### Programme Code
F1I1-MAS

### Programme Title
Mathematical Studies

### School
MACS

### Type
Specialist

### Awards
Cert HE, Dip HE, BSc, BSc Hons

### Programme Accredited by
N/A

### UCAS Code
N/A

### QAA Subject Benchmarking Group(s)
N/A

### Date of Production/Revision
June 2009

### Stage Composition

<table>
<thead>
<tr>
<th>Mandatory Courses</th>
<th>Optional Courses</th>
<th>Elective Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stage 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up to 8 optional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up to 2 elective</td>
<td></td>
<td></td>
</tr>
<tr>
<td>At least 3 courses from those offered in the School of Mathematical and Computer Sciences and as timetabled and approved by the Programme Leader¹</td>
<td>At least 3 courses from those offered in the School of Mathematical and Computer Sciences and as timetabled and approved by the Programme Leader¹</td>
<td>Any SCQF Level 7 course from approved list as timetabled and approved by the Programme Leader¹</td>
</tr>
<tr>
<td><strong>Stage 2</strong></td>
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<tr>
<td>8 courses</td>
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<td></td>
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<tr>
<td>Up to 8 optional</td>
<td></td>
<td></td>
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<tr>
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<td></td>
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</tr>
<tr>
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<td>At least 3 courses from those offered in the School of Mathematical and Computer Sciences and as timetabled and approved by the Programme Leader²</td>
<td>Any SCQF Level 7 or 8 course from approved list as timetabled and approved by the Programme Leader²</td>
</tr>
</tbody>
</table>

### Certificates

- **Certificate of Higher Education**
  Requires 120 SCQF credits including a minimum of 120 credits at Level 7

- **Diploma of Higher Education**
  Requires 240 SCQF credits including a minimum of 90 credits at Level 8

### Notes

1. For all courses in Stage 1, subject to any prior learning requirements identified for that course.
2. For all courses in Stages 2, 3 and 4, subject to pre-requisites
Form 16
Heriot-Watt University – Undergraduate Programme Structure Template (RAY)

<table>
<thead>
<tr>
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<thead>
<tr>
<th>6. Programme Accredited by</th>
<th>7. UCAS Code</th>
<th>8. QAA Subject Benchmarking Group(s)</th>
<th>9. Date of Production/Revision</th>
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<tr>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>June 2009</td>
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<table>
<thead>
<tr>
<th>10. Stage Composition</th>
<th>11. Arrangement of Courses: (Themes and Subject Streams)</th>
<th>12. Awards, Credits &amp; Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mandatory Courses</td>
<td>Optional Courses</td>
</tr>
<tr>
<td></td>
<td>Semester 1</td>
<td>Semester 2</td>
</tr>
</tbody>
</table>

**Stage 3**
- 8 courses
- Up to 8 optional
- Up to 2 elective

- At least 3 courses from those offered in the School of Mathematical and Computer Sciences and as timetabled and approved by the Programme Leader
- At least 3 courses from those offered in the School of Mathematical and Computer Sciences and as timetabled and approved by the Programme Leader
- Any SCQF Level 7,8,9 course from approved list as timetabled and approved by the Programme Leader
- Any SCQF Level 7,8,9 course from approved list as timetabled and approved by the Programme Leader

**Stage 4**
- 8 courses
- Up to 8 optional
- Up to 2 elective

- At least 3 Level 10 or 11 courses from those offered in the School of Mathematical and Computer Sciences and as timetabled and approved by the Programme Leader
- At least 3 Level 10 or 11 courses from those offered in the School of Mathematical and Computer Sciences and as timetabled and approved by the Programme Leader
- Any SCQF Level 7,8,9,10 course from approved list as timetabled and approved by the Programme Leader
- Any SCQF Level 7,8,9,10 course from approved list as timetabled and approved by the Programme Leader

**Ordinary Degree**
Requires 360 SCQF credits including a minimum of 60 credits at Level 9

**Honours Degree**
Requires 480 SCQF credits including a minimum of 90 at Level 9 and 180 at Levels 9 and 10

Notes
1. For all courses in Stage 1, subject to any prior learning requirements identified for that course.
2. For all courses in Stages 2, 3 and 4, subject to pre-requisites.
3. The accompanying Programme Notes provide details of stage notes, progression requirements and award requirements for the programme.
4. The accompanying Programme Description provides details of aims, outcomes, teaching & learning and assessment policies for the programme.
Stage Notes

Students may at any Stage transfer into another programme offered in the School of Mathematical and Computer Sciences, provided that they have satisfied the learning requirements of the previous Stages of that programme. To be eligible to transfer to the degree of BSc Mathematics, students should have taken F17CA1, F17CB2 and F17CC1 during Stage 1, and F18CD1, F18CE2 and F18CF1 during Stage 2. To be eligible to transfer to the degree of BSc in Mathematics with Physics/Computer Science/Statistics/Finance students should, in addition to F17CA1, F17CB2 and F17CC1, have taken B27MW1 and B27FF2/F27SA1 F27SB2 and F27SG2/F77SA1 and F77SB2/C27OA1 and C37FF2 respectively during Stage 1 and in addition to F18CD1, F18CE2 and F18CF1 during Stage 2 B28PO1 and B28TP2/F17LP1 and F28FS2/F78PA1 and F78PB2/C38FM1 and C38FN2 respectively during Stage 2. To be eligible to transfer to the degree of BSc in Mathematics and Computer Science students should have taken F17CA1, F17CB2, F17CC1, F27SA1, F27SB2, F27SL1, F27SG2 and F27CS2 during Stage 1, and F18CD1, F18CE2, F18CF1, F17LP1, F28SD2, F28FS2, F18NA2 and F28PL1 during Stage 2. To be eligible to transfer to the degree of BSc in Mathematics with a European language students should have taken F17CA1, F17CB2, F17CC1 and two of C47LF1, C47MF2, C47LG1, C47MG2, C47LE1 and C47ME2 during Stage 1, and F18CD1, F18CE2, F18CF1, and two of C48LF1, C48MF2, C48LG1, C48MG2, C48LE1 and C48ME2 during Stage 2. To be eligible to transfer to the degree of BSc in Mathematical Statistical and Actuarial Sciences, students should have taken F17CA1, F17CB2, F17CC1, F77SA1 and F77SB2 during Stage 1 and F18CD1, F18CE2, F18CF1, F78PA1, F78PB2, F78AA1 and F78AB2 during Stage 2. To be eligible to transfer to the degree of BSc in Financial Mathematics, students should have taken F17CA1, F17CB2, F17CC1, C27OA1, C37FF2, F77PD2, F77SA1 and F77SB2 during Stage 1 and F18CD1, F18CE2, F18CF1, F78PA1, F78PB2, F78AA1 and F78AB2 during Stage 2. To be eligible to transfer to the degree of BSc in Actuarial Science or BSc in Statistical Modelling students should have taken F17CA1, F17CB2, F17CC1, F77PD2, F77SA1 and F77SB2 during Stage 1 and F18CD1, F18CE2, F18CF1, F78PA1, F78PB2, F78AA1 and F78AB2 during Stage 2.

Stage 2 At least four of the optional courses in Stage 2 shall be at SCQF level 8. At least six of the courses in Stage 2 shall be at SCQF level 8.

Stage 3 At least four of the optional courses in Stage 3 shall be at SCQF level 9. For an honours student at least six of the optional courses in Stage 3 shall be at least at SCQF level 9.

Stage 4 In Stages 3 and 4 at least six of the optional courses shall be at SCQF level 9 and at least six of the optional courses shall be at SCQF level 10 or 11.

Honours students must complete one project course grouping: F19GB1+F10GP2 (Mathematics project) OR F79MA1+F79MB2 (Statistics project)

The choice of electives has to be approved by the course director.
## Progression Requirements

- **a)** Progression through the programme requires the following *minimum* number of credit points at each stage. Students may, at the discretion of the Board of Examiners, be permitted to proceed into Stages 2 or 3 of the course while carrying and repeating a maximum of one non-core course per semester which they have failed in the previous year.
  
  - Stage 1 to Stage 2: 90 credits (6 courses)
  - Stage 2 to Stage 3: 210 credits (14 courses)
  - Stage 3 to Stage 4: 360 credits (24 courses)

- **b)** To progress from Stage 1 to Stage 2 students must have the pre-requisites for at least six SCQF level 8 courses.

- **c)** To progress from Stage 2 to Stage 3 students must have gained a minimum of 90 credits at SCQF level 8 and must have the pre-requisites for at least six SCQF level 9 or level 10 courses which are available in Stage 3 of a MACS programme.

- **d)** To progress from Stage 3 to Stage 4 students must have gained a minimum of 90 credits at SCQF level 9 or above and must have the pre-requisites to enable them to have taken at least six qualifying courses which are at SCQF level 9 and at least six qualifying courses which are SCQF level 10 or 11 by the end of Stage 4.

- **e)** Students may take a course with pre-requisites only if they have successfully completed those pre-requisites.

- **f)** In order to progress from stage 1 to 2 or stage 2 to 3, students must normally have an average mark over their MACS courses of 40% or better. In order to progress from Stage 3 to Stage 4, students must normally have an average mark of 40% or better in their qualifying courses and have an average mark of 40% or better in their qualifying courses other than F19GB1.

- **g)** For students who have not achieved the required credit points for progression or award (as stated in (a)), but who otherwise meet the criteria for progression, the Board of Examiners may award discretionary credits, normally for up to 30 credits (2 courses) throughout a student’s period of study, following standard university policy.

- **h)** SCQF Level 7 MACS courses available as optional courses on this degree are currently F17CA1, F17CC1, F17CB2, F17GA2, F17SC2, F17LP1, F17GC1, F27IS1, F27PX1, F27SA1, F27CS2, F27WD2, F27SB2, F27TS2, F27SG2, F77SA1, F77SB2, F77PD2.

- **i)** SCQF Level 8 MACS courses available as optional courses on this degree are currently F18AA1, F18CD1, F18CF1, F18GD1, F18CE2, F18NA2, F18PA2, F28DA1, F28WP1, F28IN1, F28CD2, F28DM2, F28PL2, F28SD2, F28FS2, F78AA1, F78PA1, F78AB2, F78PB2, F78SC2.

- **j)** SCQF Level 9 MACS courses available as optional courses on this degree are currently F19GB1, F19MV1, F19PB1, F19PL1, F19AB2, F19MC2, F19MO2, F19NB2, F29A11, F29CT1, F29FA1, F29KM1, F29SO1, F29FB2, F29OCR2, F29PD2, F29SS2, F79MA1, F79PA1, F79PS1, F79SP1, F79PB2, F79DF2, F79MZ2, F79SU2.

- **k)** SCQF Level 10 MACS courses available as optional courses on this degree are currently F10AC1, F10AM1, F10MF1, F10MM1, F10NC1, F10PC1, F10AN2, F10GP2, F10MP2, F10ND2, F10PD2, F10PG2, F20PA1, F20PB2, F20PC2, F20MC1, F20DL1, F20MA1, F20DO1, F20IF1, F20NA2, F20GP2, F20DP2, F20EC2, F20AD2, F20RO2, F70CF1, F70DA1, F70LA1, F70PE1, F70DB2, F70DP2, F70LB2, F70LP2, F70RT2, F70TS2.

- **l)** SCQF Level 11 MACS courses available as optional courses on this degree are currently F71RM1, F71CM2.
Form P8
Heriot-Watt University – Undergraduate Programme Notes Template

<table>
<thead>
<tr>
<th>1. Programme Code(s) (recruitment &amp; exit awards)</th>
<th>2. Programme Titles for all awards (unabbreviated)</th>
<th>3. Main Award(s) (to be recruited to)</th>
<th>4. Exit Awards (for graduation only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1I1-MAS/YYY</td>
<td>Mathematical Studies</td>
<td>BSc (F1I1-MAS)</td>
<td>BSc (Hons) (F1I1-YYY)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BSc (Ord) (F1I1-ZZZ)</td>
<td>BSc (Ord) (F1I1-ZZZ)</td>
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</tbody>
</table>

5. Type
School specialist degree

6. Programme Accredited by

7. UCAS Code
Mathematical & Computer Sciences

8. School

9. QAA Subject Benchmarking Group(s)
Mathematics

10. Date of Production/Revision
February 2015

Award Requirements

To Graduate with an Ordinary degree
- a student must have gained a total of at least 360 credits
- a student must have gained a minimum of 60 credits at SCQF level 9
- a student must have gained a maximum of 300 credits from SCQF level 7 and SCQF level 8 (not more than 210 credits at SCQF level 7)
- a student must have the majority of their MACS courses whose codes start with F1 or F7.

To Graduate with an Honours degree
- a student must have gained a total of at least 480 credits
- a student must have gained a minimum of 90 credits at SCQF level 10 and a minimum of 90 credits at SCQF level 9
- a student must have gained a minimum of 30 credits from Project courses F19GB1+F10GP2 (Mathematics project) OR F79MA1+F79MB2 (Statistics project).
- a student must have gained a maximum of 300 credits from SCQF level 7 and SCQF level 8 (not more than 210 credits at SCQF level 7)
- the class of Honours shall be determined by performance in the 6 best MACS Stage 3 courses and the 6 best MACS Stage 4 courses taken, these are termed "the qualifying courses". The classification shall be based on 40% of the average mark of the Stage 3 qualifying courses and 60% of the average mark of the Stage 4 qualifying courses.
- students may resit failed Stage 3 courses in order to gain the required credits, but the mark at the first sitting will be used in the calculation of the final mark used to classify their degree
- a candidate may not resit a Stage 4 course.

The BSc Hons gradings are:
- first class, normally equating with a final degree mark of 70% or above from the qualifying courses
- second class upper division, normally equating with a final degree mark of 60-69% from the qualifying courses
- second class lower division, normally equating with a final degree mark of 50-59% from the qualifying courses
- third class, normally equating with a final degree mark of 40-49% from the qualifying courses
10. Educational Aims of the Course

- To provide an academically sound and relevant undergraduate education for those seeking graduate level employment;
- To provide students with the flexibility to pursue an individually tailored programme of study within the full range of mathematical and computer sciences under the guidance of a tutor;
- To offer students the possibility to broaden their background knowledge by studying a broad range of other topics to a lower level;
- To enable students to attain the best intellectual development and gain the maximum degree award compatible with their abilities;
- To enable students to maximise their potential by developing transferable as well as subject skills.

11. The Course provides opportunities for learners to achieve the following outcomes:

### Subject Mastery

#### 1. Understanding and Knowledge

On completion of the course students should be able to:

- demonstrate an understanding across a broad range of mathematics and computer science
- demonstrate a detailed knowledge and understanding in certain specific areas of mathematics and computer science
- 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 and computer science over a wide range of applications

Given the purpose of the course to enable pursuit of an individually tailored programme of study, the scope of knowledge will vary with the programme of study, to be agreed between the student and the course leader.

#### 2. Cognitive Skills

- Transfer theoretical and practical problem-solving skills to a variety of contexts.
- Develop critical, analytical and numerical skills.
- Demonstrate an ability to exercise initiative, original thought and independence.

#### 3. Scholarship, Enquiry and Research

On completion of the course students should have mastered the majority of the following. The precise outcomes depend on their choice of specialism

- 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
- demonstrate a good level of skill in calculation and in mathematical manipulation
- To gain an in depth understanding of the theoretical foundations of computation and its relevance to everyday computing
- To be able to design, implement, document, verify and validate relatively large heterogeneous software systems.
**Personal Abilities**

*Industrial, Commercial and Professional Practice*

On completion of the course, students will have the knowledge and skills for the development, application and consequent analysis of mathematics, mathematical models and techniques from computer science 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 course 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 and ICT*

On completion of the course, 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.

**12. Approaches to Teaching and Learning:**

This course provides a flexible, student-centred learning and teaching environment. The flexibility of choice makes it vitally important for the student to learn to work with the course leader to construct a programme of study that allows the student to fully realise their potential.

The following teaching methods are used: lectures, tutorials, computing laboratory work, coursework, projects. Teaching on the course is student-focused, with students encouraged to take responsibility for their own learning and development. In addition, students learn through structured group work in problem-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 modules as is appropriate for the subject matter.

Approaches to learning and teaching are reviewed and assessed annually at module and course levels. The review and redesign of techniques and methods adopted are obtained from student questionnaires, comments from the Student-Staff Committee, pass rates and external examiners' reports.

Specific details about learning and teaching methods are provided in the appropriate module descriptors.
13. Assessment Policies:

The assessment policy is to tailor the methods of assessment to the subject being taught and the nature of the classes so that understanding, knowledge and subject-specific skills are assessed using a variety of approaches. These include class tests, reports, written examinations, practical exercises, presentations, group and individual projects and the dissertation. What is best for each module is moderated by seeking a balance of modes within terms and stages.

Formal assessment in modules teaching subject specific understanding, knowledge and skills is usually by a mixture of coursework and unseen written examinations, but there are modules which are assessed by only one method. The examinations are summative, while coursework may used to assess understanding and subject specific skills on a formative or summative basis. Practical work is usually assessed by written reports. This approach to assessment enables staff and students to monitor the establishment and honing of transferable skills in practical exercises.

The methods of assessment adopted are annually reviewed at module and programme levels. Specific details about assessment methods are provided in the appropriate module descriptor.

The accompanying Programme Structure template provides details of modules, awards and credits for the course. The accompanying Programme Notes provide details of stage notes, progression requirements and award requirements for the course.