<table>
<thead>
<tr>
<th>Pathway programmes: some specialisation</th>
<th>Advanced Chemical Engineering</th>
<th>Optional modules</th>
<th>Research project (60 credits)</th>
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<tbody>
<tr>
<td>ACE with bioprocessing</td>
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<td>ACE with energy</td>
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<td>ACE with formulation</td>
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<td>ACE with healthcare technology</td>
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<th>MSc programmes in Chemical Engineering at the University of Birmingham</th>
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<td><strong>Introductory modules (10 credits)</strong></td>
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<td><strong>Core modules (50 credits)</strong></td>
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<td><strong>Pathway modules</strong></td>
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**Advanced Chemical Engineering**
- Process Engineering Fundamentals or
- Bioscience for Graduates from Other Scientific Disciplines
- Non-ideal materials
- Measurement, Sensors and Design of Experiments
- Applied Synthetic Biology

**Pathway modules**
- 40 credits of modules on bioprocessing
- 40-60 credits of modules on energy
- 40-50 credits of modules on formulation
- 40-60 credits of modules on healthcare technology

**Optional modules**
- Choose from a wide range of modules in the areas of:
  - Bioprocessing
  - Energy engineering
  - Business skills
  - Food processing & safety
  - Formulation engineering
  - Healthcare technology
  - Pharmaceuticals

**Research project.** Work with a research group within the school on an original research project.

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**Global Energy Technology Systems**
- Fundamental aspects: Advanced Energy Technology & Energy Systems and Policy

**Introductory modules**
- Process Engineering Fundamentals (unless Chem Eng grad)

**Core modules (80-90 credits)**
- Non-ideal materials
- Measurement, Sensors and Design of Experiments
- Industry 4.0 and Big Data

**Optional modules**
- 20-30 credits of modules on formulation
- 20-40 credits of optional modules

**Research project (60 credits)**
- Formulation engineering
- Research project

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**Formulation Engineering**
- Process Engineering Fundamentals (unless Chem Eng grad)

**Introductory modules (0-20 credits)**
- Introduction to Healthcare Technology
- Bioscience for Graduates

**Core modules (60 credits)**
- Advanced Therapeutic Medicine Products
- Additive manufacturing and 3D printing for healthcare applications
- Frontiers in Tissue Engineering
- Advanced Biomaterials for Healthcare Technologies
- Medical Devices
- Sensor systems in medicine

**Optional modules**
- 40-60 credits of optional modules

**Research project (40-60 credits)**
- Healthcare Technology
- Research project

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**Healthcare Technology**
- Introduction to Healthcare Technology
- Bioscience for Graduates

**Introductory modules (0-20 credits)**
- Advanced Chemical Engineering

**Core modules (110 credits)**
- Advanced Therapeutic Medicine Products
- Additive manufacturing and 3D printing for healthcare applications
- Frontiers in Tissue Engineering
- Advanced Biomaterials for Healthcare Technologies
- Medical Devices
- Sensor systems in medicine

**Optional modules**
- 40 credits of optional modules

**Research project (10 credits)**
- Global Energy Technology Systems
- Research project

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Please note that optional modules are subject to change. For a full list of the available optional modules and module contents, please visit [www.birmingham.ac.uk/adv-chemical-engineering](http://www.birmingham.ac.uk/adv-chemical-engineering).