Programme Specification for the MEng in Mechanical Engineering

<table>
<thead>
<tr>
<th>1. Awarding Institution:</th>
<th>Imperial College London</th>
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<td>2. Teaching Institution:</td>
<td>Imperial College London</td>
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<tr>
<td>3. External Accreditation by Professional / Statutory Body:</td>
<td>Institution of Mechanical Engineers</td>
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<td>4. Name of Final Award:</td>
<td>MEng</td>
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<tr>
<td>5. Programme Title:</td>
<td>Mechanical Engineering</td>
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<tr>
<td>6. Date of revision of this programme specification:</td>
<td>09/2014</td>
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<td>7. Name of Home Department:</td>
<td>Department of Mechanical Engineering</td>
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<td>8. Name of Home Faculty:</td>
<td>Faculty of Engineering</td>
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<td>9. UCAS Code (or other coding system if relevant):</td>
<td>H301; H3H8</td>
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<td>10. Relevant QAA Subject Benchmarking Group(s) and/or other external/internal reference points:</td>
<td>Engineering</td>
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<td>11. Level(s) of programme within the Framework for Higher Education Qualifications (FHEQ)</td>
<td>Integrated Master’s (MEng), Levels 6 and 7</td>
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<td>12. Mode of Study:</td>
<td>Full time</td>
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<td>13. Language of Study:</td>
<td>English</td>
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<tr>
<td>14. Educational aims/objectives of the programme:</td>
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</table>
• Attract the most able and highly-motivated students irrespective of race, background, gender or country of origin,
• Provide those students with a thorough understanding of engineering principles, concepts and theories and with practice at using their understanding to solve problems and achieve project objectives, and
• Provide industry, the professions and public service with engineering graduates equipped to play leading roles. |
15. Programme Learning Outcomes:
These are based on UK-SPEC (see §16) via the Institution of Mechanical Engineers Specific Learning Outcomes — identified [like this] below. They have been adjusted, where necessary, to accommodate alternative ways in which attainment might be demonstrated by individual students.

1. Knowledge and Understanding

Knowledge and Understanding of:
- Scientific principles and methodologies which underpin mechanical and other engineering disciplines, enable appreciation of its scientific and engineering context, and support the understanding of future developments and technologies. [US1, US1m]
- Mathematical principles necessary to underpin their education in mechanical and related engineering disciplines and to enable them to apply mathematical methods, tools and notations proficiently in the analysis and solution of engineering problems [US2]
- Mathematical models relevant to the mechanical and related engineering disciplines, and an appreciation of their limitations [US2m]
- Concepts from a range of areas, including some outside engineering, and the ability to apply them effectively in engineering projects [US3m]
- The role and limitations of ICT, and an awareness of developing technologies in ICT [US4m]
- Engineering principles, and the ability to apply them to analyse key engineering processes [E1]
- The capabilities of computer based models for solving problems in engineering, and the ability to assess the limitations of particular cases [E3m]
- Design processes and methodologies and the ability to apply and adapt them in unfamiliar situations [D1m].
- The commercial and economic context of engineering processes [S1]
- Management techniques which may be used to achieve engineering objectives within that context [S2]
- Management and business practices, and their limitations, and how these may be applied appropriately to strategic and tactical issues [S2m]
- The requirement for engineering activities to promote sustainable development [S3]
- The framework of relevant legal requirements governing engineering activities, including personnel, health, safety and risk (incl. environmental risk) issues [S4]
- The need for a high level of professional and ethical conduct [S5]
- Characteristics of particular equipment, processes, or products [P1]
- Current practice and its limitations, and some appreciation of likely new developments [P1m]
- Contexts in which engineering knowledge can be applied (e.g. operations and management, technology development, etc.) [P3]
- The use of technical literature and other information sources [P4]
- The nature of intellectual property and contractual issues [P5]
- Appropriate codes of practice and industry standards [P6]
- Quality issues [P7]

...by the following teaching, learning and assessment methods and strategies:
- Core lecture courses in basic mechanical engineering science subjects [US1]
- Diagnostic assessment, at registration, of abilities in Applied Mathematics, followed by lectures and tutorials to establish mastery of mathematics at benchmark level [US2]
- Optional lecture courses on advanced engineering subjects and methodologies [US1m, US2m]
- Problem Sheets designed to reinforce understanding, and promote self-assessment, of concepts introduced in lectures.
- Study group tutorial guidance towards solution of Problem Sheets.
- Core course assessment by progress tests and by unseen written examinations.
- Emphasis on the mathematical concepts as a unifying feature of engineering by cross-referencing from engineering science courses [US2].
• Core programming (MatLab) courses in Years 1 and 2, integrated with tutored exercises based on other core engineering courses; assessed by code-writing to an unseen specification [US4m].

2. Skills and other Attributes

Intellectual Skills

Ability to:

• Apply and integrate knowledge of and understanding of other engineering disciplines to support the study of mechanical and related engineering disciplines [US3]
• Use fundamental knowledge to investigate new and emerging technologies [E1m]
• Identify, classify and describe the performance of systems and components through the use of analytical methods and modelling techniques [E2]
• Extract data pertinent to an unfamiliar problem, and apply in its solution using computer based engineering tools when appropriate [E2m]
• Apply quantitative methods and computer software relevant to mechanical and related engineering disciplines, to solve engineering problems [E3]
• Apply a systems approach to engineering problems [E4]
• Investigate and define a problem and identify constraints including environmental and sustainability limitations, health and safety and risk assessment issues [D1]
• Understand customer and user needs and the importance of such considerations as aesthetics [D2]
• Identify and manage cost drivers [D3]
• Use creativity to establish innovative solutions [D4]
• Generate an innovative design solution for a system, component or process to fulfil new needs [D4, D4m]
• Ensure fitness for purpose for all aspects of the problem including production, operation, maintenance and disposal [D5]
• Generate ideas for new products and develop and evaluate a range of new solutions [D5m].
• Manage the design process and evaluate outcomes [D6]
• Make general evaluations of commercial risks through some understanding of the basis of such risks [S1m]
• Ability to work with technical uncertainty [P8]
• Ability to apply engineering techniques taking account of a range of commercial and industrial constraints [P8m]

...by the following teaching, learning and assessment methods and strategies:

• Presentation of key engineering processes and systems to illustrate core lecture courses [E1]
• Core lecture courses in principal disciplines of mechanical engineering analysis [E2]
• Problem Sheets which require the principles of these disciplines to be applied to real-world engineering problems
• Tutorial support for Problem Sheet solution
• Core lecture course assessment by progress tests and by written examinations
• Core programming (MatLab) courses in Years 1 and 2, integrated with tutored exercises based on other core engineering courses [E3]
• Core teaching of algorithmic methods and systematic structuring, and of algorithmic ‘debugging’ methodology, via programming and via construction of mechatronic systems [E3, E4]
• Guided laboratory exercises illustrating or simulating key engineering processes, requiring analysis of results by students
Core Advanced Application courses focussing on the application and development of core course concepts in specific, front-line technologies [E1m, E2m, E3m]

Core Years 1-2 lecture modules in Design and Manufacture [D4, D4m, D5m, D6].

Development of sensitivity to aesthetic and ergonomic aspects of design, and of visual-spatial skills, through design studies and sketching exercises [D2]

Year 1 small-group exercises in creative design, with use of CAD for detailed and assembly designs and with poster presentation

Examined core lecture modules on organisational and financial aspects of production [D2, D3]

Group practical exercises Year 2 (Pump Design) and Year 3 'Design Make and Test' projects [D1, D2, D3, D4, D4m, D5m, D6]

Core lecture course assessment by written examinations

Artefact studies to develop appreciation of fitness for purpose

Core Years 1-2 lecture courses in Design and Manufacture, incorporating case studies [S1, S3, S5]

Examined Year 2 core lecture courses covering legal and health and safety aspects of production [S4]

Practical implementation of these practices in the Year 3 ‘Design Make and Test’ project [S1, S4]

Core lecture course assessment by written examinations

Exhortation, reiteration and assessment — at every stage of the programme — of the need to acknowledge the contribution of predecessors, colleagues and others, and to avoid any form of plagiarism

Business game focussing on Engineering Ethics and sustainability, assessed by essay.

**Practical Skills**

**Ability to**

- Complete basic engineering workshop and laboratory tasks [P2]
- Demonstrate practical knowledge and understanding of a wide range of common engineering materials and components [P2m]

**...by the following teaching, learning and assessment methods and strategies:**

- Core Year 1 Design and Manufacture lecture course [P1]
- Year 1 Engine Dismantling exercise to develop practical skills and expand technical vocabulary [P2, P4]
- Year 1 Workshop Training course, supported by lectures [P2]
- Year 1 Experimental Reporting Skills course, consisting of laboratory exercises backed by lectures on treatment of results and linked to report writing mastery exercises [P2]
- Integrated core lecture courses in manufacturing technologies
- Training in use of CES integrated materials selection software [P2m]
- Core Year 2 lecture course assessed by examination [P3, P5, P6, P7, P8, P8m]
- Open-book examinations on some M-level courses, requiring self-organisation or learning resources [P4]
- Core Year 4 double course focussing on the application and development of core course concepts in specific, front-line technologies [P1m, P4]

**Professional Skills**

**Ability to:**

- Express concepts and ideas with articulacy, both orally and in writing, to lay and specialist audiences
- Engage in attentive exchange, with informed persuasive argument and reasoning
- Demonstrate teamwork and leadership skills
- Demonstrate an appreciation of cost and value
• Demonstrate an understanding of risk, uncertainty, failure and success
• Demonstrate networking and negotiating skills
• Be proficient at project and time management
• Show consideration for others in their workplace.

...by the following teaching, learning and assessment methods and strategies:
• Year 1 introductory group project
• Year 1 core course on the use of sketching, technical drawing and Solidworks CAD for the communication of ideas
• Year 1 core course to develop mastery of technical writing, given intensive written feedback.
• Year 1-2 laboratory exercises requiring group teamwork and individual written reports.
• Year 2 core course on oral technical presentation skills (using Powerpoint).
• Year 3 core supervised group project, with workshops on employability skills and team working skills.

In addition to the skills training embedded in the degree programme, the College is introducing an innovative new co-curricular programme called “Imperial Horizons” designed to broaden the undergraduate education experience and enhance career potential. With a broad range of courses available, students have the opportunity to study diverse topics from languages to business, as well as to investigate global challenges such as climate change and global health. The Careers Advisory Service also provides training and support for students on career options, job seeking and interviews.

16. The following reference points were used in creating this programme specification
• The Framework for Higher Education Qualifications
• The UK Standard for Professional Engineering Competence

17. Programme structure and features, curriculum units (modules), ECTS assignment and award requirements

<table>
<thead>
<tr>
<th>Year one</th>
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<td>Every student must take all modules.</td>
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<tr>
<td>Most modules run through all three terms, with examinations in Term 3.</td>
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Modules:
• Mathematics (coursework and examination) 12 ECTS
• Fluid Mechanics (coursework and examination) 5.5 ECTS
• Thermodynamics (coursework and examination) 5.5 ECTS
• Mechanics (coursework and examination) 5.5 ECTS
• Stress Analysis (coursework and examination) 5.5 ECTS
• Materials (coursework and examination) 5.5 ECTS
• Mechatronics (coursework and examination) 5.5 ECTS
• Design and Manufacture (coursework only) 10 ECTS
• Experimental Reporting Skills (term 1 only, coursework only) 2 ECTS
• Computing (term 2 only, coursework only) 3 ECTS

Progression to Year two:
• The Examination Total Pass mark is 40% and the Coursework Total Pass mark is 40% (there is a minimum Examination Pass mark for each subject).
• Candidates must satisfy the examiners in coursework and in examinations separately before proceeding to Part II.
• Supplementary Qualifying Tests, normally in not more than one subject, may be offered to candidates whose examination performance is marginally unsatisfactory.
• The Examiners will exercise discretion in individual cases.
• The marks gained in Part I will be noted on the final degree transcript and used to determine the Dean’s List, but will not be counted towards the final degree classification.
### Year two

Every student must take all modules.
Most modules run through all three terms, with examinations in Term 3.

**Modules:**
- Mathematics (coursework and examination) 9 ECTS
- Fluid Mechanics (coursework and examination) 5.5 ECTS
- Thermodynamics (coursework and examination) 5 ECTS
- Heat Transfer (coursework and examination) 4.5 ECTS
- Dynamics (coursework and examination) 4.5 ECTS
- Stress Analysis (coursework and examination) 5.5 ECTS
- Materials (coursework and examination) 5 ECTS
- Mechatronics (coursework and examination) 5.5 ECTS
- Management and Business for Engineers (examination only) 2 ECTS
- Design and Manufacture (coursework only) 10.5 ECTS
- Technical Presentation Skills (term 1 only, coursework only) 1 ECTS
- Computing (term 2 only, coursework only) 2 ECTS

### Progression to Year Three:
- The Examination Total Pass mark is 40% and the Coursework Total Pass mark is 40% (there is a minimum Examination Pass mark for each subject)
- Candidates must satisfy the examiners in coursework and in examinations separately before proceeding to Part III
- Supplementary Qualifying Tests, normally in not more than one subject, may be offered to candidates whose examination performance is marginally unsatisfactory
- A student who fails to achieve 50% on Part II Examination Total will be required to transfer to BEng degree registration
- The Examiners will exercise discretion in individual cases
- Part II marks contribute one-quarter of the total for the MEng degree, and two-fifths of that for the BEng degree

### Year three

Most modules run through all three terms, with examinations in Term 3.
Each student must take:

- All four core modules PLUS
- Five H-level electives, with the constraint that students can count towards their degree no more than:
  - One Co-curricular elective
  - Three Design and Management electives.

**Core modules:**
- Machine System Dynamics (coursework and examination) 6 ECTS
- Thermodynamics and Energy (examination only) 6 ECTS
- Design Make and Test Project (coursework only) 14 ECTS
- Literature Research Project (coursework only) 4 ECTS

**H-level Technical electives:**
- Computational Continuum Mechanics
- Embedded C for Microcontrollers
- Finite Element Analysis and Applications
- Fluid Mechanics
- Fundamentals of Fracture Mechanics
- Introduction to Nuclear Energy
- Mathematics
- Statistics
- Stress Analysis
- Structure, Properties and Applications of Polymers
- Tribology
**H-level Design and Management electives:**
- Design-Led Innovation and New Venture Creation
- Manufacturing Technology and Management
- System Design and Optimisation
- Technology, Business and the Market
- Business Economics
- Finance and Financial Management

**Progression to Year four:**
- The Examination Total Pass mark is 40% and the Coursework Total Pass mark is 40%. In addition, there is a Pass mark of 40% in the aggregate of the two core courses (Machine System Dynamics and Thermodynamics and Energy) and in the Design, Make and Test project.
- A student who achieves an examination total exceeding 35% while satisfying all other criteria for progression to Part IV may, at the discretion of the Examiners, be permitted to graduate with the award of a BEng Pass Degree.
- The Examiners will exercise discretion in individual cases.
- Part III marks contribute three-eighths of the total for the MEng degree, and three-fifths of that for the BEng degree.

**Year four**
Most modules run through all three terms, with examinations in Term 3.
Each student must take:
- The Individual Project module
- One Advanced Applications module
- Five electives, of which at least TWO must be at M level and with the constraint that students can count towards their degree no more than:
  - One Imperial Horizons elective
  - Two IDX electives and
  - Three Design and Management electives

**M-level Advanced Applications electives (all 50% coursework, 50% examination, 12 ECTS):**
- Aircraft Engine Technology
- Metal Processing Technology
- Polymer Processing Technology
- Vehicle Propulsion Technology

**M-level Technical electives (all 7 ECTS):**
- Advanced Stress Analysis
- Advanced Control
- Advanced Vibration Engineering
- Combustion
- Computational Fluid Dynamics
- Finite Element Analysis and Applications
- Mechanical Transmissions
- Nuclear Reactor Physics
- Equivalent Faculty of Engineering M-level electives available under the Interdepartmental Exchange (IDX) scheme.

- The Examination Total Pass mark is 40% and the Individual Project pass mark is 40%.
- The Examiners will exercise discretion in individual cases.
- A student who is unable to complete their final year exams because of illness, or the death of a near relative, may be considered for an MEng degree under the ‘ægrotat’ provisions.
- In order for an MEng degree to satisfy the academic requirements for Corporate Membership of the Institution of Mechanical Engineers, marks for at least four Part IV courses (including the Advanced Applications course) must equal or exceed 40%.
- Part IV marks contribute three-eighths of the total for the MEng degree.
18. Support provided to students to assist learning

During Welcome Week, arriving students are welcomed to the Department by senior staff then — after an introductory lecture on safety — briefed on the group project. The first day ends with a Welcome reception to which all academic staff are also invited. After Freshers’ Fair the following day, students take a short test which will identify those needing additional Maths support. Students then meet their personal tutors.

The remainder of the week is dominated by the group project, which ends with a competitive test event on Friday; but students are also given an introduction to Library services.

Additional support is provided by:

- The Student Handbook
- A Personal Tutor, assigned during Welcome Week, with meetings timetabled throughout Years 1–2 and periodically during Years 3–4.
- A personal student mentor ("buddy") in a higher year
- The Senior Tutor, to provide personal advice and guidance
- The Academic Tutor, to enhance the student experience by closing feedback loops and improving communication between students and academic teaching staff
- Access — via the Senior Tutor or otherwise — to College counselling and support services
- A designated Advisor to Women Students
- A detailed, online Module Descriptor for every taught element of the programme.
- Advice on study skills, and the College Imperial Study Guide, provided to all Year 1 students
- A student to staff ratio of 12
- Intensive academic monitoring and progress assessment during Year 1 Autumn and Spring terms, so that potential failures are identified for additional support.
- An ‘open door’ policy to facilitate student access to academic teaching staff during the term-time College teaching day
- Prompt feedback to students of coursework, with written comments, either directly or via the Personal Tutor.
- Regular study group tutorials of 12-18 students, tutored by an academic member of staff, in Years 1-2.
- Availability of the Director of Courses for advice on selection of electives
- Additional pre-exam clinic tutorials in Summer term
- Well equipped computing facilities
- Virtual Learning Environment (VLE) sites for all taught modules
- High quality printed copy provided for all required course materials
- Access via VLE to past examination papers and answers
- Access via VLE to tutorial support via forums for all core modules
- Sharepoint collaborative workspaces provided for group projects.
- Quiet Rooms for on-site study
- Student-chaired Staff Student Committee, meeting once per term, brings programme management together with elected student representatives.
- Student representation on the Courses Committee
- A Year Organiser for each year of study, coordinating parallel subject courses in order to manage student workload
- A Year Abroad Coordinator for student exchange matters
- An Industrial Liaison Coordinator to advise on, and monitor, industrial placement
- An active Industrial Academic Board, which periodically reviews the programme for industrial relevance
- The third-year group project linked to career guidance workshops to enhance student employability
- Personal Development Planning promoted via College iPlan system
- The English Language Support Programme offers classes, most free of charge, to students and members of Imperial College London who are not native speakers of English.

**Departmental Facilities:**
- Four lecture theatres (350, 150, 80 and 48 seats)
- Moodle Virtual Learning Environment for all taught modules
- Student Teaching Workshop with 20 benches and a range of manual and CNC machine tools
- IDEAs Lab Workshop for prototyping activities, equipped with rapid prototyping equipment and 20 craft and wood-working machine tools
- IDEAs Lab Project Development Area containing 40 benches for individual and group project prototyping
- Open-access computer clusters of 85 machines, plus 140 in facilities shared with 2 other departments, plus 70 shared with one other department. All running general purpose office and engineering software under Windows 7, some offering dual boot with Redhat Linux
- Two — partitionable to eight — multi-purpose drawing offices or tutorial rooms
- Thermofluids laboratory containing purpose-built apparatus for three first-year experiments and two second-year experiments
- Solid Mechanics laboratory containing purpose-built apparatus, tensile testing machines and a Charpy test machine and microscopes, micrographic preparation and hardness testing equipment for two first-year experiments
- Mechatronics laboratory containing 20 stations each equipped with a computer, basic test equipment, demonstration kits, a National Instruments Elvis II unit, and microcontroller programming kit
- Mechatronics project space for student project development.

**Departmental/Course Feedback Policy:**
For each item of required coursework, explicit learning outcomes are stated against which assessment will be made and feedback given. The submission date, the intended date of return relative to that date and the nature of feedback provided are stated in advance on the module descriptor. The return time is determined by the course leader based on the requirements of the course; the default period is 14 days.

**Welfare and Pastoral Care:**
College student welfare services are the responsibility of the Dean of Students, Learning and Teaching who manages the Head of the Student Counselling Service, the Head of the Disability Advisory Service, the College Tutors and the Hall Wardens. The Dean of Students, Learning and Teaching acts as liaison between the College and the College Health Centre (NHS) and the Chaplaincy and works closely with the ICU Deputy President (Welfare) to enhance welfare, advice and support.

**The Library**
There are libraries at all Imperial College campuses; with print collections, PCs, study space and other amenities. The Library has extensive electronic resources, including electronic databases, electronic books and full text electronic journals. Students are able to search for electronic resources, using the on-line library catalogue and web pages, and access them from anywhere on and off campus.

**19. Criteria for Admission**
Candidates must satisfy the general admissions requirements of Imperial College London for Mechanical Engineering courses.

Minimum qualifications are normally three full GCE ‘A’ levels with grades A*, A, A (GCE A/ASub level points: 340 (28)) including Maths and Physics. The third ‘A’ level should not be General Studies. Scottish qualifications are considered on the basis of their equivalence under the UCAS Tariff. Eligible overseas qualifications include the International Baccalaureate, the European...
Baccalaureate and the French Baccalaureate. Other qualifications are considered on an individual basis.

Applicants must provide evidence of proficiency in English.

20. Processes used to Select Students

All UCAS applications are carefully considered by the Admissions Tutor and are ranked according to suitability to undertake the course. Suitable applicants who are resident in England or Wales are then invited to attend an Admissions Day, which includes a selection interview with a member of the academic staff. The interview objectives are:

- To assess how articulate and motivated the candidate is towards engineering
- To assess ‘engineering aptitude’ by discussion on an engineering artifact
- To discuss the candidate’s preferred programme electives and
- To answer his or her own questions.

An interviewer satisfied with the candidate’s potential may make an immediate informal offer, subject to the prevailing requirements.

The interviewer then completes a report form, indicating whether they believe the candidate to be suitable and, if so, whether an informal offer was made. The Admissions Tutor writes to the candidate within a few days making, where appropriate, a conditional— or unconditional—offer.

21. Methods for Evaluating and Improving the Quality and Standards of Teaching and Learning

a) Methods for review and evaluation of teaching, learning, assessment, the curriculum and outcome standards:

The external examiner system and Boards of Examiners are central to the process by which the College monitors the reliability and validity of its assessment procedures and academic standards. Boards of Examiners comment on the assessment procedures within the College and may suggest improvements for action by relevant departmental teaching Committees.

At programme level, the Head of Department has overall responsibility for academic standards and the quality of the educational experience delivered within the department.

The Engineering Studies Committee reviews and considers the reports of external examiners and accrediting bodies and conducts periodic and internal routine reviews of programmes. Regular reviews ensure that there is opportunity to highlight examples of good practice and ensure that recommendations for improvement can be made.

The Department’s undergraduate programmes are accredited by the Institution of Mechanical Engineers. Accreditation provides the College with additional assurance that its programmes are of an appropriate standard and relevant to the requirement of industry and the professions.

b) Committees with responsibility for monitoring and evaluating quality and standards:

The Senate oversees the quality assurance and regulation of degrees offered by the College. It is charged with promoting the academic work of the College, both in teaching and research, and with regulating and supervising the education and discipline of the students of the College. It has responsibility for approval of changes to the Academic Regulations, major changes to degree programmes and approval of new programmes.

The Strategic Education Committee includes representatives of academic staff and academic support services. The SEC has four Committees reporting to it: the e-Learning Strategy Committee (e-LSC), the Strategic Humanities Committee, the Graduate Education Strategy Committee and
the Recruitment and Admissions Strategy and Policy Committee (RASPC), which also reports to the SRC. The SEC reports to the Management Board and also submits regular reports to Senate for information and is responsible for in developing and implementing the College's educational strategy.

The Quality Assurance and Enhancement Committee (QAEC) is the main forum for discussion of QA policy and the regulation of degree programmes at College level. QAEC develops and advises the Senate on the implementation of codes of practice and procedures relating to quality assurance and audit of quality and arrangements necessary to ensure compliance with national and international standards.

The Engineering Studies Committee is the major vehicle for the quality assurance of undergraduate courses. Its remit includes:
- Setting the standards and framework, and overseeing the processes of quality assurance, for the areas within its scope;
- Monitoring the provision and quality of e-learning;
- Undertaking reviews of new and existing courses;
- Noting minor changes in existing programme curricula approved by Departments;
- Approving new modules, changes in module titles, major changes in examination structure and programme specifications for existing programmes; and
- Reviewing proposals for new programmes, and the discontinuation of existing programmes

…and making recommendations to Senate as appropriate.

The Engineering Faculty Teaching Committee maintains and develops teaching strategies and promotes inter-departmental and inter-faculty teaching activities to enhance the efficiency of engineering teaching. It also identifies and disseminates examples of good practice in teaching.

The Departmental Courses Committee has responsibility for the day-to-day oversight of Mechanical Engineering programmes including the approval of minor changes to course curricula and examination structures and approval of arrangements for course work. In addition, the Department operates:
- Teaching Subject Groups to review the progression of subject teaching, learning and assessment
- Annual Review by the Director of Courses, Teaching Subject Group Leaders, Deputy Director of Undergraduate Studies and Year Organisers
- Review by the Courses Committee of a detailed proposal, with sample assessment exercises, for any new module
- Biennial peer lecturer observations, monitored by Director of Courses
- Exchanges of view on the programme between course leaders and employers, via the Industrial Academic Board
- Assistance for new staff taking on course teaching responsibilities.

c) Mechanisms for providing prompt feedback to students on their performance in course work and examinations and processes for monitoring that these named processes are effective:
- Submission dates, return dates and the form of feedback supplied are specified in advance on module descriptors.
- The UG Office logs all coursework submissions, and the Director of Courses is notified of late returns.
- Each examination paper is published with answers and with an Examination Feedback document providing, for the entire paper and for each individual question:
  - Average mark
  - Standard deviation
  - Feedback on both student performance and question effectiveness.
d) Mechanisms for gaining student feedback on the quality of teaching and their learning experience and how students are provided with feedback as to actions taken as a result of their comments:

Students are invited to participate in surveys so that student feedback on the College and its courses can be obtained and used to enhance provision. External surveys in which students participate include:

- National Student Survey (NSS)
- Postgraduate Research Experience Survey (PRES)
- International Student Barometer (ISB)

Internal surveys include:

- SOLE (undergraduate student online evaluation exercise)
- PG SOLE (Master’s student online evaluation exercise)
- TOLE (tutor online evaluation exercise)

The Staff-Student Committee is the primary arena for staff-student engagement at Departmental level. A range of issues is discussed from SOLE reports, external examiner reports and curriculum changes to practical issues, such as the availability of computers and pastoral care. The Committee is chaired by a student who will liaise with the Department and fellow students to agree an agenda for the meeting in advance.

e) Mechanisms for monitoring the effectiveness of the personal tutoring system:

The Senior Tutor oversees both the academic tutorial system and the personal tutor meetings (twice a term). Students are encouraged to communicate feedback directly to the Senior Tutor for personal tutor matters or to directly contact the College tutors.

f) Mechanisms for recognising and rewarding excellence in teaching, research supervision, pastoral care and supporting the student experience:

- Staff are encouraged to reflect on their teaching, in order to introduce enhancements and develop innovative teaching methods. Each year College awards are presented to academic staff for outstanding contributions to teaching, pastoral care, supporting the student experience or research supervision. A special award for Teaching Innovation, available each year, is presented to a member of staff who has demonstrated an original and innovative approach to teaching. Nominations for these awards come from across the College and students are invited both to nominate staff and to sit on the deciding panels.

22. Regulation of Assessment

a) Assessment Rules and Degree Classification:

Classification of degrees will be according to the following range of marks:

<table>
<thead>
<tr>
<th>Classification</th>
<th>Marks</th>
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<tbody>
<tr>
<td>First class</td>
<td>70 – 100%</td>
</tr>
<tr>
<td>Second class (upper division)</td>
<td>60 – 69.9%</td>
</tr>
<tr>
<td>Second class (lower division)</td>
<td>50 – 59.9%</td>
</tr>
<tr>
<td>Third class</td>
<td>40 – 49.9%</td>
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The pass mark for all undergraduate programmes is 40%. The marking scheme for this programme is available here. Further information is available in the Academic and Examination Regulations.

b) Processes for dealing with mitigating circumstances:

The College’s Procedures make provision for Boards of Examiners to use their discretion where extenuating circumstances are independently corroborated and are judged by the advisory panel to be of sufficient severity to have substantially affected performance.

c) Processes for determining degree classification for borderline candidates:
Candidates who fall no more than 2.5% below the minimum mark for a higher honours classification shall be eligible for review of their final classification; this review could include an oral examination or practical test or other mechanism appropriate to the discipline. Candidates whose marks are below the 2.5% borderline may be considered for a higher honours classification where certain provisions apply. Where the Board of Examiners determines that a candidate should be awarded a higher honours classification extra marks should be applied to bring their final marks into the higher range. Detailed records of all decisions should be recorded in the minutes of the meeting of the Board.

d) Role of external examiners

The external examiner system and Boards of Examiners are central to the process by which the College monitors the reliability and validity of its assessment procedures and academic standards. External examiners’ primary duties are to ensure that the standard of the College’s degrees is consistent with that of the national sector; to ensure that assessment processes measure student achievement rigorously and fairly and that the College is maintaining the threshold academic standards set for its awards in accordance with the frameworks for higher education qualifications and applicable subject benchmarks statements. External examiners gather evidence to support their judgement through the review of course materials, approval of draft question papers, assessment of examination scripts, projects and coursework, and in some instances, through participation in viva voce and clinical examinations. External examiners are members of Boards of Examiners and participate in the determination of degree classifications and student progress.

External examiners submit their reports to the Rector and President. The reports are scrutinised by the Pro-Rector (Education) and by the Registry QA team to identify any points of concern. These are then referred to the HOD and Chairman of the Board of Examiners, with a request to comment on the points raised and to explain how any concerns will be addressed. The reports and Departmental comments are subsequently considered by the relevant Faculty Studies Committee or Graduate School MQC, which may seek further assurances from a Department on the resolution of a particular problem. The committees will also consider examples of good practice raised by the external examiners. Following consideration of the reports, the Registry provides feedback to external examiners. From 2011-12 external examiner reports, and the departmental responses to them, are available on the College’s intranet.

23. Indicators of Quality and Standards

- Satisfactory reports by the External Examiners on course content, examination standards and student achievements.
- Acceptance by the Engineering Studies Committee of Annual Monitoring reports.
- Renewal of accreditation, by the Institution of Mechanical Engineers, as satisfying its academic requirements for Corporate Membership and for registration with the Engineering Council as a Chartered Engineer.
- Successful periodic review by the Engineering Studies Committee during the follow-up to accreditation.
- A satisfactory proportion of students achieving a First Class or Upper Second Class Honours Degree.
- An acceptably low failure rate in all years, especially the third and fourth years.
- The ability of graduates to compete successfully for entry to the careers of their choice.

24. Key sources of information about the programme

- Online prospectus
- Student handbook
- Module descriptions