### Form P6

**Heriot-Watt University – Undergraduate Programme Structure Template**

<table>
<thead>
<tr>
<th>1. Programme Code(s) <strong>(recruitment &amp; exit awards)</strong></th>
<th>2. Programme Titles for all awards <strong>(unabbreviated)</strong></th>
<th>3. Main Award(s) <strong>(to be recruited to)</strong></th>
<th>4. Exit Awards <strong>(for graduation only)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>F181-MCS /YYY/ZZZ</td>
<td>Mathematics with Computer Science</td>
<td>BSc (F181-MCS)</td>
<td>BSc (Hons) (F181-YY) BSc (Ord) (F181-ZZZ)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5. Type</th>
<th>6. Programme Accredited by</th>
<th>7. UCAS Code</th>
<th>8. School &amp; Department</th>
<th>9. QAA Subject Benchmarking Group(s)</th>
<th>10. Date of Production/Revision</th>
</tr>
</thead>
<tbody>
<tr>
<td>School specialist degree</td>
<td></td>
<td>G100</td>
<td>Mathematical &amp; Computer Sciences</td>
<td>Mathematics</td>
<td>14 June 2011/201112</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>11. Stage Composition</th>
<th>12. Arrangement of Courses: (Themes and Subject Streams)</th>
<th>13. Awards, Credits &amp; Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1</td>
<td>Semester 1</td>
<td>Semester 2</td>
</tr>
<tr>
<td>8 courses</td>
<td>Calculus A (F17CA1)</td>
<td>Calculus B (F17CB2)</td>
</tr>
<tr>
<td>All mandatory</td>
<td>Algebra A (F17CC1)</td>
<td>Introduction to Statistical Science B (F77SB2)</td>
</tr>
<tr>
<td></td>
<td>Introduction to Statistical Science A (F77SA1)</td>
<td>Software Development 1 (F27SA1)</td>
</tr>
<tr>
<td></td>
<td>Software Development 2 (F27SB2)</td>
<td>Software Development 3 (F27SG2)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stage 2</th>
<th>Semester 1</th>
<th>Semester 2</th>
<th>Optional Courses</th>
<th>Elective Courses</th>
<th>Certificate of Higher Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 courses</td>
<td>Multivariable Calculus and Real Analysis A (F18CD1)</td>
<td>Multivariable Calculus and Real Analysis B (F18CE2)</td>
<td>240 credits, incl. 90 at Level 8</td>
<td>(16 courses to be completed</td>
<td></td>
</tr>
<tr>
<td>7 mandatory</td>
<td>Linear Algebra (F18CF1)</td>
<td>Numerical Analysis A (F18NA2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 optional</td>
<td>Logic &amp; Proof (F17LP2)</td>
<td>Pure Mathematics A (F18PA2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Software Design (F28SD2)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Programme Code(s) (recruitment & exit awards)
F181-MCS /YYY/ZZZ

## Programme Titles for all awards (unabbreviated)
Mathematics with Computer Science

## Main Award(s) (to be recruited to)
BSc (F181-MCS)

## Exit Awards (for graduation only)
BSc (Hons) (F181-YYY)
BSc (Ord) (F181-ZZZ)

## UCAS Code
G100

## School
Mathematical & Computer Sciences

## QAA Subject Benchmarking Group(s)
Mathematics

## Date of Production/ Revision
14 June 2011/2011

### Stage Composition

<table>
<thead>
<tr>
<th>Mandatory Courses</th>
<th>Optional Courses</th>
<th>Elective Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stage 3</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 mandatory, up to 2 optional, up to 2 elective</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abstract Algebra (F19PL1)</td>
<td>Ordinary Differential Equations (F19MO2)</td>
<td>Up to one of Pure Mathematics B (F19PB1)</td>
</tr>
<tr>
<td>Project Preparation (F19GB1)</td>
<td>Complex Analysis (F19MC2)</td>
<td>Up to one of Numerical Analysis B (F19NB2)</td>
</tr>
<tr>
<td>Artificial Intelligence &amp; Intelligent Agents (F29AI1)</td>
<td>Formal Specification (F29FS2)</td>
<td>Any SCQF Level 7,8,9 module from approved list¹</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Any SCQF Level 7,8,9 module from approved list</td>
</tr>
</tbody>
</table>

¹ The choice of electives at different stages will be published in the student handbook.

### Arrangement of Courses: (Themes and Subject Streams)

- **Abstract Algebra (F19PL1)**
- **Ordinary Differential Equations (F19MO2)**
- **Up to one of Pure Mathematics B (F19PB1)**
- **Up to one of Numerical Analysis B (F19NB2)**
- **Any SCQF Level 7,8,9 module from approved list¹**
- **Any SCQF Level 7,8,9 module from approved list**
- **Ordinary or General Degree**

360 credits, incl. 60 at Level 9
(24 courses to be completed)
<table>
<thead>
<tr>
<th>Programme Code(s) (recruitment &amp; exit awards)</th>
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<th>Main Award(s) (to be recruited to)</th>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>BSc (Ord) (F181-ZZZ)</td>
</tr>
</tbody>
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<thead>
<tr>
<th>Type</th>
<th>Programme Accredited by</th>
<th>UCAS Code</th>
<th>School</th>
<th>QAA Subject Benchmarking Group(s)</th>
<th>Date of Production/ Revision</th>
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</thead>
<tbody>
<tr>
<td>School specialist degree</td>
<td></td>
<td>G100</td>
<td>Mathematical &amp; Computer Sciences</td>
<td>Mathematics</td>
<td>14 June 2011/201112</td>
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<tr>
<th>Stage</th>
<th>Composition</th>
<th>Arrangement of Courses: (Themes and Subject Streams)</th>
<th>Awards, Credits &amp; Levels</th>
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</thead>
<tbody>
<tr>
<td>Stage 4</td>
<td></td>
<td>Mandatory Courses</td>
<td>Optional Courses</td>
</tr>
<tr>
<td></td>
<td>8 courses</td>
<td>Mathematics Project Dissertation (F10GP2)</td>
<td>Pure Mathematics C</td>
</tr>
<tr>
<td></td>
<td>1 mandatory</td>
<td>Applied Mathematics C</td>
<td>Applied Mathematics D</td>
</tr>
<tr>
<td></td>
<td>7 optional</td>
<td>Numerical Analysis C</td>
<td>Numerical Analysis D</td>
</tr>
<tr>
<td></td>
<td>Choose two F2 courses and five F1 courses</td>
<td>Mathematical Biology A</td>
<td>Mathematical Biology B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Optimisation (F10MM1)</td>
<td>PDEs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Functional Analysis (F10MF1)</td>
<td>Geometry</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Data Mining &amp; Machine Learning (F21DL1)</td>
<td>Biologically Inspired Computation (F21BC2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3D Modelling and Animation (F21MA1)</td>
<td>Biologically Inspired Computation (F21BC2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rigorous Methods for Software Engineering (F21RS1)</td>
<td>Rigorous Methods for Software Engineering (F21RS1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Web Intelligence (F21WI1)</td>
<td>Web Intelligence (F21WI1)</td>
</tr>
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Form P6  Heriot-Watt University – Undergraduate Programme Structure Template

1. Programme Code(s) (recruitment & exit awards)  
   F181-MCS /YYY/ZZZ

2. Programme Titles for all awards (unabbreviated)  
   Mathematics with Computer Science

3. Main Award(s) (to be recruited to)  
   BSc (F181-MCS)

4. Exit Awards (for graduation only)  
   BSc (Hons) (F181-YYY)  
   BSc (Ord) (F181-ZZZ)

5. Type  
   School specialist degree

6. Programme Accredited by  
   UCAS Code  
   G100

7. School  
   Mathematical & Computer Sciences

8. Subject Benchmarking Group(s)  
   Mathematics

9. Date of Production/ Revision  
   14 June 2011/20112

10. Stage Composition  
    12. Arrangement of Courses: (Themes and Subject Streams)

   Mandatory Courses  
   Optional Courses  
   Elective Courses

The accompanying Programme Notes provide details of stage notes, progression requirements and award requirements for the programme.  
The accompanying Programme Description provides details of aims, outcomes, teaching & learning and assessment policies for the programme.
Stage Notes

The choice of electives at different stages will be published in the student handbook.

Stage One: Students must study 8 mandatory courses.

Stage Two: Students must study 7 mandatory and 1 optional course.

Stage Three:
- Honours degree students must study 6 mandatory courses, together with 2 optional courses and no electives.
- Ordinary degree students must study 6 mandatory courses, together with up to 2 optional courses and up to 2 approved elective courses.

An optional course may not run if there is insufficient demand for it; some choices of courses may not be available to students in some years because of timetabling constraints.

Progression Requirements

(a) Progression through the programme normally requires a minimum of number of credit points:

- Progression from Stage 1 to Stage 2: 120 credits
- Progression from Stage 2 to Stage 3: 240 credits
- Progression from Stage 3 to Stage 4: 360 credits

(b) Progression through the programme for an Honours degree normally requires:

- Stage 1: a minimum of Grade D in at least six courses, including the three F2 courses and the three F1 courses.
- Stage 2: a minimum of Grade D in at least six courses, including the F2 course and F18CD1, F18CE2, F18CF1, F17LP1.
- Stage 3: average mark on qualifying courses in both subjects of at least 40%

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.

(c) Progression through the programme for an Ordinary degree normally requires:

- Stage 1: a minimum of Grade D in at least 5 courses including one F2 course and three F1 courses.
- Stage 2: a minimum of Grade D in at least 5 courses including one F2 course and three F1 courses.
Award Requirements

Honours degree classification is determined by performance in:

- Stage 3, averaged over all qualifying courses (40%)
- Stage 4, averaged over all qualifying courses (60%)

The qualifying courses are all courses in these years rated SCQF level 9 or 10.

The accompanying Programme Structure provides details of courses, awards and credits for the programme.
The accompanying Programme Description template provides details of aims, outcomes, teaching & learning and assessment policies for the programme.
List of Optional courses to be appended
10. Educational Aims of the Course

The principal aims of the course are to

- provide high-quality undergraduate education in a wide range of subjects in modern mathematics and computer science
- enable students to develop detailed knowledge and critical understanding of both theoretical and applied elements of mathematics and computer science
- 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 and computer science necessary to go onto to further study or straight into graduate jobs

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

**Subject Mastery**

*Understanding, Knowledge and Cognitive Skills*

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

*Scholarship, Enquiry and Research*

On completion of the course 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
Form 19

Heriot-Watt University – Course Description Template (RAY)

<table>
<thead>
<tr>
<th>(a) Course Code</th>
<th>(b) Course Title</th>
<th>(c) School</th>
<th>(d) Type</th>
<th>(e) Awards</th>
<th>(f) Course Accredited by</th>
<th>6. UCAS Code</th>
<th>7. QAA Subject Benchmarking Group(s)</th>
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<td>Mathematics with Computer Science</td>
<td>Mathematical &amp; Computer Sciences</td>
<td>BSc</td>
<td>BSc Honours, BSc Ordinary, DipHE, CertHE</td>
<td></td>
<td>G100</td>
<td>Mathematics</td>
<td>4 April 2008</td>
</tr>
</tbody>
</table>

**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:**

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 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 modules 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.
13. Assessment Policies:

The assessment policy for the course incorporates a range of assessment types. Continuous assessment during some modules and summative assessment at the conclusion of modules 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 module descriptors.

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