Buckinghamshire New University

PROGRAMME SPECIFICATION

1. Key Information

Programme Title:	MSc Engineering Design
Awarding Institution:	Buckinghamshire New University
Teaching Institution(s):	Buckinghamshire New University
Subject Cluster:	3D Design
Award Title (including separate Pathway Award Titles where offered):	MSc Engineering Design
Pathways (if applicable)	
FHEQ level of final award:	7
Other award titles available (exit qualifications):	Postgraduate Certificate Postgraduate Diploma
Accreditation details:	
Length of programme:	2 years
Mode(s) of Study:	Part Time
Mode of Delivery:	In person (on-site) delivery
Language of study:	English
QAA Subject Benchmark(s):	Engineering (2019)
Other external reference points (e.g. Apprenticeship Standard):	
Course Code(s):	
UCAS Code(s):	
Approval date:	01 December 2022
Date of last update:	

2. Programme Summary

Engineering provides a rewarding career with exciting roles using science and creativity to make new things or improve on existing ones in a variety of fields such as food, medicines, cars, aeroplanes or buildings, bridges and roads - aimed at the betterment of society and life in general. Engineers not only make things but also manage products, facilities or services. The engineering discipline offers intellectual challenge and the high level of satisfaction that comes from problem solving. There is a shortage of engineering skills in the UK and the demand for engineers is growing.

This MSc Design Engineering course is designed to give students who have achieved an undergraduate degree in Engineering or equivalent the opportunity to extend their

engineering skills and develop further understanding and knowledge on how to employ management and technical tools, and the skills and confidence to spearhead and manage the development of new products and projects within the engineering industry. Students will learn to identify business issues and develop systematic, original and creative intellectual skills to formulate solutions. They will be investigating issues or problems on a topic of professional relevance and use holistic approaches to deal with engineering developments. They will also be able to demonstrate effective interpersonal skills and show a personal commitment to professional standards.

Key features of the course

The course is designed around the themes of Design/Technology, Project Management, Business Alignment and Complex Problem Solving in an engineering context, which:

- Extends knowledge and skills in specialist and contemporary areas of design and technology to deal with complex engineering problems

- Provides an understanding of commercial/financial management and modern tools and processes required for competitive product design and manufacture.

- Develops project management skills including the management of people and resources

- Leads to professional qualifications

3. Programme Aims and Learning Outcomes

Programme Aims

This programme aims to:

1. Enable postgraduates to deliver engineering projects efficiently, sustainably, ethically, and safely as a Senior Engineer mastering the state-of -the art design practices and technologies in engineering

2. Equip postgraduates with advanced critical understanding of theoretical concepts in order to solve problems in existing and emerging technologies, applying, developing and adapting analytical techniques in unfamiliar situations

3. Foster opportunities to develop team-working, creativity, and the skills of innovation through projects involving the management of products, systems, components or processes to fulfil needs

4. Produce well-rounded postgraduates capable of evaluating business needs and constraints covering both strategic and operational issues, through the application of an enhanced understanding of technical sign-off responsibilities

5. Extend analytical and research skills to investigate a chosen complex engineering subject systematically and coherently by demonstrating proficiency in primary research and integrating any relevant secondary research to produce solutions to engineering problems

Programme Learning Outcomes

Knowledge and Understanding (K)

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

ID	Learning Outcome
K1	Demonstrate a synthesised understanding of emerging design concepts, principles and technologies relating to the development of engineering products, services and specifications.
K2	Evidence the systematic acquisition of knowledge and understanding in order to apply suitable analytical, computational, simulation and other modelling techniques to solving engineering problems in an uncertain business environment.
K3	Demonstrate advanced comprehension of technical sign off responsibilities and authorisation processes and the impact of the decisions to wider stakeholders.
K4	Perform appropriate trade-offs between technical and socio-economic factors in the management of complex engineering systems, whilst evaluating how these factors influence the functioning of a business and its constraints.
K5	Justify the importance of an understanding of compliance with legislation and codes, as well as social and ethical responsibilities.

Analysis and Criticality (C)

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

ID	Learning Outcome
C1	Use critical analysis to evaluate information and knowledge related to engineering products and services.
C2	Generate innovative designs in conjunction withdeveloping manufacturing processes for products, systems, components or services to fulfil new needs.
C3	Engage in critical debate of a range of concepts relating to the management of people and development of the skills necessary to develop other technical staff.
C4	Display critical and creative thinking to include analysis, synthesis and critical appraisal to identify areas of improvement to an engineering business.
C5	Appraise business and commercial needs/constraints comprehensively when developing new or enhancing products, systems, and services.

Application and Practice (P)

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

ID	Learning Outcome
P1	Apply a critically-informed knowledge of project management methodologies to deliver engineering projects and understand the importance of accountability for technical, financial, social and environmental responsibilities.
P2	Deploy innovative concepts from a range of areas, including sources outside of engineering and design, effectively in a range of engineering projects.
P3	Evaluate systematically the commercial, social and environmental risks associated with complex engineering projects.

P4	Conduct independent empirical research or problem-based learning demonstrating a mastery of relevant skills and understanding.
P5	Embed a critical, ethical dimension to your practice through managing the implications of ethical dilemmas and working proactively and professionally with others to formulate solutions.

Transferable skills and other attributes (T)

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

ID	Learning Outcome
T1	Work effectively with multiple teams as a manager, leader or member and undertake technical responsibility for complex engineering systems.
T2	Communicate complex ideas effectively to a wide audience.
T3	Reflect on knowledge and understanding of your own competencies, capabilities and limitations, and draw from other practitioners' areas of expertise.
T4	Take significant responsibility for project(s)/programme(s), financial and personnel management.
T5	Demonstrate experience of management and leadership used in a range of different projects, varying in size and complexity.

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.

This course will support the learners who are aspiring to join the industry as professional engineers or continue the development of their career into the senior engineering roles. Graduates of MSc Engineering Design will have the ability to integrate their knowledge and understanding into engineering practice to solve a substantial range of complex engineering problems in unfamiliar situations in developing new products and services (K1-K5) and devise health and safety, risk, legal, intellectual property, and change management strategies in the engineering businesses (P1-P5). Crucially, with sustainability as a key theme, the graduates will have acquired skills to critically analyse and comprehend scientific principles, deploy computer-aided design methods and digital modelling approaches to the design and adapt emerging manufacturing technologies in creating innovative products and services (C1-C5). They will be well-rounded reflective professionals equipped with the design, technical, and people management skills required of a senior engineer leading new product design and associated manufacturing processes (P1-P5). They will be able to evidence effective leadership through well-developed interpersonal skills and a personal commitment to professional standards, recognising obligations to society, the profession, and the environment being responsible for project(s)/programme(s), finance, and personnel management (T1-T5).

4. Entry Requirements

The University's general entry requirements will apply to admission to this programme with the following additions / exceptions:

- It is normally expected that the applicants will have an undergraduate degree in Engineering Design or other relevant engineering degrees with 2:2 or higher. The University will consider all such applications and will have the final decision whether to accept the candidate for entry to the programme.

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

Pathway 1 or stand-alone course **[add further tables for each additional pathway]**

Level	Modules (Code, Title and Credits)	Exit Awards
Level 7	**Core modules:** Project Management (20) Product Development for Business (20) Contemporary Methods in Engineering Design (20) Research Skills for Engineers (20) Industrial Group Project (20) Manufacturing Automation, Robotics and Internet of Things (IoT) (20) Engineering Dissertation (60) **Option modules:** No option modules are available at this level.	60 credits PGC in Engineering Design 120 credits PgDip Engineering Design 180 credits MSc

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 course will be delivered on a part time mode, which allows the delivery with some self-directed learning for a period of 18 month followed by the project with the initial stage being done over the summer period of the first year as part of the self-directed learning component. This will mean that the part time route would take two academic years to complete the programme of study.

A comprehensive Induction Programme will be held in the first month to ensure learners have the necessary base and study skills to benefit fully from the course. During the induction learners are made aware of opportunities/resources to support their learning including, but not limited to library resources, the Learning and Development Unit, and disability services.

The learning and teaching strategy is focused on the needs of industry, will be flexible to match the abilities of the learners and the logistics of the programme. Considerations will be made to foster the awareness and utilisation of emerging technologies facilitating close interaction between industrial partners, learner workplaces, the academia and professional organisations.

The attendance in campus is the main mode of delivery, which will take mainly one day attendance in every week or block teaching.

- **Lecturers and Tutorials:** A variety of teaching and learning strategies and methodologies are evident within the Programme structure. Lectures will be used to deliver the overarching topics. Tutorials will then be used to work through examples and case studies reinforcing the lectures.

- **Seminars:** In addition to the traditional lecture and tutorial approach, discursive seminars are used extensively to develop and reinforce group dynamics and interpersonal skills. This is particularly useful where higher level cognitive and presentation skills are required. The importance of previous learning experience is also identified as critical and the knowledge which the individual learners bring to a group forum gives a value-added dimension to the learning experience. Case studies will be utilised particularly within the Engineering modules and specialist lecturers be invited and external experts will be integrated within appropriate modules. This will add industrial input to the module material and is another area which is of value to the learning process.

- **Workshops and presentations** are also used to help develop personal research and reflection skills as well as learning to express oneself by portraying a commanding presence.

- **Laboratory Sessions and practical demonstration**s: Laboratory sessions allow learners to practically apply the theoretical aspects of the course which encourages learner experimentation, this could be physical exercises or software-based activities. Practical sessions will allow the acquisition of specific skills and techniques, and highlight the health and safety requirements of materials, equipment and processes.

- **Engineering Dissertation:** In the second year, learners will undertake a major project which would normally be work-based for part time learners and sponsored by the company. During this period the learners are expected to draw on knowledge gained from studying the taught modules and apply it in an industrial context. A project handbook is issued to all learners at the beginning of the programme which contains all the necessary details regarding completion and presentation of the work. If a situation arises, where a learner is unable to find a suitable industry-based project for the dissertation, the course team will support the learner by agreeing topics projects which have industrial relevance from their research, development and consultancy activities.

Assessment

There are a variety of assessment vehicles, which are a selection of those found in the QAA Engineering Benchmark. Assignments are carried out in the learner's own time, in-class assignments, worksheets, presentations; laboratory/CAD exercises may also be used. The forms of assessment have been chosen to motivate learners to achieve and to create positive learning opportunities, and to meet the learning outcomes of the programme.

A variety of assessment methods will be used within this programme as appropriate to meet the learning outcomes. The following assessment activities are used on this programme:

- **Written Assignment** – This will be mainly in the form of written documents, where learners are requested to present research material in specific subjects and edit it to fit the desired outcomes.

- **Reports** – Learners are encouraged to document their entire learning progress throughout the degree, and some of that documentation will be delivered in the form of reflective and critically evaluative reports and will be assessed and marked.

- **Portfolio** – Learners will be expected to produce a portfolio as part of the group work. Learners are taught on the different processes involved in producing an industry-standard portfolio and will be assessed on the outcomes.

- **Presentation Assessment** –Presentation skills are a key element when working in teams and presenting ideas. Throughout the degree, learners are expected to produce coursework and present it to a range of audiences (including industry representatives), who's feedback will contribute to the assessment.

- **Group-work –** This mode of assessment develops transferable skills in the areas of oral communication, negotiation and interpersonal skills. Working in a group can also promote the sharing of ideas and practical problem-solving skills. Learners will have the opportunity to undertake team-based assessments; where they are assessed, the grade for the assignment will be a combination of a shared grade as a group based on specific assessment criteria and individual element.

  The group work will be facilitated using the Virtual Learning Environment (VLE) where the learners will be sharing their work with each other, discuss and monitor progress. In a special circumstance, if there is no learner available to work as a team, the tutor will suggest other options of collaborating such as finding other engineers/ professionals and lecturers to provide inputs as appropriate.

Assessment strategies support learners' understanding of their learning processes and are designed to foster a deep approach to learning. Strategies also promote autonomous learning and self-evaluation as vital elements within the overall learning process.

Learners will be asked to complete a series of projects given in the form of a project brief. Self and peer feedback during regular group and individual discussions will be an essential element in the maturation of ideas and practical development. Learners will be expected, during critiques and other discussions, to display a critical and reflective approach to their own and the work of others.

Summative assessment will take place during and at the end of the module. Submitted work will be assessed on the achievement of the module Learning Outcomes and awarded a grade based upon the assessment criteria. The assessments will take place with a full review of the briefs and all the supporting development work, which should clearly document the breadth and depth of research and the development of conceptual ideas for each project undertaken.

Summative feedback is provided with three weeks turnaround. However formative feedback will normally be provided prior to this during the assessment process, to ensure that learners are given opportunities to respond to feedback prior to submission. Formative feedback and feed forward are considered a vital part of the assessment process. More formal oral and/or written formative feedback is given at key identified points, usually during learner led presentations of work in progress. Self and peer-evaluation constitute an important part of formative assessment and, on occasion, of the formal summative assessment process.

Contact Hours

1 unit of credit is the equivalent of 10 notional learning hours. Full-time postgraduate learners study 180 credits (1800 hours) as per year or 'stage' of the course. For the part time delivery the hours will be completed over the two years of study.

7. Programme Regulations

This programme will be subject to the following assessment regulations:

- [Academic Assessment Regulations](#)

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.

9. Programme monitoring and review

BNU has a number of 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 Subject Benchmark Statement – see detailed mapping below
- The QAA Master's Degree Characteristics Statement
- The BNU Qualifications and Credit Framework
- The BNU Grading Descriptors
- The University Strategy

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)				
Benchmark / Standard requirement	**K1**	**K2**	**K3**	**K4**	**K5**	**C1**	**C2**	**C3**	**C4**	**C5**	**P1**	**P2**	**P3**	**P4**	**P5**	**T1**	**T2**	**T3**	**T4**	**T5**
Engineering																				
Be pragmatic, taking a systematic approach and the logical and practical steps necessary for, often complex, concepts to become reality	x	x					x			x	x		x							x
Seek to achieve sustainable solutions to problems and have strategies for being creative, innovative and overcoming difficulties by employing their skills, knowledge and understanding in a flexible manner	x			x			x			x		x			x		x	x		
Be skilled at solving problems by applying their numerical, computational,	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
analytical and technical skills, using appropriate tools																				
Be risk, cost and value-conscious, and aware of their ethical, social, cultural, environmental, health and safety, and wider professional responsibilities			x		x			x	x	x			x			x		x		
Be familiar with the nature of business and enterprise in the creation of economic and social value				x			x		x	x			x		x	x				x
Appreciate the global dimensions of engineering, commerce and communication			x	x	x			x				x	x				x	x		
Be able to formulate and operate within appropriate					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
codes of conduct, when faced with an ethical issues																				
Be professional in their outlook, be capable of team working, be effective communicators, and be able to exercise responsibility and sound management approaches			x		x			x	x				x		x	x	x	x	x	x

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)				
Module Code (Core)	K1	K2	K3	K4	K5	C1	C2	C3	C4	C5	P1	P2	P3	P4	P5	T1	T2	T3	T4	T5
Level 7																				
Project Management	x		x	x	x			x		x	x	x	x			x	x	x	x	x
Product Development for Business	x	x	x	x	x	x	x	x		x		x	x	x	x	x	x	x		x
Contemporary Methods in Engineering Design	x	x					x					x		x		x	x	x		
Research Skills for Engineers	x	x				x			x			x	x	x		x	x	x		
Industrial Group Project	x	x	x		x		x		x	x	x	x	x		x	x	x	x	x	x
Manufacturing Automation, Robotics and IoT	x	x					x					x		x		x	x	x		
Engineering Dissertation	x	x			x	x	x	x	x	x	x	x		x	x		x	x	x	x