Programme Specification: MEng Engineering Science

1. Awarding institution/body  University of Oxford
2. Teaching institution  University of Oxford
3. Programme accredited by  Institutions of Civil and Structural Engineers, Institution of Engineering and Technology, Institution of Mechanical Engineers, Institute of Measurement and Control, Institution of Chemical Engineers
4. Final award  MEng
5. Programme  Engineering Science
6. UCAS codes  H100 MEng, H200 MEng/CvE, H300 MEng/MecE, H620 MEng/EE, H630 MEng/IE, H800 MEng/ChE, H811 MEng/BioE
7. Relevant subject benchmark statement  Engineering
8. Date of programme specification  November 2014
9. Educational aims of the programme
   - To provide students with: a systematic understanding of the knowledge-base of Engineering Science: the ability to analyse complex issues both systematically and creatively, make sound judgements in the absence of complete data and communicate their conclusions clearly; the ability to be self-directed and innovative in tackling and solving problems; the independent learning ability required for continuing professional development.
   - To provide a broad curriculum which provides state-of-the-art knowledge and practical skills in Engineering.
   - To provide a learning environment that enables students of high innate ability to reach their full potential, personally and academically, so that on graduation they are free to choose from many different careers, and have the understanding, knowledge and personal maturity to make a rapid contribution to their chosen employment or research area.
   - To provide a course which meets the educational requirements of all the appropriate Engineering Institutions for Chartered Engineer status.

10. Programme outcomes

Teaching/Learning Methods and Strategies

A number of teaching methods are used to encourage student learning and facilitate the achievement of the programme outcomes as described later in this section. The theoretical part of the course is taught primarily by lectures supported by tutorials and classes, while the practical elements are taught using laboratory sessions and project work. The major teaching methods are:

- Lectures - backed up by handouts provided as hard copy (such material is also made available on WebLearn, the University’s Virtual Learning Environment). First pass through material; emphasis on understanding rather than note taking. Establishing a learning framework.

- Tutorials and classes - problem based learning in small groups – with college tutor in early years and with course lecturer or teaching assistant in later specialist options – using tutorial problem sheets issued by the Department. Analytical skills developed. Student centred as far as possible.

- Practicals: Structured practicals to introduce students to test equipment, experimental techniques, provide illustration of theoretical ideas. Assessed throughout the year.
- **DBT**: Design, build, and test. Problem based practicals extending over several sessions. Opportunity for student to lead design and to set his/her own pace. Assessed on practical work and a report.

- **CWMs**: Coursework modules (including a compulsory design module). Four-day practical courses, problem based. Students take significant responsibility for planning and execution. Some industrial visits.

- **3YP**: Third-Year Projects. Multidisciplinary (between engineering disciplines) group projects on design of an engineering system, led by students with assistance from academic supervisors. Student group responsible for project management. Include business, technical and sustainability aspects. Assessed continuously throughout the year – final assessment made on the basis of the overall standard of the performance of the team in meeting the objectives of the project; the project logbook; the quality of the oral presentation and the written project report.

- **4YP**: Fourth-Year Projects. Often research based or design project. Students work alone or in pairs (sometimes), responsible for planning and execution with advice from academic supervisor. Assessed through presentation and report.

The high staff-student ratio in tutorials ensures student participation and challenges them to develop a deep understanding of the material covered. The colleges and the Department co-operate fully on the timing and content of material received in this way, with the lecturers responsible for each course also providing tutorial problem sheets.

A number of strategies based on student participation, with staff-student ratio normally better than 1 to 8, are used to stimulate deep learning further through problem based projects and practical work in which students extend their understanding and application of material in more realistic contexts. Design techniques are introduced through loosely structured ‘design-build-test’ projects in the first year, and developed through the core course through project work and the coursework modules, with possible extension in the fourth year project for interested students. Opportunities to work in a team, to use managerial skills and to develop presentational skills are introduced primarily through the third year projects.

Summative assessment (through written examinations and submitted reports) is an important part of the course in motivating students to assimilate the techniques and material in the course in depth, with the most successful student thereby building up a facility in both which is available to them for life. Formative assessment is vital in encouraging and directing their on-going learning, and in providing goals of attainment throughout their course. The following table summarises the assessment styles associated with each teaching method:

<table>
<thead>
<tr>
<th></th>
<th>Lectures</th>
<th>Tutorials</th>
<th>Practics</th>
<th>DBT</th>
<th>CWM</th>
<th>3YP</th>
<th>4YP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Formative</strong></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Assessment</strong></td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td><strong>Summative</strong></td>
<td>✓ (exam)</td>
<td>✓ (exam)</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
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<tr>
<td><strong>Assessment</strong></td>
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</tbody>
</table>

The course design is presented in the context of

- The QAA Benchmark Statements for Engineering
- The Annex concerning MEng degrees
- UK-SPEC

The following sub-sections show how the learning methods described are used in relation to the attributes identified in these documents.
A. Students will develop a knowledge and understanding of:

**Mathematics:** Mathematical methods relevant to the discipline and an appreciation of their limitations.

**Science:** Scientific principles appropriate to the specific discipline.

**Information Technology:** Principles of IT and Communications (ITC) relevant to the discipline.

**Design**
General principles of design. Design techniques specific to particular products and processes. Characteristics of a wide range of engineering materials and components.

**Business Context:** Management and business practices (including finance, law, marketing, personnel and quality). Professional and ethical responsibilities including global and social context of engineering.

**Engineering Practice**
Manufacturing and/or operational practice. Codes of practice and the regulatory framework. Requirements for safe operation.

These are covered by the following methods:

<table>
<thead>
<tr>
<th></th>
<th>Lectures</th>
<th>Tutorials/Classes</th>
<th>Practicals</th>
<th>DBT</th>
<th>CWM</th>
<th>3YP</th>
<th>4YP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maths</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Science</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>IT</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Design</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Business Context</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Engineering Practice</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

B.I. Students will have the opportunity to develop the following intellectual skills during their course:

**Mathematics:** Ability to select and apply appropriate mathematical methods for modelling and analysing engineering problems.

**Science:** Use of scientific principles in the development of engineering solutions to practical problems. Use of scientific principles in the modelling and analysis of engineering systems, processes and products.

**Information Technology:** Ability to select and apply appropriate computer based methods for modelling and analysing engineering problems and the ability to assess the limitations of particular cases.

**Design:** Analysis of systems, processes and components requiring engineering solutions. Creation of new processes or products through the synthesis of ideas from a wide range of sources. Ability to apply and adapt design methodologies in unfamiliar situations.

**Business Context:** Commercial risk evaluation.

**Engineering Practice:** Ability to produce solutions to problems through the application of engineering. Knowledge and understanding ability to undertake technical risk evaluation.
These are covered by the following methods:

<table>
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<tr>
<th></th>
<th>Lectures</th>
<th>Tutorials</th>
<th>Classes</th>
<th>Practicals</th>
<th>DBT</th>
<th>CWM</th>
<th>3YP</th>
<th>4YP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maths</td>
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<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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</tr>
<tr>
<td>Science</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>IT</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Design</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Business</td>
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<tr>
<td>Context</td>
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</tr>
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<td>Engineering</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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</tr>
</tbody>
</table>

**B.II. Students will have the opportunity to develop the following practical skills during their course:**


Science: Use of relevant test and measurement equipment. Experimental laboratory work.

Information Technology: Use of engineering IT tools (including programming languages where appropriate).

Design: Design of a system, component or process. Practical testing of design ideas in laboratory or through simulation, with technical analysis and critical evaluation of results. Research for information to develop ideas further.

Engineering Practice: Ability to apply engineering techniques taking account of industrial and commercial constraints. Project management.

These are covered by the following methods:

<table>
<thead>
<tr>
<th></th>
<th>Lectures</th>
<th>Tutorials</th>
<th>Classes</th>
<th>Practicals</th>
<th>DBT</th>
<th>CWM</th>
<th>3YP</th>
<th>4YP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maths</td>
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<td>✓</td>
<td></td>
<td>✓</td>
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</tr>
<tr>
<td>Science</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>IT</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Design</td>
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<td></td>
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<td>✓</td>
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</tr>
<tr>
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<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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</tbody>
</table>

**B.III. Students will have the opportunity to develop the following transferable skills during their course:**

Mathematics: Manipulation and sorting of data. Presentation of data in a variety of ways. Analytical skills.

Science: Use of scientific evidence based methods in solution of problems.

Information Technology: Use of general IT tools.
Design: Creativity and innovation in problem solving. Working with limited or contradictory information.


Engineering Practice: Engineering approach to solution of problems. Time and resource management. Teamwork and leadership.

These are covered by the following methods:

<table>
<thead>
<tr>
<th></th>
<th>Lectures</th>
<th>Tutorials</th>
<th>Classes</th>
<th>Practicals</th>
<th>DBT</th>
<th>CWM</th>
<th>3YP</th>
<th>4YP</th>
</tr>
</thead>
<tbody>
<tr>
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<td>✓</td>
<td></td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
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</tr>
</tbody>
</table>
11. Programme Structures and Features

The programme is offered as a four-year course leading to the degree of MEng in Engineering Science – the components are summarised below:

<table>
<thead>
<tr>
<th>Year</th>
<th>Part</th>
<th>Element</th>
<th>Written Paper or Coursework</th>
<th>Core or Options</th>
<th>Examination Unit (EU)</th>
<th>Total EU</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PRELIMS</td>
<td>P1 Mathematics</td>
<td>WP</td>
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<td>1</td>
<td>1</td>
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<tr>
<td></td>
<td></td>
<td>P2 Electronic and Information Engineering</td>
<td>WP</td>
<td>C</td>
<td>1</td>
<td>1</td>
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<tr>
<td></td>
<td></td>
<td>P3 Structures and Mechanics</td>
<td>WP</td>
<td>C</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>P4 Energy</td>
<td>WP</td>
<td>C</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>P5 Engineering Coursework</td>
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<td>C</td>
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</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>4.5</strong></td>
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<tr>
<td>2</td>
<td>A</td>
<td>A1 Mathematics</td>
<td>WP</td>
<td>C</td>
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<tr>
<td></td>
<td></td>
<td>A2 Electronic and Information Engineering</td>
<td>WP</td>
<td>C</td>
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<tr>
<td></td>
<td></td>
<td>A3 Structures, Materials and Dynamics</td>
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<tr>
<td></td>
<td></td>
<td>A4 Energy Systems</td>
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<td>C</td>
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<tr>
<td></td>
<td></td>
<td>A5 Engineering Practical Work</td>
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<tr>
<td></td>
<td><strong>B</strong></td>
<td>B1 Engineering Computation</td>
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<td>C</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B2 Engineering in Society</td>
<td>WP</td>
<td>C</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B3 Group Design Project</td>
<td>C</td>
<td>C</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B4 Engineering Practical Work</td>
<td>C</td>
<td>C</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td><strong>Sub Total</strong></td>
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<td></td>
<td><strong>10</strong></td>
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</tr>
<tr>
<td>3</td>
<td>C</td>
<td>6 C Option Papers</td>
<td>WP</td>
<td>O</td>
<td>0.5 each</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
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<td>4th year Project</td>
<td>C</td>
<td>C</td>
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<tr>
<td></td>
<td><strong>Sub Total</strong></td>
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<td></td>
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<td></td>
<td><strong>Total</strong></td>
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<td></td>
<td></td>
<td><strong>16</strong></td>
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</tr>
</tbody>
</table>
First Year
P1 Mathematics
P2 Electronic and Information Engineering
P3 Structures and Mechanics
P4 Energy
P5 Engineering Coursework

Second Year (Final Honour School Part A)
A1 Mathematics
A2 Electronic and Information Engineering
A3 Structures, Materials and Dynamics
A4 Energy Systems
A5 Engineering Practical Work

Third Year (Final Honour School Part B)
Compulsory elements
   B1 Engineering Computation
   B2 Engineering in Society
   B3 Group Design Project
   B4 Engineering Practical Work

Five options from (indicative titles):
   B5 Solid Mechanics
   B6 Equilibrium Thermodynamics
   B7 Fluid Flow, Heat & Mass Transfer
   B8 Materials
   B9 Structures and Hydraulics
   B10 Soil Mechanics
   B11 Chemical Processes
   B12 Electronic Devices
   B13 Circuits and Communications
   B14 Information Engineering Systems
   B15 Control Systems
   B16 Software Engineering
   B17 Biomechanics
   B18 Biomedical Modelling and Monitoring

Fourth Year (Final Honour School Part C)
Fourth Year Project
Six options from (indicative titles):
   C1 Automotive engineering
   C2 Aerothermal engineering
   C3 Micromechanics and materials modelling
   C4 Mechanical performance and integrity
   C5 Advanced Structures
   C6 Geotechnics
   C7 Hydraulics
   C8 Sustainable energy
   C9 Environmental engineering
   C10 Bioprocess Engineering
   C11 Chemical Engineering I
   C12 Chemical Engineering II
   C13 Production engineering
   C14 Optoelectronics
   C15 Microelectronics
   C16 Communications and Electromagnetics
   C17 Power electronics
   C18 Machine Vision and Robotics
12. Support for students and their learning

Teaching and Learning:

The Engineering Science Course Handbook contains a wealth of detailed information and advice about the course, and is distributed to all first-year undergraduates at the Departmental induction session in the week before the start of Michaelmas Term. The Handbook is revised each Summer, and the up-to-date version together with further information (e.g. reading lists) are always available on the Department’s internal web pages (restricted access) at https://weblearn.ox.ac.uk/portal/hierarchy/mpls/eng/ug

The Department provides a comprehensive series of lectures for all courses, backed up by handouts. Extended syllabuses and learning outcomes for the core and options courses are published on the University’s Virtual Learning Environment (WebLearn) and on the Department's intranet. The main lecture theatres and lecture rooms are all well-equipped and include data projectors for computer generated material.

To ensure consistency of teaching between colleges, the lecturers also provide tutorial problem sheets with reading lists to college tutors, typically one problem sheet every four lectures. Generally, tutors use these sheets as a basis for the term’s work. During the core part of the course (i.e. until the first term of the third year) students usually have two tutorials a week with their college tutor. These are typically two students to one tutor. Hence, a typical student would go to about two tutorials per week on top of ten hours of lectures and about five to ten hours of practical work. For each tutorial, typically there will be a problem sheet for which about ten hours of self-organised work is required.

Engineering tutors attempt to schedule tutorial problem sheets soon after the related lectures in order to consolidate the material taught in the lecture. Just occasionally Tutorial Problem Sheets may be attempted before the lectures; in these cases the extra effort of working from textbooks, independently of lectures, has educational value in terms of promoting discovery and self-confidence.

For third year options material and the whole of the fourth year, classes are arranged by the Department on behalf of the colleges. Problem classes of up to ten students are held by the lecturer for each course or teaching assistants.

A significant part of the teaching and learning is provided through laboratory work. All students are given their own personal timetable for this work and issued with detailed descriptions of what is required. Demonstrators are always at hand to provide help and advice.

Library Provision:

Undergraduates have access to excellent library facilities.

The Engineering Science Department maintains a reference collection of the books on the undergraduate recommended course reading lists. There is also study space and a wireless network available for use by students, staff and visitors.

The Department provides several dedicated PCs connected to SOLO (Search Oxford Libraries Online). Its resources include OLIS (the Oxford University on-line catalogue), abstracting services and the large number of electronic journals to which the University subscribes.

In addition, students have access to University libraries. The Bodleian is a copyright deposit library with reference holdings of nearly all UK publications. Items from the Bodleian are for reference use
only but can be ordered through OLIS for consultation during staffed library hours. The Radcliffe Science Library contains the main scientific and technical collection of the Bodleian Library.

Each college has a library providing for its own students, which provides a comprehensive selection of the recommended undergraduate textbooks.

**IT Provision:**

Students have access to the following computing facilities located in the Department of Engineering Science:

- The Software Laboratory on the sixth floor of the Thom Building houses a network of 60 workstations; 30 with Linux OS and the rest with MS Window OS. These provide a wide variety of software and Computer Aided Engineering packages.
- A design suite, housing 28 PCs is located in the Engineering and Technology Building. 24 are used for timetabled laboratories and four are made available for projects.

All these computing facilities are supported by the Engineering Computing Support Group. Notes are issued to all new users, who are also asked to sign an undertaking to abide by the University Rules for the Use of Computers.

For their fourth year project work, undergraduates are assigned to supervisors whose research groups often provide them with access to computing and other equipment. All undergraduates are given an email account and the majority of communications between students, Tutors and Engineering staff are conducted by email. An increasing amount of Department and course-related information is accessible from the Department’s web site and on WebLearn, the University’s Virtual Learning Environment.

Undergraduates also have the use of IT facilities provided by their college, and those provided by the Oxford University Computing Services (OUCS).

**Workshop provision:**

The staff-student workshop provides opportunities for engineering undergraduates to develop basic skills and understanding of workshop practices, both through the Workshop Practice course and during the DBT projects. The Department’s comprehensive machine workshop supports the project work throughout the course, and provides opportunities for undergraduates to interact with and learn from experienced technicians.

**Welfare:**

The Department staffs a Faculty office, which answers undergraduate queries and sorts out problems relating to the courses. It also has two confidential advisers and a disabilities contact. However, Colleges are the main source of welfare for students. College tutors and other college officers monitor the students’ progress and provide help and guidance of all kinds. Regular personal contact between students and tutors ensure that problems are addressed promptly. Colleges administer hardship and other funds as well as providing accommodation, sports and social facilities. The University Counselling Service is available to those students who need it.

**13. Criteria for Admission**

Candidates of high ability are encouraged to apply to read Engineering Science by attending open days and promotional visits. The Department of Engineering Science also runs a one-week residential ‘Headstart’ course, which provides the opportunity for students in Year 12 or Scottish Year 5 to find out what it is like to study for a degree in Engineering at Oxford University.

Grades required are A*AA at A-level, or equivalent marks on the Scottish Highers or the IB. Students taking alternative examinations are expected to attain an equivalent level of achievement. It is very unusual to receive applications from candidates offering HNDs or GNQVs.
Candidates are required to take an aptitude test as part of the admissions process for Engineering Science. Details are available at http://www.eng.ox.ac.uk/study-here/undergraduate/applying-for-admission/engineering-admissions-test

Students are expected to complete the full four-year course. Direct entry to any year of the course other than the first year is not generally permitted. After the examinations at the end of the 3rd year students who have not performed at a 2nd class level and above cannot continue into the 4th year but leave with a BA degree.

Applications are made to colleges of the University, not to the faculty/department, in the case of undergraduates. However, the Engineering tutors act together in the admissions process to ensure uniformity of practice between colleges and to ensure that all candidates are treated fairly and consistently. The target intake is agreed between the Head of Department and the Engineering Tutors, the latter agreeing the target distribution between colleges.

We expect to interview a much larger number of candidates than there are places to be offered. Sometimes individual colleges will be heavily over-subscribed with good candidates and in these cases it may be necessary for some candidates to be reallocated to a college different from their stated preference.

All shortlisted candidates resident in Europe are called to Oxford for interview. Shortlisted candidates who reside outside Europe can choose i) to come to Oxford for interview, or ii) to ask to have a Skype/telephone/videoconference interview at the discretion of the candidate’s first college. Candidates are interviewed in Oxford on one of three days in December. Each candidate called to Oxford is interviewed by two colleges. To complete the selection of candidates, information is again pooled for consideration by all the colleges together. Candidates are ranked according to their perceived ability and academic potential.

Our aim is to make offers to the highest ranked candidates, regardless of their college of preference, or the college to which they were assigned in the open application scheme. Engineering operates an ‘open offer’ scheme whereby a small number of candidates will be made an offer of a place without allocation to a particular college. The college will be determined after the publication of A-level results the following August, when all colleges have had the opportunity to review their entries. In every other respect, open offers are as firm as normal offers.

Qualities sought in the written application
The candidate’s application should give evidence of the following qualities:

1. High academic ability and potential, particularly in mathematics and physical sciences, as evidenced by:
   a. Actual achievement in recognised national and international public examinations already taken during the course of schooling (e.g., GCSE, AS-levels, etc)
   b. Predicted or actual achievement in recognised national and international public exams taken at the end of a candidate’s school or college career (e.g., A-levels, IB, etc).
   c. Academic references from independent and objective referees familiar with the candidate’s recent work.

2. An active and sustained interest in and enthusiasm for the engineered world, interpreted broadly.

Qualities sought during interview
Candidates invited for interview should expect an academic or technical interview. They should be able to demonstrate:

a. Fluency in expressing core knowledge and ideas in physics and mathematics.
b. Ability to apply existing knowledge methodically to new situations.
c. Ability to assimilate and apply new concepts.
d. Rapidity in thinking and reasoning and to be able to discuss their:
e. Commitment to intense and sustained learning.
f. Interest in and enthusiasm for the engineered world.
14. Methods for evaluating and improving the quality and standards of learning

Responsibility for the course is vested in the Faculty of Engineering Science (the collective body of the academics in the Department), which is part of the Mathematical, Physical and Life Sciences Division. The Divisional Board has formal responsibility for the maintenance of educational quality and standards in the broad subject areas, and exercises its responsibility through its Academic Committee, and in particular the scrutiny it gives to new course proposals and proposed course revisions, to reports of examiners, and to more general questions of academic policy.

Evaluation and enhancement of teaching arises from a variety of sources, including the following:

Student feedback

Feedback questionnaires allow Engineering students in all four years to comment on the perceived standards of lecture preparation and presentation, the lecture notes distributed, the relevance and difficulty of the problem sheets. Feedback on practical sessions and projects is also sought via these questionnaires. The outcomes of the feedback questionnaires are addressed by the Undergraduate Studies Committee on a termly basis. Comments by students on teaching quality and on the course may also be made directly via the Joint Consultative Committee, which meets with Departmental academic and administrative staff twice a term.

Shortcomings identified by the student feedback or any other means are discussed by the Undergraduate Studies Committee in the first instance. The Committee can, however, ask the Chairman of Faculty (or another member) to discuss the problem with the member of staff involved with a view to initiating remedial action. Possible remedial action might be attendance at Staff Development course(s) or peer review of a lecture.

Feedback on a lecturer’s performance is often available informally from comments made by students during tutorials. Learning how others have presented material in a way which evokes favourable comments from students can inspire lecturers to improve their own teaching methods. As most university lecturers are also college tutorial fellows, any difficulties with lectures or problem sheets are spotted and resolved quickly.

Colleges operate a feedback system on tutorial provision, questionnaires being distributed to students each term and results fed back to tutors, and other bodies where appropriate.

Monitoring procedures

The Engineering Science curriculum is the responsibility of the Faculty of Engineering Science. However, detailed course planning and consideration of the syllabus is delegated to the Undergraduate Studies Committee, which takes advice on teaching and syllabus matters from Subject Panels, and allocates lecture courses and laboratory teaching to individual staff members, attempting to match expertise and enthusiasm to teaching needs, and to balance loads between staff members.

Annual review

As part of the internal review process, teaching in the main Engineering subject areas is discussed by Subject Panels. Membership of a Panel is open to all staff with an interest in that area. Each panel has a representative on the Undergraduate Studies Committee to discuss changes and improvements to course content and delivery, and also recommend lecturers for the B and C option courses in the light of their expertise and experience. The process for monitoring programmes of study has recently been enhanced with the introduction of a new procedure, whereby Subject Panels review the content and delivery of all lecture courses and coursework packages on an annual cycle. The Undergraduate Studies Committee receives the minutes of panel meetings, and considers any wider implications of the review.

Changes in regulations

Changes in regulations recommended by Subject Panels or the Undergraduate Studies Committee are approved by the Faculty of Engineering Science, but also require Divisional and the University’s Education Committee approval.
Teaching

The Divisional Board is also responsible for academic appointments and for the arrangements (including mentoring, appraisal, and reviews of performance) for the support of newly appointed lecturers and for monitoring their teaching competence.

External reviews of learning and teaching

The programme is accredited by a range of professional engineering institutions (see section 6).

Examinations

The University appoints three external examiners from other Universities. The external examiners see all papers for the Final Honour School Examinations at the draft stage, monitor the marking and final decision process, and submit independent written reports. In order to monitor examination standards and procedures, once the examinations are over, the internal examiners also write a report which includes a question-by-question analysis of every paper.

The examiners’ reports, the minutes of the Undergraduate Studies Committee and the external examiners’ reports are considered by the Michaelmas Term meeting of the Faculty. These reports, together with the Faculty’s comments are then passed to the Divisional Board Academic Committee, which satisfies itself that relevant points are being addressed at departmental level, and considers any points which raise wider questions of policy. The Division passes on examiners’ reports, departmental comments, and its own comments and recommendations to the University’s Education Committee. The Divisional Office writes to each external examiner to respond to the points he/she has raised.

15. Regulation of assessment

Every undergraduate is required to sit a First Public Examination (Prelims) and a Second Public Examination (Finals). The Prelims Examination ensures that the student has developed understanding of all foundation areas of the course; resits are available in September where that understanding is defective in any paper. The Final Examination for classified honours is taken in three parts, at the end of the second, third and fourth years. Students sit written papers and also receive credit for the practical work, projects and essays done throughout the course.

The formal procedures determining the conduct of examinations are established and enforced by the University Proctors. The Examiners are appointed by the Proctors and formally are independent from the Department and from those who lecture the courses.

Boards of Examiners, under their elected Chairs, are responsible for setting all papers, and marking the scripts of the examinees. During the examination process, candidates are identified only by candidate number to ensure anonymity. Examiners may appoint Assessors to assist in the setting and marking of the more specialist papers. After scripts have been marked, the Board of Examiners meets to classify the students in accordance with the rules established by the Examinations Committee.

The conventions to be used by the examiners in Prelims and Finals are approved by the Faculty of Engineering Science on an annual basis and are communicated to candidates in writing with a reference copy being accessible on the Department’s web site. A copy of the previous year’s conventions are included in the Course Handbook and published on the web.

External examiners are appointed in order:

1. To verify that standards are appropriate to the award, in part by comparison with the standards of comparable institutions, and to ensure that the assessment procedures and the regulations governing them are fair and otherwise appropriate.

2. To ensure that the conduct of the examination and the determination of awards has been fairly conducted, and that individual student performance has been judged in accordance with the regulations and conventions of the Examining Board. This will entail signing the Class List as an endorsement that the processes of examination and classification have been fairly conducted.
Each external examiner is expected to write a report in each year in which they act. The reports are expected to cover all the following points:

- the standards demonstrated by the students
- the extent to which standards are appropriate for the award
- the design, structure and marking of assessments
- the procedures for assessment and examinations
- whether or not external examiners have had sufficient access to, and the power to call upon, any material necessary to make the required judgments
- students’ performance in relation to their peers in comparable courses
- the coherence of the policies and procedures relating to external examiners and their consonance with the explicit roles required of them
- the basis and rationale for any comparisons made
- the strengths and weaknesses of the students as a cohort
- the quality of teaching and learning which may be indicated by student performance

The report is addressed to the Vice-Chancellor, and is considered by the relevant Divisional Boards, faculties/departments and by the University’s Education Committee.

Where an external examiner’s report contains particular suggestions or criticisms, it is the responsibility of the faculty/department to ensure that full consideration is given to these, to institute further discussion or action, and to inform the external examiner within a reasonable time of what is done.

Classification

The following class boundaries are used as a guideline in classification in Finals:

**70-100: First Class** - The candidate shows excellent problem-solving skills and excellent knowledge of the material over a wide range of topics, and is able to use that knowledge innovatively and/or in unfamiliar contexts.

**60-69: Upper Second** - The candidate shows good or very good problem-solving skills, and good or very good knowledge of much of the material over a wide range of topics.

**50-59: Lower Second** - The candidate shows basic problem-solving skills and adequate knowledge of most of the material.

**40-49: Third** - The candidate shows reasonable understanding of at least part of the basic material and some problem solving skills. Although there may be a few good answers, the majority of answers will contain errors in calculations and/or show incomplete understanding of the topics.

**30-39: Pass** - The candidate shows some limited grasp of basic material over a restricted range of topics, but with large gaps in understanding. There need not be any good quality answers, but there will be indications of some competence.

**0-29: Fail** - The candidate shows inadequate grasp of the basic material. The work is likely to show major misunderstanding and confusion, and/or inaccurate calculations; the answers to most of the questions attempted are likely to be fragmentary only.

The Prelims examinations are not classified, but the Moderators may award a distinction to any candidate who achieves an average mark over all 5 papers of 70% or above.

16. Indicators of quality and standards

- Undergraduates regularly win national prizes for project work and scholarships for their studies.
- Employers regularly approach the Department, and our graduates are highly sought after. Very high employment rates are achieved over a wide variety of desirable destinations.
- The Royal Academy of Engineering sponsors Visiting Professors of Engineering Design.
• RAE 2008: with 85% of activity rated as ‘world leading’ or ‘internationally excellent,’ Oxford was ranked 2nd in the UK for General Engineering.

• The MEng Engineering Science is accredited by the relevant Engineering Institutions.

• The External Examiners have always been most complimentary about the overall standard of our courses and impressed by the quality of student projects.

• Good undergraduate feedback.

Contact for Queries
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