

PROGRAMME SPECIFICATION

1. Key Information

Programme Title:	BEng (Hons) Mechanical Engineering BEng (Hons) Mechanical Engineering with Foundation Year BEng (Hons) Mechanical Engineering with Placement Year
Awarding Institution:	Buckinghamshire New University
Teaching Institution(s):	Buckinghamshire New University
Subject Cluster:	Engineering
Award Title (including separate Pathway Award Titles where offered):	BEng (Hons) Mechanical Engineering
Pathways (if applicable)	Not applicable
FHEQ level of final award:	6
Other award titles available (exit qualifications):	Certificate of Higher Education Diploma of Higher Education BEng Mechanical Engineering
Accreditation details:	Accreditation will be sought from the Institution of Mechanical Engineers (IMechE) and Institute of Engineering and Technology (IET)
Length of programme:	3 years Full-time 4 years with Foundation year 4 years with Placement year
Mode(s) of Study:	Full-time
Mode of Delivery:	In person (on-site) delivery
Language of study:	English
QAA Subject Benchmark(s):	QAA Subject Benchmark Statement Engineering (March 2023)
Other external reference points (e.g. Apprenticeship Standard):	Accreditation of Higher Education Programmes, Fourth Edition (AHEP 4) UK Standard for Professional Engineering Competence (UK-SPEC)
Course Code(s):	BNMECEFT BNMECFY BNMECESW
UCAS Code(s):	ME01, ME02, ME03
Approval date:	January 2025
Date of last update:	

2. Programme Summary

The Mechanical Engineering programme equips you to tackle complex challenges with innovation and creativity. You'll delve into key areas such as Computer-Aided Design and Simulation, Thermodynamics, Fluid Dynamics, Robotics and Automation, and Sustainability and Reliability.

Gain hands-on experience through extensive lab sessions and real-world projects, ensuring you are well-prepared for the workplace. The curriculum is designed to meet current industry needs, with input and support from leading employers and industrial partners, ensuring that what you learn is relevant and up-to-date.

Develop advanced technical knowledge and digital skills that are highly valued by employers. You'll be trained to think critically and solve problems creatively, making you a versatile and valuable asset in any engineering team.

Mechanical engineers play a crucial role in driving innovation and sustainability across various sectors, including manufacturing, energy, transportation, and healthcare. By focusing on these areas, the programme prepares you to contribute significantly to achieving sustainability and net-zero goals.

The programme also emphasizes professional practice, ethics, and sustainability, ensuring you are not only technically proficient but also aware of the broader impact of your work on society and the environment.

3. Programme Aims and Learning Outcomes

Programme Aims

This programme aims to:

1. Offer a contemporary and comprehensive curriculum to provide a stimulating and challenging programme of mechanical engineering that meets the knowledge, skills and behaviours of the mechanical engineering sector and needs of employers in the industry.
2. Foster creativity and innovation by enabling students to design, develop, and implement solutions to complex mechanical engineering problems, applying critical thinking and advanced problem-solving skills.
3. Provide key employability skills to achieve optimum and innovative solutions to mechanical engineering design in an efficient and effective manner, to further develop their design creativity and digital skills.
4. Develop learners with critical understanding and leadership of professional framework and engineering ethics, social and cultural values in mechanical engineering and other business contexts in developing designs recognising the impacts their decisions could have on the environment and society (locally and nationally).
5. Prepare graduates for diverse mechanical engineering career pathways by integrating knowledge and skills across multiple domains, encouraging versatility, adaptability, and leadership qualities.

Programme Learning Outcomes

Knowledge and Understanding (K)

On successful completion of the programme you will be able to:

ID	Learning Outcome
K1	Develop detailed and systematic skills, knowledge, and understanding of a range of scientific and engineering principles, tools, and processes used in solving complex mechanical engineering design and technological problems.
K2	Demonstrate a comprehensive understanding of mechanics, thermodynamics, materials science, fluid dynamics, and control systems, including their applications in diverse engineering contexts.
K3	Outline a range of tools and techniques, including digital approaches, to model, simulate, and analyse complex mechanical engineering problems.
K4	Select suitable planning, implementation, and presentation techniques in carrying out a major individual project within the field of mechanical engineering.
K5	Define the importance of linking academic knowledge and skills with industry, research, and development within the engineering sector.

Analysis and Criticality (C)

On successful completion of the programme you will be able to:

ID	Learning Outcome
C1	Evaluate appropriate techniques and methods, including laboratory experiments, for solving complex numerical and scientific engineering problems in mechanical systems.
C2	Interpret scientific knowledge and skills in formulating and analyzing mechanical engineering design concepts and techniques while considering client, financial, environmental, and safety objectives.
C3	Critique a range of engineering software for the integration of design functions from concept to realization within the fields of mechanics, thermodynamics, and fluid dynamics.
C4	Analyze mechanical engineering materials and evaluate their life cycle impacts for the design, development, and implementation of sustainable and practical solutions to engineering challenges.
C5	Integrate research and scholarship skills in structuring strategies for discovery, learning, and dissemination within the field of mechanical engineering.

Application and Practice (P)

On successful completion of the programme you will be able to:

ID	Learning Outcome
P1	Manage and apply safe systems of work, including taking responsibility for personal obligations regarding health, safety, and welfare, while assessing and controlling risks.

P2	Conduct and interpret experimental laboratory work within a range of mechanical engineering subjects to current industrial standards, critique results, and draw conclusions to inform engineering design.
P3	Implement engineering design projects individually and in groups, utilizing a systematic and disciplined approach to meet client, financial, environmental, quality, and safety requirements.
P4	Design mechanical systems and components considering lifecycle, safety, ethical, and sustainability considerations to achieve optimal performance and reliability.
P5	Apply appropriate planning and management systems for executing mechanical engineering projects, effectively managing resources and budgets while reflecting on the limitations of the approach.

Transferable skills and other attributes (T)

On successful completion of the programme you will be able to:

ID	Learning Outcome
T1	Work effectively in collaboration with others by setting and achieving targets for personal, career, and professional development.
T2	Communicate effectively through oral, written, and visual means, utilizing specialized manual and computer-based methods for mechanical engineering design, analysis, and presentation.
T3	Plan, manage, and monitor key stages within a mechanical engineering project, collaborating with multidisciplinary teams and addressing project constraints, including budgets, timelines, and client expectations.
T4	Investigate and define mechanical engineering problems while considering constraints such as environmental and sustainability limitations, ethical responsibilities, health and safety concerns, and adherence to codes of practice and industry standards.
T5	Adapt to a dynamic and evolving mechanical engineering landscape by embracing new technologies, regulations, and challenges such as climate change, while demonstrating resilience and a commitment to lifelong learning.

Graduate Attributes

The BNU Graduate Attributes of: Knowledge and its application; Creativity; Social and ethical awareness and responsibility; and Leadership and self-development focus on the development of innovative leaders in professional and creative capacities, who are equipped to operate in the 21st Century labour market and make a positive impact as global citizens.

Graduates will achieve comprehensive knowledge and understanding of mechanical engineering (K1), who will be pragmatic, seek to achieve sustainable solutions (K4, C4, P4). They will be effective problem solvers, able to apply creative, critical, and evidence-based planning and thinking to conceive innovative responses to future challenges (P3) in mechanical engineering and convey ideas effectively (T2) to a range of audiences for a variety of purposes (C1-C5). They will be risk, cost and value-conscious, ethical, social, cultural, environmental, health and safety aware (P3). They will have the ability to engage with dynamic traditions of thought (K2-K3), the ability to apply their knowledge in real-time practice across multi-disciplinary and multi-professional contexts (P3-P4) in designing mechanical system,

products and services. Graduates will appreciate the global dimensions of mechanical engineering, be able to formulate and operate within appropriate codes of conduct, professional in their outlook, capable of team working and effective communicators (T1-T5). Graduates will engage in professional, intellectual, and ethical behaviour, and have the potential to take leadership roles in the future (K5, P5), well prepared for living, learning, and working in a digital society (K3, C3, T2) within their chosen careers.

4. Entry Requirements

The University's [general entry requirements](#) will apply to admission to this programme. For up-to-date entry requirements, please visit the programme web page. The following additions / exceptions apply:

- For entry into Year 1 (Level 4), applicants will need to have gained relevant qualifications at levels 2 and 3, such as:
 - A levels in Mathematics or Physics
 - BTEC National Diploma/Extended Diploma in Engineering or Physics
 - Relevant T level qualification
 - GCSE Maths and English
- For further details of our international English entry requirements, please visit our international webpages.
- Students from an HNC, HND and Foundation Degree Engineering or equivalent may have the opportunity to join this programme as part of the progression route at Level 5 or Level 6.

If you do not meet the entry requirements you may, if you have relevant professional experience, still be invited for interview, where you will be required to demonstrate the necessary knowledge and understanding for entry onto the course.

Previous study, professional and / or vocational experiences may be recognised as the equivalent learning experience and permit exemption from studying certain modules in accordance with our [accreditation of prior learning](#) (APL) process.

5. Programme Structure

Level	Modules (Code, Title and Credits)	Exit Awards
Foundation Year¹	Core modules: ENG0007 Foundation Mathematics ENG0008 Introduction to Engineering Design ENG0009 Introduction to Engineering Science ENG0010 Introduction to Engineering Materials and Structures ENG0011 Project: Engineering Design ENG0012 Engineering in Practice and Professional Development	N/A. No credit is awarded at this Level.
Level 4	Core modules: CAD4079 Science and Materials for Engineers (20) CAD4080 Mathematics for Engineers (20) CAD4083 Computer Aided Design and Simulation (20) CAD4087 Individual Engineering Project and Management (20) CAD4076 Fundamentals of Electrical & Electronic Principles (20) CAD4086 Modelling & Analysis of Electromechanical Systems (20)	Certificate of Higher Education, awarded on achievement of 120 credits at Level 4
Level 5	Core modules: CAD5113 Engineering Design, Materials and Processes (20) CAD5114 Strength of Materials and Mechanics (20) CAD5039 Thermodynamics, Heat Engines and Thermofluids (20) CAD5096 Sensors, Actuators and Instrumentation (20) Optional modules: CAD5099 Advanced Mechanical Principles, Dynamics and Control (20) ENG5043 Aircraft Dynamics and Control (20) CAD5118 Control Systems Engineering and Mechatronics (20) ENG5044 Renewable Energy Technologies	Diploma of Higher Education, awarded on achievement of 240 credits, including a minimum of 120 credits at Level 5
Placement year (optional)	ENG5036 Professional Practice (20)	

¹ Modules on the Foundation Year only apply to learners who are enrolled on the “with Foundation Year” programme.

<p>Level 6</p>	<p>Core modules: CAD6061 Leadership and Management (20) ENG6041 Computational Fluid Dynamics (20) CAD6063 Emerging and Sustainable technologies for Engineers (20) CAD6021 Research Project (40)</p> <p>Optional modules: CAD6067 Advanced Manufacturing Technology and Automation (20) ENG6042 Aerospace Propulsion Systems (20) ENG6043 Computational Mechanics and Failure Analysis (20) CAD6064 Robotics, Automation and Industry 4.0 (20)</p>	<p>Ordinary Degree, awarded on achievement of 300 credits, including 60 credits at Level 6 and 120 credits at each of Levels 4 and 5</p> <p>Honours Degree, awarded on achievement of 360 credits, including 120 credits at each of Levels, 4, 5 and 6</p>
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Please note: Not all option modules will necessarily be offered in any one year. Other option modules may also be introduced at a later stage enabling the programme to respond to changes in the subject area.

6. Learning, Teaching and Assessment

Learning and teaching

The programme is designed to provide you with a balanced mix of theoretical knowledge and practical skills, ensuring you are well-prepared for professional practice. We use a variety of active learning approaches to make your learning experience engaging and effective.

- **Lectures:** These sessions will introduce and explain key concepts and theories, often incorporating interactive elements to keep you engaged.
- **Seminars:** Smaller, interactive sessions where you can discuss topics in detail, often involving group work and presentations.
- **Laboratory Sessions:** Practical classes where you'll conduct experiments and apply theoretical knowledge to real-world scenarios.
- **Tutorials:** Small group or one-on-one sessions focused on problem-solving and personalized guidance.
- **Projects:** Individual or group projects that involve designing, building, and testing engineering solutions.

This approach ensures you gain hands-on experience and develop the skills needed to excel in your engineering career.

Placement Year

The programme offers a placement year, providing an opportunity for you to complete a year-long industry placement. If you enrol on the three-year programme, the placement year is optional for you. If you wish to transfer to the four-year programme with the placement year, your programme leader will work with you to facilitate the transfer. If you enrol on the four-year programme with the placement year, you will be provided with all the support to secure a placement. An academic from the school will act as a placement tutor, who will advise and support you on placements. The university Career Success team will support you by providing workshops in CV writing, mastering interview and working in the UK. The placement will be administered and monitored through a 20-credit, year-long 'professional placement' module. If you are entering through the Foundation Year, you can subsequently transfer to the placement year option, subject to meeting the student finance and funding requirements.

Assessment

We use a variety of assessment methods to evaluate your understanding and progress, making your learning experience comprehensive and effective.

- **Examinations:** These formal tests at the end of each semester assess your understanding of key concepts and theories.
- **Coursework Assignments:** Regular assignments challenge you to apply theoretical knowledge to practical problems and projects.
- **Laboratory Reports:** You'll write detailed reports on experiments conducted during lab sessions, demonstrating your ability to apply theoretical knowledge and analyze results.
- **Presentations:** You'll deliver professional presentations to develop your communication skills and ability to convey complex information clearly and effectively.
- **Case Studies:** Analysis of real-world scenarios to assess your ability to apply theoretical knowledge to practical situations.
- **Computer Simulations:** Use of simulation software to model and solve engineering problems, evaluating your proficiency with digital tools and techniques.

This diverse range of assessment methods ensures you develop a well-rounded skill set, preparing you for a successful career in mechanical engineering.

Contact Hours

Learners can expect to receive approximately 12 hours of scheduled learning activities per week. You will also be expected to undertake 18-20 hours of independent study (including research and practice) per week towards the completion of your coursework.

7. Programme Regulations

This programme will be subject to the following assessment regulations:

- *Regulations for Taught Degree Programmes (2023)*

The following exceptions will apply to all modules on this programme:

- The module pass mark will be 40% overall, but in accordance with Engineering Council regulations each assessment element must achieve a minimum threshold of 30% for the module to be passed.
- No more than 20 credits may be compensated across the programme. Where compensation is applied, the student may instead request reassessment.
- For the placement year option, the degree algorithm will instead be calculated on the best 100 credits out of 140 Level 5 credits. Other aspects will remain the same. The student will achieve an overall total of 380 credits.

8. Support for learners

The following systems are in place to support you to be successful with your studies:

- The appointment of a personal tutor to support you through your programme
- A programme handbook and induction at the beginning of your studies
- Library resources, include access to books, journals and databases - many of which are available in electronic format – and support from trained library staff

- Access to Blackboard, our Virtual Learning Environment (VLE), which is accessible via PC, laptop, tablet or mobile device
- Access to the MyBNU portal where you can access all University systems, information and news, record your attendance at sessions, and access your personalised timetable
- Academic Registry staff providing general guidance on University regulations, exams, and other aspects of students and course administration
- Central student services, including teams supporting academic skills development, career success, student finance, accommodation, chaplaincy, disability and counselling
- Support from the Bucks Students' Union, including the Students' Union Advice Centre which offers free and confidential advice on University processes.
- Access to a 'Final Year Project Information Session' towards the end of stage 2, where you will be introduced to the final year project selection process and will learn how you go about choosing or proposing your research project.

9. Programme monitoring and review

BNU has several ways for monitoring and reviewing the quality of learning and teaching on your programme. You will be able to comment on the content of their programme via the following feedback mechanisms:

- Formal feedback questionnaires and anonymous module 'check-ins'
- Participation in external surveys
- Programme Committees, via appointed student representatives
- Informal feedback to your programme leader

Quality and standards on each programme are assured via the following mechanisms:

- An initial event to approve the programme for delivery
- An annual report submitted by the External Examiner following a process of external moderation of work submitted for assessment
- The Annual Monitoring process, which is overseen by the University's Education Committee
- Review by the relevant PSRB(s)
- Periodic Subject Review events held every five years
- Other sector compliance and review mechanisms

10. Internal and external reference points

Design and development of this programme has been informed by the following internal and external reference points:

- The Framework for Higher Education Qualifications (FHEQ)
- The QAA 2023 Engineering Subject Benchmark Statement – see detailed mapping below
- The PSRB Standards of Proficiency (SOP) for the Joint Board of Moderators (JBM), Institution of Mechanical Engineers (IMechE)
- The BNU Qualifications and Credit Framework
- The BNU Grading Descriptors
- The University Strategy, Thrive 2028

Mapping of Subject Benchmark Statement and any relevant Apprenticeship Standard to Programme Learning Outcomes

Subject Benchmark Statement / Apprenticeship Standard:	Knowledge and understanding (K)					Analysis and Criticality (C)					Application and Practice (P)					Transferable skills and other attributes (T)				
	K1	K2	K3	K4	K5	C1	C2	C3	C4	C5	P1	P2	P3	P4	P5	T1	T2	T3	T4	T5
Engineering																				
Science, mathematics, and engineering principles	X	X	X			X						X								X
Engineering analysis, including use of computational tools and techniques.	X		X			X		X				X					X			X
Design, creativity, safety and innovation, including applying an integrated or systems approach.			X	X			X		X				X	X				X	X	X
Engineering and society, incorporating sustainability, ethics, risk, security and equity, diversity and inclusion		X			X				X	X	X			X					X	X
Engineering practice, including teamwork, project management,				X	X		X	X			X		X		X	X	X	X		X

Subject Benchmark Statement / Apprenticeship Standard:	Knowledge and understanding (K)					Analysis and Criticality (C)					Application and Practice (P)					Transferable skills and other attributes (T)				
Benchmark / Standard requirement	K1	K2	K3	K4	K5	C1	C2	C3	C4	C5	P1	P2	P3	P4	P5	T1	T2	T3	T4	T5
communication and use of practical equipment.																				

Mapping of Programme Learning Outcomes to Modules

Programme Learning Outcome	Knowledge and understanding (K)					Analysis and Criticality (C)					Application and Practice (P)					Transferable skills and other attributes (T)				
	K1	K2	K3	K4	K5	C1	C2	C3	C4	C5	P1	P2	P3	P4	P5	T1	T2	T3	T4	T5
Level 4																				
Science and Materials for Engineers	X	X	X			X	X				X	X						X	X	
Mathematics for Engineers	X	X				X	X				X	X								X
Computer Aided Design and Simulation	X		X	X	X	X		X		X	X	X	X	X		X	X		X	
Individual Engineering Project	X	X	X	X	X	X	X	X			X	X	X	X		X	X		X	X
Fundamentals of Electrical & Electronic Engineering	X	X	X			X	X				X	X	X				X		X	
Modelling & Analysis of Electromechanical Systems	X	X	X		X	X	X				X	X	X	X		X	X	X	X	
Level 5																				
Engineering Design, Materials and Processes	X	X			X	X	X				X	X	X	X	X	X	X	X	X	
Strength of Materials and Mechanics	X	X		X		X		X			X	X	X	X		X	X	X		
Thermodynamics, heat engines and Thermofluids	X	X				X	X				X	X	X	X		X	X	X	X	

Programme Learning Outcome	Knowledge and understanding (K)					Analysis and Criticality (C)					Application and Practice (P)					Transferable skills and other attributes (T)				
	K1	K2	K3	K4	K5	C1	C2	C3	C4	C5	P1	P2	P3	P4	P5	T1	T2	T3	T4	T5
Sensors, actuators and instrumentation	X			X		X		X			X	X	X	X		X	X	X		
Module Code (Optional)																				
Advanced Mechanical Principles, Dynamics and Control	X	X	X			X	X	X	X			X		X	X				X	X
Aircraft Dynamics and Control	X			X		X		X			X	X	X	X		X	X	X		
Control Systems Engineering and Mechatronics	X					X		X			X	X	X	X		X	X	X		
Renewable Energy Technologies	X	X			X	X	X		X			X		X	X		X		X	X
Level 6																				
Computational Fluid Dynamics	X						X	X	X		X	X				X	X			
Emerging and Sustainable technologies for Engineers	X	X				X	X	X	X			X	X	X		X	X	X	X	
Leadership and Management	X	X				X	X	X			X	X	X			X	X	X	X	
Research Project	X					X	X				X	X	X			X	X	X	X	X

Programme Learning Outcome	Knowledge and understanding (K)					Analysis and Criticality (C)					Application and Practice (P)					Transferable skills and other attributes (T)				
	K1	K2	K3	K4	K5	C1	C2	C3	C4	C5	P1	P2	P3	P4	P5	T1	T2	T3	T4	T5
Advanced Manufacturing Technology and Automation	X	X					X	X	X		X		X	X	X	X	X			X
Aerospace Propulsion Systems	X	X					X	X	X	X		X	X	X		X	X			
Computational Mechanics and Failure Analysis	X	X	X			X	X				X	X	X			X				
Robotics, Automation and Industry 4.0	X	X	X			X	X	X	X		X	X	X	X	X		X	X	X	X