Programme Specification – 2016/17

1. Awarding body
   University of Surrey

2. Teaching institution (if different)
   N/A

3. Final award and programme/pathway title
   MSc Mathematics

4. Subsidiary award(s) and title(s)
<table>
<thead>
<tr>
<th>Award</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PG Diploma</td>
<td>Mathematics</td>
</tr>
<tr>
<td>PG Certificate</td>
<td>Mathematics</td>
</tr>
</tbody>
</table>

5. FHEQ Level
   7

6. Credits and ECTS credits
   180 UK credits, 90 ECTS credits

7. Name of Professional, Statutory or Regulatory Body (PSRB)
   N/A

8. Mode of study and route code
<table>
<thead>
<tr>
<th>Mode of study</th>
<th>Route code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full-time</td>
<td>Y</td>
</tr>
<tr>
<td>Full-time with PTY</td>
<td>N</td>
</tr>
<tr>
<td>Part-time</td>
<td>N</td>
</tr>
<tr>
<td>Distance learning</td>
<td>N</td>
</tr>
<tr>
<td>Short course</td>
<td>N</td>
</tr>
</tbody>
</table>

9. JACs code

10. QAA Subject benchmark statement (if applicable)
    Level 7 Annex to the QAA Subject Benchmark Statement for Mathematics, Statistics and Operational Research

11. Other internal and / or external reference points
    N/A

12. Faculty and Department/School
    Faculty of Engineering and Physical Sciences, Department of Mathematics

13. Programme Leader
    Prof S.A. Gourley

14. Date of production/revision of the specification
    July 2016

15. Educational aims of the programme
    • To provide graduates with a strong background in advanced mathematical theory and its applications to the solution of real problems.
    • To develop students understanding of core areas in advanced mathematics including standard tools for the solution of real life applied mathematical problems.
    • To develop the skill of formulating a mathematical problem from a purely verbal description.
    • To develop the skill of writing a sophisticated mathematical report and, additionally, in presenting the results in the form of an oral presentation.
    • To lay a foundation for carrying out mathematical research leading to a research degree and/or a career as a professional mathematician in an academic or non-academic setting.

16. Programme learning outcomes – the programme provides opportunities for students to develop and demonstrate knowledge and understanding, skills, qualities and other attributes in the following areas:

Knowledge and understanding
    • Knowledge (limited for PGCert; broad for PGDip and MSc) of the core theory and methods of advanced pure and applied mathematics and how to apply that theory to real life problems.
(MSc only) An in-depth study of a specific problem arising in a research context.

### Intellectual / cognitive skills

- Ability to demonstrate knowledge of key techniques in advanced mathematics and to apply those techniques in problem solving.
- Ability to formulate a mathematical description of a problem that may be described only verbally.
- An understanding of possible shortcomings of mathematical descriptions of reality.
- (For MSc) ability to use software such as MATLAB and IT facilities more generally including research databases such as MathSciNet and Web of Knowledge.

### Professional practical skills

Professional practical skills for a research mathematician are fluency in advanced mathematical theory, the ability to interpret the results of the application of that theory, an awareness of any weaknesses in the assumptions being made and of possible shortcomings with model predictions, and the skill of writing an extended and sophisticated mathematical report and of verbally summarising its content to specialist and/or non-specialist audiences.

### Key / transferable skills

- Ability to reason logically and creatively.
- (for MSc) Effective oral presentation skills.
- (for MSc) Written report writing skills.
- (for MSc) Skills in independent learning.
- Time management.
- Use of information and technology

### 17. Programme structure – including the route / pathway / field requirements, levels modules, credits, awards and further information on the mode of study.

All programmes operate on a 15 credit modular structure over two semesters. All taught modules are semester based and are worth 15 credits, which is indicative of 150 hours of learning, comprised of student contact, private study and assessment. Project and dissertation modules can be either 15, 30, 45 or 60 credits and, additionally Master’s dissertations 90 credits.

The dissertation module is 60 credits. Students work on the dissertation in the latter half of the one-year programme including the Summer, and submit their dissertation in late Summer.

Credits achieved from completing the dissertation / final project module cannot be attributed to a subsidiary award. Students are unable to submit their dissertation until they have successfully completed their taught modules.

This programme is studied full-time over one academic year. In order to achieve the principal award of an MSc a student must complete 180 credits, with a minimum of 150 credits at FHEQ level 7 and the remainder at FHEQ level 6. Students are also eligible to exit the programme with the following subsidiary awards:

- **PG Dip** – 120 credits with a minimum of 90 credits at FHEQ level 7 and the remainder at FHEQ level 6
- **PG Cert** – 60 credits with a minimum of 45 credits at FHEQ level 7 and the remainder at FHEQ level 6

In order for students to progress they must achieve a minimum average of 50%.
### Programme adjustments (if applicable)

N/A

<table>
<thead>
<tr>
<th>Module code</th>
<th>Module title</th>
<th>Core /compulsory /optional</th>
<th>Credit volume</th>
<th>Semester (1 / 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT3013</td>
<td>Maths of Weather</td>
<td>Optional</td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>MAT3043</td>
<td>Graphs and Networks</td>
<td>Optional</td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>MAT3009</td>
<td>Manifolds &amp; Topology</td>
<td>Optional</td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>MAT3039</td>
<td>Quantum Mechanics</td>
<td>Optional</td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>MAT3015</td>
<td>Numerical Solutions of PDEs</td>
<td>Optional</td>
<td>15</td>
<td>2</td>
</tr>
<tr>
<td>MATM022</td>
<td>Functional Analysis &amp; Partial Differential Equations</td>
<td>Optional</td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>MATM027</td>
<td>Nonlinear Wave Equations</td>
<td>Optional</td>
<td>15</td>
<td>2</td>
</tr>
<tr>
<td>MATM035</td>
<td>Representation Theory</td>
<td>Optional</td>
<td>15</td>
<td>2</td>
</tr>
<tr>
<td>MATM045</td>
<td>Advanced Techniques in Mathematics</td>
<td>Optional</td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>MATM011</td>
<td>Lie Algebras</td>
<td>Optional</td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>MATM031</td>
<td>Nonlinear Patterns</td>
<td>Optional</td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>MATM032</td>
<td>Geometric Mechanics</td>
<td>Optional</td>
<td>15</td>
<td>2</td>
</tr>
<tr>
<td>MATM036</td>
<td>Relativity</td>
<td>Optional</td>
<td>15</td>
<td>2</td>
</tr>
<tr>
<td>MATM037</td>
<td>Ecological and Epidemiological Modelling</td>
<td>Optional</td>
<td>15</td>
<td>2</td>
</tr>
<tr>
<td>MATM040</td>
<td>Mathematical Biology and Physiology</td>
<td>Optional</td>
<td>15</td>
<td>2</td>
</tr>
<tr>
<td>MATM042</td>
<td>Topology</td>
<td>Optional</td>
<td>15</td>
<td>2</td>
</tr>
<tr>
<td>MATM049</td>
<td>Non-Commutative Algebras</td>
<td>Optional</td>
<td>15</td>
<td>2</td>
</tr>
<tr>
<td>MATM046</td>
<td>Dissertation</td>
<td>Compulsory</td>
<td>60</td>
<td>Summer</td>
</tr>
</tbody>
</table>

How many optional modules must a student choose in order to achieve the necessary amount of credits to achieve this level?

Except for the dissertation, all modules are optional, subject only to the requirements noted above (e.g., for the MSc, a minimum of 150 credits must be at Level 7).

Due to limitations on the availability of academics, not every module is offered every year. In a typical academic year, approximately 5 Level 6 modules and 10 Level 7 modules will be offered in addition to the dissertation.

### Opportunities for placements / work-related learning / collaborative activity – please indicate if any of the following apply to your programme

- Associate Tutor(s) / Guest Speakers / Visiting Academics: N/A
- Professional Training Year (PTY): N/A
- Placement(s) (study or work that are not part of the PTY or Erasmus Scheme): N/A
- Clinical Placement(s) (that are not part of the PTY Scheme): N/A
- ERASMUS Study (that is not taken during Level P): N/A
- Study exchange(s) (that are not part of the ERASMUS Scheme): N/A
- Dual degree: N/A

### Quality assurance

The Regulations and Codes of Practice for taught programmes can be found at: [http://www.surrey.ac.uk/quality_enhancement/index.htm](http://www.surrey.ac.uk/quality_enhancement/index.htm)