UNIVERSITY OF LEICESTER

# Programme Specification (Undergraduate) FOR ENTRY YEAR: 2022/23

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## 1. Programme title(s) and code(s):

a) Award Titles

Bachelor of Engineering (Mechanical)

Diploma of Higher Education (Mechanical Engineering)*

Certificate of Higher Education (Mechanical Engineering)*

* These awards are only available as exit awards, are not available for students to register onto.

b) HECOS Code

| HECOS CODE | % |
|---|---|
| 100190 | 100 |

c) UCAS Code (where required) H300

## 2. Awarding body or institution:

University of Leicester

## 3. a) Mode of study:

Full time

**b) Type of study:**

Campus-style based in Panjin Campus, DUT

## 4. Registration periods

The normal period of registration is four years

The maximum period of registration is six years

## 5. Typical entry requirements:

All students that have followed the Chinese school and qualification system must be from the same Gaokao group (the top group out of four) as students entering other DUT undergraduate programmes. Students must also possess a sufficient level of English language to enable such students to undertake studies with the English language as the teaching medium;

For Year 1 entry, a Gaokao English language score of 70% for English language or an IELTS score of 5.0 will be required. After intensive English language teaching in Year 1, students will be required to demonstrate CEFR Level B2 in English language (otherwise IELTS 6.0).

## 6. Accreditation of Prior Learning:

APL will not be accepted for exemptions from individual modules, however may be considered for direct entry to year 2, on a case by case and subject to the general provisions of the University APL policy.

## 7. Programme aims:

All the variants of the programmes aim to satisfy the criteria of the accrediting engineering institutions in preparation for future application of the accreditation. These are based on the Engineering Council's Accreditation of Higher Education Programmes (AHEP) learning outcomes. These are defined in 6 overarching outcomes:

- Science and Mathematics (SM),
- Engineering Analysis (EA),
- Design (D),
- Economic, Legal, social, ethical and environmental context (EL)
- Engineering Practice (P)
- Additional General Skills (G).

Programme-level Intended Learning Outcomes for the degrees programmes are mapped, using the shorthand codes above, to these overarching outcomes in section 9 - Programme Outcomes below. Each of these overarching outcomes is divided into a maximum of 11 specific outcomes (e.g. P1 – P11). These are mapped to module-level Intended Learning Outcomes and assessment elements, and are detailed in the module specifications.

The BEng programme aims to

1. provide a curriculum that is enjoyable and motivating and which creates enthusiasm for engineering through the challenge of responding to interesting engineering problems;
2. provide students with the breadth of understanding in relevant science and mathematics to allow analysis and design of Mechanical Engineering systems that improve quality of life through being able to integrate knowledge from other engineering disciplines.
3. develop students' knowledge and understanding of the tools and techniques used for modelling, analysis, design and control of complex Mechanical engineering systems;
4. develop students' detailed knowledge and understanding of engineering applications used in research and industry;
5. cultivate the synergy between teaching and research; and
6. foster students' independent learning and organisational skills.

## 8. Reference points used to inform the programme specification:

- QAA Benchmarking Statement
- Framework for Higher Education Qualifications (FHEQ)
- UK Quality Code for Higher Education
- Engineering Accreditation Board (EAB) Bachelors and Integrated Masters Degree Learning Outcomes (AHEP 3rd Edition)
- UK-SPEC (UK Standard for Professional Engineering Competence)
- Engineering Council Compensation and Condonement requirements November 2018.
- University Learning Strategy
- University Assessment Strategy
- University of Leicester Periodic Developmental Review Report
- External Examiners' reports (annual) for Leicester campus programme
- United Nations Education for Sustainable Development Goals
- Student Destinations Data for Leicester campus programme

## 9. Programme Outcomes:

| Intended Learning | Teaching and Learning | How Demonstrated? |
|---|---|---|
| ***(a) Discipline specific knowledge and competencies*** | | |

| | | |
|---|---|---|
| **(i) Mastery of an appropriate body of** | | |
| Demonstrate knowledge of the scientific and mathematical principles and techniques necessary for a Mechanical Engineer, including materials, applied thermodynamics, fluids, dynamics, structures, failure mechanisms (SM). | Lectures, tutorials, seminars, laboratory practicals, directed reading, independent research, resource-based learning. | Examinations, laboratory reports, seminar presentations, contributions to discussions, problem-based exercises, design tasks, simulation exercises, group projects, independent projects. |
| **(ii) Understanding and application of key concepts and techniques** | | |
| Demonstrate knowledge, understanding and application of appropriate mathematical, computational and scientific techniques and methods for modelling and analysing Mechanical engineering problems (SM, EA). | Lectures, tutorials, surgeries problem solving classes, computer practical classes, example sheets. | Examinations, laboratory reports, seminar presentations, contributions to discussions, problem-based exercises, design tasks, simulation exercises, group projects, independent projects. |
| Demonstrate knowledge and understanding of the design process and design methodologies used in the discipline (D) | Lectures, tutorials, surgeries problem solving classes, independent research, project supervision. | As above |
| Demonstrate knowledge and understanding of management and business practices that influence an engineer's work (EL). | Lectures, tutorials, independent research, project supervision. | As above |
| Demonstrate knowledge and understanding of manufacturing and/or operational practice (P). | | |
| **(iii) Critical analysis of key issues** | | |
| Apply scientific principles to model and analyse engineering systems, processes and products (SM). | Lectures, tutorials, surgeries problem solving classes computer practical classes, example sheets. | Examinations, laboratory reports, seminar presentations, contributions to discussions, problem-based exercises, design tasks, simulation exercises, group projects, independent projects. |
| Analyse systems, processes or components as part of the design process. | As above | |
| Evaluate commercial risks and technical risks (EL). | Problem solving exercises, independent research projects, group projects. | |

| Intended Learning | Teaching and Learning | How Demonstrated? |
|---|---|---|
| **(iv) Clear and concise presentation of material** | | |
| Interpret and report results, presenting data in alternative forms suitable for a range of different audiences in order to create deeper understanding and/or greater impact (D, P, G). | Lectures, seminars, masterclasses. | Written assignments, exhibitions, poster displays, reports, independent research projects. |
| **(v) Critical appraisal of evidence with appropriate insight** | | |
| Select and apply appropriate computer-based methods for modelling and analysing engineering problems (EA). | Computer practical classes, lectures, surgeries. | Computer-based exercises, simulation exercises, research projects. |
| Evaluate customer and user needs taking into account the wider engineering context (D) | Design tasks, laboratory practicals, simulation exercises, group projects, work placement | Problem solving exercises, simulations, exhibitions, independent research. |
| Create and design new processes or products to fulfil a specified requirement through synthesis of ideas from a wide range of sources (D). | Design tasks, laboratory practicals, simulation exercises, group projects. | Problem solving exercises, simulations, exhibitions, independent research. |
| Perform practical testing, technical analysis and critical evaluation of design ideas in laboratory or through simulation (P) | Design tasks, laboratory practicals, simulation exercises, group projects, , group projects. | Laboratory examinations, laboratory reports, simulation reports. |
| **(vi) Other discipline specific competencies** | | |
| Select and use appropriate test and measurement instrumentation (P). | Laboratory practicals, group research projects, independent research projects. | Laboratory reports, examinations, projects reports. |
| Select and conduct appropriate experimental procedures (P). | Laboratory practicals, design tasks, independent research. | Laboratory reports, examinations, project reports. |
| Demonstrate knowledge and understanding of manufacturing and/or operational practice (P) | Manufacturing skills programme, work placement. | Laboratory reports, written assignments, work placement report. |
| Apply understanding of codes of practice related to hazards and operational safety to ensure good working practices and effective risk management (EL). | Laboratory practicals, design tasks, independent research.<br><br>All teaching and learning methods detailed above. | Laboratory reports, written assignments. |
| ***(b) Transferable*** | | |
| **(i) Oral** | | |
| Present technical and business information orally, in an appropriate form for a given audience (D, G). | Tutorials, group projects, independent research, project supervision. | Oral presentations, portfolio. |
| **(ii) Written** | | |
| Communicate business and technical information in an appropriate written form for a given audience (D). | Lectures, group projects, independent research, project supervision.<br><br>As above | Written assignments, laboratory reports, essays, independent project reports.<br><br>As above |

| | | |
|---|---|---|
| Report on a practical or simulation test of a design solution including analysis and discussion of the results (D). | | |

| Intended Learning | Teaching and Learning | How Demonstrated? |
|---|---|---|
| **(iii) Information** | | |
| Use standard and specialist engineering IT software confidently to conduct and report on engineering analysis and projects (G). | Lectures, group projects, independent research, project supervision. | Written assignments, laboratory reports, essays, independent project reports. |
| **(iv)** | | |
| Manipulate and sort data to generate new data sets (SM, EA).<br><br>Manipulate and present data in alternative formats to create deeper understanding or greater impact (EA, D). | Problem-solving classes, research projects.<br><br>Problem-solving classes, research projects. | Computer-based exercises, written assignments, poster displays, oral presentations. |
| **(v) Team** | | |
| Work collaboratively as part of an engineering team undertaking a range of different team roles (P). | Tutorials, masterclasses, project supervision, induction programmes. | Learning logs/diaries, learning portfolios, group projects, simulation exercises. |
| **(vi) Problem** | | |
| Solve problems through the integration of knowledge of mathematics, science, information technology, design, business context and engineering practice (SM, EA).<br><br>Select & analyse appropriate evidence to solve non-routine problems (EA, D).<br><br>Use systematic analysis and design methods to solve problems in unfamiliar situations (D).<br><br>Use creativity and innovation to solve problems (D).<br><br>Apply standard management techniques to plan and allocate resources to projects (EL). | Project supervision, lectures, tutorials, example sheets, simulation exercises, laboratory based exercises, computer-based exercises, independent research projects, group projects.<br><br>As above<br><br>As above<br><br>As above<br><br>As above | Individual research projects, oral presentations, project reports, problem-based examinations, practical demonstrations. |
| **(vii) Information** | | |
| Select and apply scientific evidence based methods in the solution of problems (SM).<br><br>Search for information related to design solution, evaluate it and suggest requirements for additional information (D).<br><br>Plan and manage the design process, including cost drivers and evaluate outcomes (D) | Lectures, tutorials, example sheets, simulation exercises, laboratory based exercises, computer-based exercises, independent research projects, group projects.<br><br>As above<br><br>As above | Individual research projects, oral presentations, project reports, problem-based examinations, practical demonstrations.<br><br>As above<br><br>As above |

| (viii) Skills for lifelong | | |
|---|---|---|
| Demonstrate knowledge and understanding of the professional and ethical responsibilities of an engineer and legal requirements (EL). | Work placement, simulation exercises, independent research. | Work placement report, simulation exercises, reports, independent projects. |
| Learn independently and understand new concepts in the discipline readily (G). | Independent research projects, group research projects,. | Work placement report, independent project report, learning logs/diaries, learning portfolios. |
| Develop and implement personal plan of work to meet a deadline. Identify the critical activities within a personal plan of work (G). | Independent research projects, group research projects. | Work placement report, independent project report, learning logs/diaries, learning portfolios. |
| Exercise initiative and personal responsibility, which may be as a team member or as a leader (P, G). | Independent research projects, group research projects, work placement. | Learning portfolios |
| Explore career development opportunities (G) | Masterclasses, learning portfolios, work placement | |

## 10. Progression points:

This programme follows the standard Scheme of Progression set out in Senate Regulation 5 governing undergraduate programmes.

There are two progression points in each academic year: end of Semester 1 and end of Semester 2 of the DUT-DLI teaching calendar. A progression decision is made by the DLI Board of Examiners on the basis of the Semester 1 exam/resit results in March and Semester 2 exam/resit results in July each year. Where it is known following Semester 1 that a student has not met the requirements to progress to the next year, they may be required to suspend their studies at that stage.

The following additional progression requirements for this programme have been approved:

- Students must pass the English language modules in year 1, which cannot be carried into year 2, in order to be able to demonstrate the ability to learn and study in English.
    - EG2006 has no resit option so must be passed at the first attempt because to provide one is impractical given major individual or group projects modules and/or those covering AHEP3 learning outcomes that are not assessed in other modules are designated as being required to be passed at Honours level and cannot be treated as compensated fails for progression. These are indicated in the relevant module specifications: EG1006, EG2006 and EG2004.

Transfer between different degrees: Students not satisfying the UoL progression requirements may be allowed to transfer onto DUT programmes. Students satisfying the UoL progression requirements may be allowed to transfer to the University of Leicester campus-based degree programme, subject to capacity and physical resource limitations on the UoL campus.

## 11. Scheme of Assessment

The programme follows the standard scheme of award and classification set out in Senate Regulation 5.

The following additional award requirements for this programme have been approved as conditions of professional body accreditation:

- Major individual or group project modules and/or those covering AHEP3 learning outcomes that are not assessed in other modules are designated as being required to be passed at Honours level and cannot be treated as compensated fails for the purpose of award. For BEng these are EG3005 and EG3008.

## 12. Special features:

Programme delivered entirely in English, UK-style facilities provided on Panjin campus, Small group tutorials via video conferencing, group problem solving, research based projects, problem based learning, Reflect lecture capture.

## 13. Indications of programme quality

Normal University academic quality assurance processes are used to continuously review and improve the programmes. The last major review and re-structure of the programmes was during institutional Curriculum Transformation process, resulting in the current programmes structures being applied to students entering from academic year 2018/2019.

All of the current BEng courses delivered at the University of Leicester are accredited by the appropriate professional engineering institutions. It is our intention to seek accreditation from the EAB for this BEng Mechanical Engineering programme during the next accreditation review.

## 14. External Examiners

The details of the External Examiner(s) for this programme and the most recent External Examiners' reports for this programme can be found **here**.

## APPENDIX 1: Programme structure (programme regulations)

**Updates to the programme**

| Academic year affected | Module Code(s) | Update |
|---|---|---|
| 2025/26 | EG3126 | EG3126 replaced with EG3124 Tribology in Engineering Design. |

## BEng Mechanical Engineering

**FIRST YEAR MODULES**

**SEMESTER 1**

| Core Modules | | | Credits |
|---|---|---|---|
| EL0002 | UNIVERSITY ENGLISH 1: SPEAKING AND LISTENING | 15 | |
| EL0003 | UNIVERSITY ENGLISH 2: READING AND WRITING | 15 | |
| EL0004 | UNIVERSITY ENGLISH 3: PROJECT | 15 | |
| EG0280 | ADVANCED MATHEMATICS I | 15 | |
| | | **Semester Total** | **60** |

Additional Non-Credit Bearing Modules

MORAL CULTIVATION AND BASIC LAW
PHYSICAL EDUCATION I
MILITARY THEORY AND TRAINING

**SEMESTER 2**

| Core Modules | | | Credits |
|---|---|---|---|
| EL0005 | ENGLISH FOR SPECIFIC ACADEMIC PURPOSES | 15 | |
| EG0281 | ADVANCED MATHEMATICS II | 15 | |
| EG0282 | MECHANICAL ENGINEERING FOUNDATION | 15 | |
| EG0283 | ELECTRONIC AND ELECTRICAL ENGINEERING FOUNDATION | 15 | |
| | | **Semester Total** | **60** |

Additional Non-Credit Bearing Modules

CHINESE MODERN CONTEMPORARY HISTORY AND SITUATION POLICY
PHYSICAL EDUCATION II
DUT GENERAL OPTIONAL MODLE I

**SEMESTER 3**

**Additional Non-Credit Bearing Modules**

COLLEGE STUDENT MENTAL HEALTH AND HEALTH EDUCATION

**SECOND YEAR MODULES**

**YEAR LONG**

| | | |
|---|---|---|
| EG1006 | ENGINEERING DESIGN AND EXPERIMENTATION | 30 |

**SEMESTER 1**

| Core Modules | | | |
|---|---|---|---|
| EG1201 | ELECTRICAL AND ELECTRONIC ENGINEERING | 30 | |
| EG1280 | ENGINEERING MATHEMATICS I | 15 | |
| | | **Semester Total** | **60** |

**Additional Non-Credit Bearing Modules**

PRINCIPLE OF MARXISM AND THEORY OF SOCIALISM
ENGINEERING TRAINING

**SEMESTER 2**

| Core Modules | | Credits |
|---|---|---|
| EG1101 | MECHANICAL ENGINEERING | 30 |
| EG1281 | ENGINEERING MATHEMATICS II | 15 |
| | **Semester Total** | **60** |

**Additional Non-Credit Bearing Modules**

DUT GENERAL OPTIONAL MODULE II

**SEMESTER 3**

**Additional Non-Credit Bearing Modules**

ON-SITE VISTING PRACTICE

Student Effort on EG1006 is split approximately 15:15 credits sem1:sem2 to give even loading.

**THIRD YEAR MODULES**

**SEMESTER 1**

| Core Modules | | Credits |
|---|---|---|
| EG2111 | MATERIALS & STRUCTURES | 15 |
| EG2302 | SYSTEM DYNAMICS AND CONTROL | 15 |
| EG2121 | MATERIALS PROCESSING | 15 |
| EG2112 | DYNAMICS & THERMOFLUIDS | 15 |
| | **Semester Total** | **60** |

**Additional Non-Credit Bearing Modules**

DUT GENERAL OPTIONAL MODULE III

**SEMESTER 2**

| Core Modules | | Credits |
|---|---|---|
| EG2004 | ENGINEERING EXPERIMENTATION AND ANALYSIS | 15 |
| EG2006 | INTEGRATED ENGINEERING DESIGN | 30 |
| EG2122 | APPLIED ENGINEERING THERMODYNAMICS | 15 |
| | **Semester Total** | **60** |

**Additional Non-Credit Bearing Modules**

PROCESS MACHINERY AND EQUIPMENT

PROCESS PRINCIPLE AND EXPERIMENT I

**SEMESTER 3**

**Additional Non-Credit Bearing Modules**

PRODUCTION PRACTICAL

**FOURTH YEAR MODULES**

**SEMESTER 1**

| Core Modules | | Credits |
|---|---|---|
| EG3313 | STATE VARIABLE CONTROL | 15 |
| EG3008 | ENGINEERING MANAGEMENT | 15 |
| EG3112 | HEAT TRANSFER AND ENERGY SYSTEMS | 15 |
| EG3124 | TRIBOLOGY IN ENGINEERING DESIGN | 15 |

**Optional Modules**

Choose 15 credits from:

| | | |
|---|---|---|
| EG3111 | FINITE ELEMENT ANALYSIS AND DESIGN | 15 |
| EG3125 | RIGID-BODY & STRUCTURAL DYNAMICS | 15 |
| EG3422 | AEROSPACE MATERIALS & STRUCTURES | 15 |
| | **Semester Total** | **75** |

**SEMESTER 2**

| Core Modules | | Credits | |
|---|---|---|---|
| EG3323 | DIGITAL CONTROL & ACTUATORS | 15 | |
| EG3005 | FINAL YEAR PROJECT | 30 | |
| | | **Semester Total** | **45** |

**Additional Non-Credit Bearing Modules**

CAREER DEVELOPMENT

## Appendix 2: Module specifications

See undergraduate module specification database (Note - modules are organized by year of delivery).