1. **Awarding body** | University of Surrey
2. **Teaching institution (if different)** | N/A
3. **Final award and programme/pathway title** | MSc Biomedical Engineering
4. **Subsidiary award(s) and title(s)** | Award | Title |
| | PG Dip | Biomedical Engineering |
| | PG Cert | Biomedical Engineering |
5. **FHEQ Level** | 7
6. **Credits and ECTS credits** | 180 UK credits, 90 ETCS credits
7. **Name of Professional, Statutory or Regulatory Body (PSRB)** | Institute of Physics and Engineering in Medicine (IPEM)
8. **Mode of study and route code** | Mode of study | Route code |
| | Full-time | Y |
| | Full-time with PTY | N |
| | Part-time | Y |
| | Distance learning | N |
| | Short course | N |
9. **JACs code** | H160
10. **QAA Subject benchmark statement (if applicable)** | Engineering
11. **Other internal and / or external reference points** | The IPEM Masters level accreditation framework
12. **Faculty and Department/School** | Faculty of Engineering and Physical Sciences, Department of Mechanical Engineering Sciences
13. **Programme Leader** | Dr Serge Cirovic
14. **Date of production/revision of the specification** | August 2016
15. **Educational aims of the programme**
The course aims to:
- Educate engineering, physical science, life science, medical and paramedical graduates in the broad base of knowledge required for a Biomedical Engineering career in industry, healthcare or research in the United Kingdom, Europe and the rest of the world.
- To underpin the knowledge base with a wide range of practical sessions including laboratory/experimental work and applied visits to expert health care facilities and biomedical engineering industry.
- To develop skills in critical review and evaluation of the current approaches in biomedical engineering. To build on these through an MSc research project in which further experimental, analytical, computational, and/or design skills will be acquired.

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**

**MSc Biomedical Engineering**
1. Demonstrate breadth and depth of awareness and understanding of issues at the forefront of Biomedical Engineering:
<p>| | |</p>
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<tr>
<td>2.</td>
<td>Demonstrate broad knowledge in Human Biology, Instrumentation, Biomechanics, and Professional and Research skills</td>
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<tr>
<td>3.</td>
<td>Demonstrate specialist knowledge in Implants, Motion analysis and rehabilitation, and Medical signals</td>
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<tr>
<td>4.</td>
<td>Understand how to apply engineering principles to conceptually challenging (bio)medical problems.</td>
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<td>5.</td>
<td>Appreciate the limitations in the current understanding of clinical problems and inherent in adopted solutions.</td>
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<tr>
<td>6.</td>
<td>Understand routes/requirements for personal development in biomedical engineering including state registration.</td>
</tr>
<tr>
<td>7.</td>
<td>Understand key elements of the concept of ethics and patient-professional relationships, recognise, analyse and respond to the complex ethical issues.</td>
</tr>
</tbody>
</table>

**PG Dip Biomedical Engineering**

1. Demonstrate breadth and depth of awareness and understanding of issues at the forefront of Biomedical Engineering:  
2. Demonstrate broad knowledge in Human Biology, Instrumentation, Biomechanics, and Professional and Research skills  
3. Demonstrate specialist knowledge in Implants, Motion analysis and rehabilitation, and Medical signals  
4. Understand how to apply engineering principles to conceptually challenging (bio)medical problems.  
5. Appreciate the limitations in the current understanding of clinical problems and inherent in adopted solutions.  
6. Understand routes/requirements for personal development in biomedical engineering including state registration.  
7. Understand key elements of the concept of ethics and patient-professional relationships, recognise, analyse and respond to the complex ethical issues.

**PG Cert Biomedical Engineering**

1. Demonstrate breadth and depth of awareness and understanding of issues at the forefront of selected topics in Biomedical Engineering:  
2. Demonstrate broad knowledge in Professional and Research skills  
3. Demonstrate broad/specialist knowledge in at least three of the following seven areas: Human Biology, Instrumentation, Biomechanics, Computer Methods, Implants and Biomaterials, Motion Analysis and Rehabilitation, and Medical Signals.  
4. Understand how to apply engineering principles to conceptually challenging selected (bio)medical problems.  
5. Appreciate the limitations in the current understanding of a range of clinical problems and inherent in adopted solutions.  
6. Understand routes/requirements for personal development in biomedical engineering including state registration.  
7. Understand key elements of the concept of ethics and patient-professional relationships, recognise, analyse and respond to the complex ethical issues.

**Intellectual / cognitive skills**

**MSc Biomedical Engineering**

1. Evaluate a wide range of applied engineering and clinical measurement and assessment tools.  
2. Design and implement a personal research project. This includes an ability to accurately assess/report on own/others work with justification and relate them to existing knowledge structures and methodologies, showing insight and understanding of alternative points of view.  
3. Carry out such research in a flexible, effective and productive manner, optimising use of available support, supervisory and equipment resources, demonstrating understanding of the complex underlying issues.  
4. Apply appropriate theory and quantitative methods to analyse problems.
PG Dip Biomedical Engineering
1. Evaluate a wide range of applied engineering and clinical measurement and assessment tools.
2. Implement mini research projects. This includes an ability to accurately assess/report on own/others work with justification and understanding of complex underlying issues.
3. Apply appropriate theory and quantitative methods to analyse problems

PG Cert Biomedical Engineering
1. Evaluate a range of applied engineering and clinical measurement and assessment tools.
2. Implement mini research projects. This includes an ability to accurately assess/report on own/others work with justification and understanding of complex underlying issues.
3. Apply appropriate theory and quantitative methods to analyse problems.

MSc Biomedical Engineering
1. Make effective and accurate use of referencing across a range of different types of sources in line with standard conventions.
2. Use/apply basic and applied instrumentation hardware and software.
3. Correctly use anthropometric measurement equipment and interpret results in the clinical context
4. Use/apply fundamental statistical analysis tools.
5. Use advanced movement analysis hardware and software and interpret results in the clinical context.
6. Use advanced finite element packages and other engineering software for computer simulation.
7. Program in a high-level programming language and use built-in functions to tackle a range of problems.
8. Use further specialist skills (laboratory-experimental, analytical, and computational) developed through the personal research project.

PG Dip Biomedical Engineering
1. Make effective and accurate use of referencing across a range of different types of sources in line with standard conventions.
2. Use/apply basic and applied instrumentation hardware and software.
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Key / transferable skills

MSc Biomedical Engineering
1. Identify, select, plan for, use and evaluate ICT applications and strategies to enhance the achievement of aims and desired outcomes.
2. Undertake independent review, and research and development projects.
3. Communicate effectively between engineering, scientific and clinical disciplines.
4. Prepare relevant, clear project reports and presentations, selecting and adapting the appropriate format and style to convey information, attitudes and ideas to an appropriate standard and in such a way as to enhance understanding and engagement by academic/professional audiences.

**PG Dip Biomedical Engineering**
1. Identify, select, plan for, use and evaluate ICT applications and strategies to enhance the achievement of aims and desired outcomes.
2. Undertake independent review, and plan for research and development projects.
3. Communicate effectively between engineering, scientific and clinical disciplines.
4. Prepare relevant, clear project reports and presentations, selecting and adapting the appropriate format and style to convey information, attitudes and ideas to an appropriate standard and in such a way as to enhance understanding and engagement by academic/professional audiences.

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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. The project/dissertation module is 60 credits.

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 and part-time over two academic years. 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%.

All modules are taught on the University main campus, with the exception of visits to the health care industry e.g. commercial companies and NHS hospitals

Programme adjustments (if applicable)
N/A

<table>
<thead>
<tr>
<th>FHEQ Level (7): Potential awards – MSc / PG Cert / PG Dip</th>
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<tbody>
<tr>
<td><strong>Module code</strong></td>
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<table>
<thead>
<tr>
<th>Module Code</th>
<th>Module Name</th>
<th>Level</th>
<th>Credits</th>
<th>Year(s)</th>
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<tbody>
<tr>
<td>ENGM185</td>
<td>Human Biology</td>
<td></td>
<td>15</td>
<td>1</td>
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<tr>
<td>ENGM186</td>
<td>Instrumentation</td>
<td></td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>ENGM187</td>
<td>Biomechanics</td>
<td></td>
<td>15</td>
<td>1</td>
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<tr>
<td>ENGM195</td>
<td>Professional and Research Skills</td>
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<td>15</td>
<td>1</td>
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<tr>
<td>ENGM259</td>
<td>Computer Methods in Biomedical Research</td>
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<td>15</td>
<td>2</td>
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<tr>
<td>ENGM261</td>
<td>Medical Implants and Biomaterial Applications</td>
<td></td>
<td>15</td>
<td>2</td>
</tr>
<tr>
<td>ENGM260</td>
<td>Human Movement and Rehabilitation</td>
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<td>2</td>
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<tr>
<td>ENGM262</td>
<td>Biomedical Sensors and Signals</td>
<td></td>
<td>15</td>
<td>2</td>
</tr>
<tr>
<td>ENGM209</td>
<td>Research Project</td>
<td></td>
<td>60</td>
<td>1 and 2</td>
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</table>

How many optional modules must a student choose in order to achieve the necessary amount of credits to achieve this level?  
No optional modules for MSc and PG Dip.  
Three optional modules for PG Cert.

18. 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**: Yes
- **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

19. 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)