 F19GB</td>
<td>Project Preparation</td>
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<tr>
<td>X 3 1 F19MV</td>
<td>Vector Analysis</td>
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<td>X 3 1 F19PB</td>
<td>Pure Mathematics B</td>
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<td>X 3 1 F19PL</td>
<td>Abstract Algebra</td>
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<td>X 3 1 F19WA</td>
<td>Year Abroad - Waterloo A</td>
<td>60</td>
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<td>X 3 2 F19AB</td>
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<td>X 3 2 F19MC</td>
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<td>X 3 2 F19MO</td>
<td>Ordinary Differential Equations</td>
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<td>X 3 2 F19NB</td>
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<td>X 3 2 F19WB</td>
<td>Year Abroad - Waterloo B</td>
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<td>Course Code</td>
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<td>F10AM</td>
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<td>F10MF</td>
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<td>F10MM</td>
<td>Optimisation</td>
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<td>F10PC</td>
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<td>F10MP</td>
<td>Partial Differential Equations</td>
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<td>F10ND</td>
<td>Numerical Analysis D</td>
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<tr>
<td>F10PG</td>
<td>Geometry</td>
<td>15</td>
<td>10</td>
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</tbody>
</table>

**ELECTIVES (UG)**

**Stage 1**
Any SCQF Level 7 course from approved list

**Stage 2**
Any SCQF Level 7 or 8 course from approved list

**Stage 3**
Any SCQF Level 7,8 or 9 course from approved list

**Stage 4**
N/A

**Stage 5**
N/A

**COMPOSITION AND STAGE NOTES (UG)**

**Stage 1**
Students must study 6 mandatory courses plus 2 optional or elective courses

<table>
<thead>
<tr>
<th>Credits</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Mandatory</td>
<td>90</td>
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<td>Optional</td>
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</tr>
<tr>
<td>Elective</td>
<td></td>
</tr>
<tr>
<td>Total 1</td>
<td>120</td>
</tr>
</tbody>
</table>

**Stage 2**
Honours degree students must study 6 mandatory courses, together with 2 optional courses and no electives.
Ordinary degree students must study 6 mandatory courses, up to 2 optional courses, and up to 2 approved elective courses.
Students who wish to take C38FR, C38FM, C38MO, C38SE or C38FN must have grade D or above in C37FF.
Students who wish to take B28PO or B28TP must have a grade D or above in B27MW and B27FF.
Exchange programmes for students on the Edinburgh campus (HWU)

Students at the Edinburgh campus (HWU) who are performing well on the programme can be selected to participate in an established exchange programme with University of Waterloo, Canada. The selection process normally takes place during Semester 2 of Stage 2.

Outline of the Waterloo Exchange Programme

1. Students on this exchange spend all of Stage 3 at the University of Waterloo, Canada. They complete Stage 4 at Heriot-Watt.
2. The programme of study for Heriot-Watt students in Waterloo is broadly equivalent in terms of content and SCQF Level to Stage 3 of the BSc (Hons) Mathematics. It includes the equivalent of 30 credits of research-informed independent work.
3. Upon successful completion of their study in Waterloo, students are awarded 120 credits for Stage 3 of the programme.
4. Students must complete 6 courses at SCQF Level 10 or above in Stage 4.

Note:

In Stage 1, Stage 2 and Stage 4, the course choices are identical for all students on the programme.

<table>
<thead>
<tr>
<th>Mandatory Credits</th>
<th>90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optional Credits</td>
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<tr>
<td>Elective Credits</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
</tr>
</tbody>
</table>

Stage 3

a. Edinburgh campus
Honours degree students must study 3 mandatory courses, together with 5 optional courses and no electives. Ordinary degree students must study 3 mandatory courses, together with up to 5 optional courses and up to 2 approved elective courses.

b. Waterloo Exchange Programme

2 taught courses (2 mandatory 60-credit courses).

**Semester 1** The 1 mandatory course is F19WA Year Abroad – Waterloo A.

**Semester 2** The 1 mandatory course is F19WB Year Abroad – Waterloo B.

<table>
<thead>
<tr>
<th>Mandatory Credits</th>
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<tbody>
<tr>
<td>Optional Credits</td>
<td>3</td>
</tr>
<tr>
<td>Elective Credits</td>
<td>3</td>
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<tr>
<td>Total</td>
<td>120</td>
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</table>

**Stage 4**

Waterloo Exchange Programme
The course choices are the same as for the Edinburgh campus.

<table>
<thead>
<tr>
<th>Mandatory Credits</th>
<th>4</th>
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<tbody>
<tr>
<td>Optional Credits</td>
<td>4</td>
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<tr>
<td>Elective Credits</td>
<td>4</td>
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<tr>
<td>Total</td>
<td>120</td>
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</table>

**Stage 5**

<table>
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<tr>
<th>Mandatory Credits</th>
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<tbody>
<tr>
<td>Optional Credits</td>
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<td>Elective Credits</td>
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<tr>
<td>Total</td>
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</table>

**ASSESSMENT AND PROGRESSION (UG)**

**Reassessment Opportunities**

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

**Progression Requirements**

<table>
<thead>
<tr>
<th>Part A. The minimum number of credits required to progress through each stage are as follows</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1 to 2</td>
</tr>
<tr>
<td>Stage 2 to 3</td>
</tr>
<tr>
<td>Stage 3 to 4</td>
</tr>
<tr>
<td>Stage 4 to 5</td>
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</tbody>
</table>

**Part B. The minimum grade of D is required in the following courses**

<table>
<thead>
<tr>
<th>Stage 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Progression through the course for an Honours degree normally requires: Stage 1: a minimum of Grade D in at least 6 courses including F17CA Calculus A, F17CB Calculus B, F17CC Algebra A and F17GA Problem Solving</td>
</tr>
<tr>
<td>Progression through the course for an Ordinary degree normally requires: Stage 1: a minimum of Grade D in at least 5 courses including F17CA Calculus A, F17CB Calculus B, F17CC Algebra A and F17GA Problem Solving</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stage 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Progression through the course for an Honours degree normally requires: Stage 2: a minimum of Grade D in at least 6 courses including F18CD Multivariable Calculus and Real Analysis A, F18CE Multivariable Calculus and Real Analysis B, and F18CF Linear Algebra</td>
</tr>
<tr>
<td>Progression through the course for an Ordinary degree normally requires: Stage 2: a minimum of Grade D in at least 5 courses including F18CD Multivariable Calculus and Real Analysis A, F18CE Multivariable Calculus and Real Analysis B, and F18CF Linear Algebra</td>
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</table>

<table>
<thead>
<tr>
<th>Stage 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>a. Edinburgh campus</strong></td>
</tr>
<tr>
<td>Progression through the course for an Honours degree normally requires: average mark on qualifying courses of at least 40% and an average mark of at least 40% in the seven qualifying courses other than F19GB (Project Presentation).</td>
</tr>
<tr>
<td><strong>b. Waterloo Exchange Programme</strong></td>
</tr>
<tr>
<td>Progression through the course for an Honours degree normally requires: Obtain credits for all courses taken in Waterloo.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stage 4</th>
</tr>
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<tr>
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**AWARDS, CREDITS AND LEVEL (UG)**

<table>
<thead>
<tr>
<th>Part A. Credit Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Credits</td>
</tr>
</tbody>
</table>
### Integrated Masters

|  | 600 | 600 SCQF credits including a minimum of 120 credit at Level 11 |

### Honours Degree (inc.MA)

|  | 480 | 480 SCQF credits including a minimum of 180 credit at Level 9 and 10 of which at least 90 credits at Level 10 |

### Ordinary or General Degree

|  | 360 | 360 SCQF credits including a minimum of 60 credit at Level 9 |

### Diploma of Higher Education

|  | 240 | 240 SCQF credits including a minimum of 90 credit at Level 8 |

### Certificate of Higher Education

|  | 120 | 120 SCQF credits including a minimum of 90 credit at Level 7 |

### Part B. Mark/Grade Requirements

<table>
<thead>
<tr>
<th></th>
<th>Overall Mark</th>
<th>Overall Grade</th>
<th>Basis of Overall Mark/Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated Masters</td>
<td>&gt;=50%</td>
<td>C</td>
<td>Credit Weighted Average &gt;=50% over all qualifying courses at Grades A-D</td>
</tr>
<tr>
<td>Honours Degree (inc.MA)</td>
<td>&gt;=40%</td>
<td>D</td>
<td>1st: Credit Weighted Average &gt;=70% Over all qualifying courses at grades A-D. 2.1: Credit Weighted Average &gt;=60% Over all qualifying courses at grades A-D. 2.2: Credit Weighted Average &gt;=50% Over all qualifying courses at grades A-D. 3rd: Credit Weighted Average &gt;=40% Over all qualifying courses at grades A-D.</td>
</tr>
<tr>
<td>Ordinary or General Degree</td>
<td>&gt;=40%</td>
<td>D</td>
<td>Minimum of grade D in all pre-requisite courses.</td>
</tr>
<tr>
<td>Diploma of Higher Education</td>
<td>&gt;=40%</td>
<td>D</td>
<td>Minimum of grade D in all pre-requisite courses.</td>
</tr>
<tr>
<td>Certificate of Higher Education</td>
<td>&gt;=40%</td>
<td>D</td>
<td>Minimum of grade D in all pre-requisite courses.</td>
</tr>
</tbody>
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### DURATION OF STUDY

<table>
<thead>
<tr>
<th></th>
<th>Full-time</th>
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<tbody>
<tr>
<td>Integrated Masters</td>
<td>60</td>
</tr>
<tr>
<td>Honours Degree</td>
<td>48</td>
</tr>
<tr>
<td>Ordinary or General Degree</td>
<td>36</td>
</tr>
<tr>
<td>Diploma of Higher Education</td>
<td>24</td>
</tr>
<tr>
<td>Certificate of Higher Education</td>
<td>12</td>
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</tbody>
</table>