UNIVERSITY of BRADFORD

Faculty of Engineering and Digital Technologies

Engineering Foundation Year Programme Specification

https://www.bradford.ac.uk/courses/ug/engineering-foundation/

Academic Year:	2024/25
Registered Learning Provider:	The University of Bradford
Target Outcome:	Progression to University-level study (undergraduate degrees)
Interim/exit Awards:	Certificate of Foundation Studies in Engineering; Certificate of Continuing Education [Regulated Qualifications Framework Level 3]
Programme Admission:	September
Programme duration:	1-year full time (9-12 months)
UCAS Code:	H101 (B56)
Subject Benchmark Statement:	Engineering (QAA 2019)

Please note: This programme specification has been published in advance of the academic year to which it applies. Every effort has been made to ensure that the information is accurate at the time of publication, but changes may occur given the interval between publishing and commencement of teaching. Any change which impacts the terms and conditions of an applicant's offer will be communicated to them. Upon commencement of the programme, students will receive further detail about their course and any minor changes will be discussed and/or communicated at this point.

Minor Modification Schedule

1. September 2016: Removal of enhanced pass waivers
2. March 2019: Changes to admissions requirements
3. December 2020: Specification reformatted and made accessible
4. May 2021: Annual changes for 2021 academic year
5. July 2022: Annual changes for 2022 academic year
6. November 2022: Changes made for periodic review
7. April 2024: Annual changes for 2024 academic year

Introduction

Albert Einstein once stated:

'Scientists investigate that which is already is, Engineers create that which has never been. Creatively is piercing the mundane to find the marvelous'

These words epitomize the role of the engineer in modern society where the application of technology is central to the welfare and prosperity of humanity and overcoming the global challenges it faces. From dealing with the issues associated with climate change and the need to move towards renewable sources of energy, through to the delivery of effective and dependable healthcare systems, the engineering profession, and its capacity for creatively and invention is key to their realization. In any given situation, an engineer must be able to combine scientific and technical knowledge with an appreciation of the cost, reliability and the socio-economic impact of their innovations and ideas. As a result of this, the opportunities for graduates in all engineering disciplines are considerable, with the UK economy needing world class engineering and technological skills and knowledge in order to compete in international

markets and create the high value-added industries of the future.

Students who choose to study engineering will have the opportunity to work on projects that will influence many of the key technological decisions being made by societies and their governments across the globe as we approach the middle of the 22nd century. In particular, the move towards sustainability with the development of electrically powered transport systems, often operating autonomously, together with the rise of "Smart Cities" based on the application of "Big Data" and "AI" will feature prominently in the career opportunities afforded to ambitious engineering and computing graduates.

Why Bradford

Bradford has a long and distinctive record of teaching and research achievement in engineering and computing since gaining University status in 1966. The University is a member of the "World Technology Universities Network" and is a pioneer in research in automotive braking, advanced materials, and sustainability. More recently, the "Bradford-Renduchintala" Centre for Space AI was set up in 2022 to advance distributed computing and telecommunications systems using low power electronic devices. Students joining the Engineering Foundation Year (EFY) will therefore benefit from learning in an environment with excellent facilities and where new technologies and ideas for innovation are constantly being explored and developed.

All engineering and computing programmes offered the University of Bradford which EFY students can progress to, enjoy the benefits of professional accredited by external bodies. These include: Institute of Mechanical Engineers (IMechE); Institute of Chemical Engineers (IChemE); Joint Board of Moderators (JBM); Institute of Engineering and Technology; British Computing Society (BCS). The EFY has been established for over 20 years and has enabled hundreds of students to successfully enter stage one of their chosen academic discipline and to pursue rewarding professional careers upon graduation.

Programme Overview

The Engineering Foundation Year is designed to provide students who are currently without eligible mathematic and/or scientific qualifications, the opportunity to study in a higher education learning environment to gain the necessary knowledge to enter stage one of a CEng accredited engineering programme. The EFY can also provide entry to programmes (accredited by the British Computer Society) in Computing / Cybersecurity / Software Engineering, which do not have specific subject requirements. Successfully completing the EFY will gain a systematic understanding of the engineering fundamentals of mathematics, physics, materials, and mechanics, combined with development of strong personal transferable skills in problem-solving, communication and critical thinking. The programme also enables students to become independent learners able to embrace the philosophy of lifelong learning and adapt to the many developments in engineering and technology that will inevitably shape their future careers.

Students entering the EFY will be introduced to each engineering and computing discipline at the University and will be supported when deciding upon their stage one progression pathway. The Faculty of Engineering and Digital Technologies has long standing links with many leading engineering companies and receives regular advice and input from specialists working in industry. This helps to ensure that the currency of the design and syllabus of all engineering programmes is maintained and enhanced to meet the needs of modern employment. A feature of all Bradford engineering programmes which students on the EFY can progress onto is the opportunity for

periods of extended work placement.

Programme Aims

The Engineering Foundation Year is intended to:

- Enable students who do not currently possess the formal and/or level of academic qualifications needed to enter stage one of an accredited (CEng) Engineering degree programme (BEng/MEng) with the opportunity to gain the relevant knowledge and skills to achieve this. The programme can also provide entry to accredited programmes in Computing / Cybersecurity / Software Engineering.

- Promote diversity and equality, together with opportunities for social mobility by providing a route for individuals who have traditionally been underrepresented in engineering (ethnic minorities, women, mature students) to pursue successful academic studies in engineering leading to professional careers and/or further study in associated disciplines/fields.

- Provide students with an understanding of the techniques and ideas of the key contributing academic disciplines of engineering study in mathematics, physics, mechanics, materials, Information and Communications Technologies (ICT).

- Facilitate students to become independent learners with the problem-solving and critical thinking skills needed for resolving integrated and multidimensional engineering problems and to communicate their findings effectively in a team/group-based environment.

Programme Learning Outcomes

To be eligible for the RQF Level 3 award of Certificate, students will be able to:

1. Understand the role of the engineer in modern society and the challenges associated with entering a profession focused on technological change and which directly impacts the welfare of humanity in a global context.

2. Have the knowledge and understanding of mathematics, mechanics, physics, and materials needed to enter an CEng accredited programme.

3. Developed the quantitative/numerical methods knowledge and ICT/computing skills needed to model and analyze real-life engineering problems via the selection and application of appropriate principles of data collection and manipulation methods/tools and comment upon their results/findings.

4. Acquired the communication and presentation skills, in both written and verbal forms, needed to facilitate the expression of complex engineering problems and ideas to a wide range of audiences with differing levels of subject expertise.

5. Become an independent learner able to undertake lifelong learning via the acquisition of personal transferable skills in problem solving, applying scientific method, team/groupwork,

critical/reflective thinking and time management.

6. Appreciate the demands and opportunities offered by the different disciplines of engineering and computing in order to make an informed decision upon which academic pathway to pursue upon successful completion of the programme.

Curriculum

The Engineering Foundation stage is taught over two semesters (an "Academic Year") with 60 credits being studied in each semester and is shown in table 1. Each subject delivered as a 20-credit core module which may be linked through both semesters. The teaching of the Mathematics, Mechanics, and Physics aims to provide an academic outcome comparable to A-level. The teaching of Materials and Information and Communication Technologies is designed to provide an understanding of the subject within the context of the Engineering profession and that needed for study on a BEng/MEng programme.

Table 1: Engineering Foundation Modules

Study Period	Code	Title	Credits	Level
Academic Year	MAE3001-B	Foundation Mechanics	20	RQF 3
Academic Year	MAE3002-B	Foundation Physics	20	RQF 3
Academic Year	MAE3003-B	Fundamentals of Materials	20	RQF 3
Academic Year	ENB3001-B	Information and Communication Technologies	20	RQF 3
Semester 1	ENM3001-B	Foundation Mathematics 1	20	RQF 3
Semester 2	ENM3002-B	Foundation Mathematics 2	20	RQF 3

Please note: The curriculum may change, subject to the University's programme approval, monitoring and review procedures.

The curriculum seeks to provide an experience from which students from a diverse range of backgrounds can benefit and which will facilitate equality of opportunity via the programmes it provides access to. In addition, the curriculum is designed in accordance with the principles of accredited engineering programmes which mandate an understanding of the core principles of sustainability and renewal resources. The curriculum design and delivery is also relevant to the United Nations Sustainable Development goals in respect of (4) Quality education, (5) Gender Equality, (10) Responsible Consumption and Production.

At the end of the programme, students will be eligible to exit with the award of *"Certificate of Foundation Studies in Engineering"* if they have successfully completed 120 credits at RQF Level 3 and achieved the award learning outcomes.

Teaching and Learning Strategy

The Engineering Foundation Year is designed in accordance with the University Learning, Teaching and Student Experience Strategy (LTSES). A key aspect of this is the commitment to equality and diversity, inclusion, and social mobility and to empower students to realize their full potential. This is facilitated by seeking to embed a high level of inclusivity via curriculum design, shared learning experiences and seeking to foster a positive learning environment. The programme is delivered by a team of academic staff with extensive teaching and research experience. This is further supported by industrial speakers who provide unique insights into contemporary developments in engineering.

Students will benefit from a suite of digital and collaborative platforms supported by the University including CANVAS, Horizon, Teams, SolidWorks, MATLAB, and Microsoft Office. All students have access to the University computer network and extensive library resources providing 24-hour access to books and online learning materials.

The guiding principle of the educational philosophy and design of the teaching, learning and assessment strategy of the programme is the recognition of the range of academic experiences and attainments that students will join in with. In particular, many applicants will have had "less than ideal" experiences in their previous school/college education and need to regain confidence in their abilities. In addition, while some students will have had previous exposure to relevant mathematics and physics topics, others may have studied subjects not aligned to engineering, or have been outside of mainstream education for a considerable length of time and are now seeking to return to as mature learners.

The style of teaching and learning is therefore designed to develop the knowledge and skills of students more gradually than in a conventional stage of an undergraduate programme. Lecturers start from the first principles of each subject and are encouraged to use a problem-solving approach where feasible, by working at a more measured pace through questions in front of the class to build up the confidence of students. The programme uses a wide range of teaching and learning environments with the core concepts and principles associated with the study of engineering introduced and explored in formal lectures, practiced in tutorials, and demonstrated in laboratory classes. All students are encouraged to make the maximum use of online resources and digital technology to support their learning.

Where appropriate, diagnostic tests are held at the start of modules to ascertain the background knowledge of students and to assist in better targeting academic support.

Key features of the teaching and learning strategy include:

- Developing practical skills in laboratories via "hands-on" experience of engineering experiments supported by academic and technical staff.

- Acquiring cognitive and personal skills through open-ended problem solving and design exercises, typically gained working in small groups supported by members of academic, technical and library staff.

- Project work (both individually and as part of a group) is used to integrate learning and to enable students to see the links across academic subjects and to enhance critical and reflective thinking.

- Supporting teaching material is placed on CANVAS including PowerPoint slides, recommended reading and videos of lectures for students to access in their own study time.

- All students are encouraged to make full use of the academic workshops available at the University which can be accessed via the link:

  https://unibradfordac.sharepoint.com/sites/academic-skills-advice-intranet/SitePages/Academic-Skills-Workshops-and-Drop-Ins.aspx

- All students are made aware of the University laptop loan scheme and advised to take advantage of this facility if they do not have access to a machine.

- The analytical and problem-solving activities involved in hands-on group work also emulate the

style of learning that students will experience when joining stage one of an engineering programme, such as in the Design, Build and Test (CDIO) module.

Assessment Strategy

The assessment strategy is a key aspect of the student learning process and as with the teaching and learning strategy, is designed to allow for a more gradual acquisition of knowledge and skills. There are two forms of assessment; formative and summative, and both are used to complement the learning experience of students. The former provides an opportunity for students to receive feedback and to monitor their progress but does not contribute to the gaining of marks. All modules on the EFY include formative assessment which may take several forms, including class discussions and questions from lecturers, classroom tests/quiz's, presentations, and practical activities.   Such activities enable students to make the most effective use of their learning and to prepare for summative assessment.

Summative assessment which does contribution towards the grading of module performance similarly uses a variety of approaches, including, coursework, written examinations (both open and closed book), formal individual/group presentations and online tests. The assessments are designed to assess not only subject-specific knowledge, but the personal transferable skills that students will acquire during the programme. A key aspect of summative assessment on the EFY is that it is spread over each semester, rather than relying disproportionately on formal written examinations at the end of the teaching.

Assessment Regulations

The programme conforms with the standard University undergraduate assessment regulations available at the link:

 https://www.bradford.ac.uk/regulations/

Admission Requirements

The University welcomes applicants from all backgrounds in accordance with institutional polices for the promotion of diversity and equality. This is reflected in the application process which is not just based on formal academic grades. In particular, the personal circumstances of each applicant are considered, including previous work experience and motivation to study. The Engineering Foundation Year programme is only available to UK students. All International students interested in Engineering Foundation Year studies are advised to apply for the University of Bradford International College (UBIC) using the link shown below:

https://www.bradford.ac.uk/international/international-college/

The standard academic entry requirements are:

- All applicants need GCSE Mathematics grade C/4 and GCSE English grade D/3 or equivalent. Other RQF Level 2 qualifications such as Key Skills are acceptable. If you have AS/A-Level Mathematics or Physics or equivalent, this will be an advantage for your studies and when there is competition for the available places.

- The UCAS tariff applicable is likely to change more than for other programmes depending on demand and your own personal background and circumstances. A typical offer to an

application made through UCAS would be between 88 points (CCD at A-Level) and 72 points (DDD at A-level).

- On submission of a UCAS application, all potential students will be invited to visit the Faculty of Engineering and Digital Technologies for an "Experience Day". This will provide the opportunity to meet with academic staff, take a guided tour of the facilities and discuss "the Bradford experience" with current students.

Access and Recognition of Prior Learning

Applications are welcome from students with non-traditional qualifications, and/or significant personal/professional experience. For such applicants, evidence of their interests and work experience is required and this would likely take the form of a portfolio of work and/or an interview with the programme.

The University of Bradford has always welcomed applications from disabled students. To discuss adjustments or to find out more about support and access, students are advised to contact the Disability Services before you apply online on the link shown below:

https://www.bradford.ac.uk/disability/before/

Applications are particularly welcomed from adult learners (those aged 21+ at the start of the programme), armed forces families, carers and care leavers, estranged or orphaned learners, refugees and asylum seekers, and Romani or Traveler families. To find out more about the University of Bradford Progression Scheme, visit the webpage:

Chttps://www.bradford.ac.uk/applicants/progression-scheme/

If applicants have prior certificated learning or professional experience which may be equivalent to parts of this programme, the University has procedures to evaluate and recognize this learning to provide applicants with exemptions from specified modules or parts of the programme. For more details on RPL, visit the webpage:

https://www.bradford.ac.uk/teaching-quality/prior-learning/

Please note: This information is relevant to the contemporary recruitment cycle and therefore may be different now to when this document was originally published. The current UCAS tariff for the programme, as well as accepted equivalent qualifications, is published.