PROGRAMME SPECIFICATION

1. Key Information

Programme Title:	BEng (Hons) 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):	BEng (Hons) Engineering Design
Pathways (if applicable)	Mechanical Engineering Electrical and Electronic Engineering Production Engineering
FHEQ level of final award:	6
Other award titles available (exit qualifications):	Certificate of Higher Education Diploma of Higher Education BEng Engineering Design
Accreditation details:	Institution of Engineering Design (IED)
Length of programme:	4 years part time 1 Year Top Up
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):	Product Design and Development Engineer Manufacturing Engineering University Strategy 2016-2021 • Buckinghamshire New University Approval of Academic Provision policy and procedure • QAA Framework for Higher Education Qualifications (2014) • Equality & Diversity Teaching & Learning Toolkit • QAA Education for Sustainable Development • Work-based and Placement Learning Policy • University Academic Qualifications Framework • Recommendation and feedback from external subject academic and industry professional
Course Code(s):	
UCAS Code(s):	
Approval date:	01 December 2022
Date of last update:	

2. Programme Summary

This programme draws you from HNC/D through to the BEng (Hons) programme, onto the MEng programme as a progression route to meet the academic requirements for Chartered Engineer. These courses will seek to be accredited to Incorporated Engineer with the Institution of Engineering Designers (IED) and the Institute of Mechanical Engineers (IMechE); also seeking to be accredited to Incorporated Engineer (IEng) with the Institution of Engineering and Technology (IET). The development of the part time programme is linked to the Apprenticeship Standards for Manufacturing Engineer and Product Design and Development Engineer, providing further support of the growth in this area. The government has a high priority in supporting the STEM subjects at all levels, coupled with the drive for apprenticeships will improve the chances of recruitment. Additionally, the recent development of the Degree Apprenticeship Levy has meant that companies are keen to explore the opportunities that this type of degree will bring to the business.

The subject contents of that the course portfolio and structure meets several elements which match with the University philosophy and strategy such as outward facing, externality and industrial involvement, looking to meet the needs of industry, and being industrially focused in delivery with work based learning.

The course is learner focused, providing you with the necessary academic qualifications to underpin and progress in your chosen apprenticeship career. It is externally supported, through the input from Industry and our industrial partners and provides a viable study platform through a variety of delivery modes with links and feedback from a wide range of industries.

The course will be delivered over 4 years for part time with levels 4 and 5 in the years 1-3 and level 6 over a full 12 month period in year 4. The level 6 will be delivered alongside the other modules for the taught element and your learning will be continuous until the completion of the dissertation, supported by tutorials usually on a one to one bases or in small groups. The year 5 will normally be for the completion of the requirements for the EPA as set out in the assessment standard for the apprenticeship only.

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 engineering design that meets the skill requirements and needs of employers in the engineering industry
2. Provide learners with a thorough understanding and knowledge of scientific and engineering principles, analysis, tools, and practices to develop an ability to formulate solutions to engineering problems and apply these to the design of manufactured products
3. Provide learners with key knowledge, understanding and skills to employ modern design methodologies, quality management systems and tools to achieve optimum solutions to engineering designs and manufacturing problems in an efficient and effective manner, to further develop their design creativity and digital skills and to present their design solutions

4. Produce graduates who are able to use a sound, evidence-based approach in applying innovative technologies, processes and systems and leadership skills to transform ideas into fully functioning real products, individually and working as a team, by meeting client, financial, environmental, quality, statutory and safety objectives
5. Develop graduates with critical understanding and leadership of professional ethics, social and cultural values in engineering and other business contexts in developing products and services recognising the impacts their decisions could have on the environment and society

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 engineering design and technological problems.
K2	Employ a range of tools and techniques, including digital approaches, to model, simulate and analyse complex products and assemblies to achieve optimum solutions.
K3	Select suitable planning, implementation, and presentation techniques in carrying out major individual project.
K4	Examine business contexts with respect to strengths and weaknesses, opportunities and threats in order to develop methods to counteract or exploit such aspects in developing sustainable production design and manufacturing solutions.
K5	Comprehend the importance of linking academic knowledge and skills with industry, research and development.

Analysis and Criticality (C)

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

ID	Learning Outcome
C1	Evaluate appropriate techniques and methods for solving numerical and scientific problems.
C2	Synthesise scientific knowledge and skills in formulating and analysing engineering design concepts and techniques whilst considering client, financial, environmental, quality, statutory and safety objectives.
C3	Critique a range of engineering software and manufacturing processes for the integration of design functions from concept to realisation.
C4	Analyse engineering materials and their processing methods for the design development and implementation of sustainable and practical solutions to engineering problems.
C5	Reflect on your own creativity in problem solving and your application of knowledge across discipline areas.

Application and Practice (P)

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

ID	Learning Outcome
P1	Employ efficiently advanced modelling, simulation, and analysis packages in engineering design.
P2	Design with a range of innovative technologies, such as electronic, electro-mechanical, mechatronics, Industry 4.0, instrumentation, control, robotics and automation techniques, in the process of product development and manufacturing.
P3	Implement engineering design projects both individually and in a group utilising a methodical and disciplined approach in order to satisfy client, financial, environmental, quality, statutory and safety requirements.
P4	Design engineering products and services considering their lifecycle, circular economy principles and sustainability considerations

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 identifying and working towards targets for personal, career, and academic development.
T2	Communicate effectively by oral, written, and visual means including highly specialised manual and computer-based methods for engineering product design and presentation.
T3	Use Electronic and mechanical computer-aided design (ECAD/MCAD) software effectively
T4	Identify and work towards targets for personal, career, and academic development.
T5	Be independent and reflective learners .

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.

The graduates will achieve comprehensive knowledge and understanding of engineering design (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 (P1) in engineering and convey ideas effectively (T2-T3) to a range of audiences for a variety of purposes (C1-C5). They will be risk, cost and value-conscious, be ethical, social, cultural, environmental, health and safety aware (P3), and be familiar with the nature of business and enterprise in the creation of economic and social value (K5, P4). They will have the ability to engage with dynamic traditions of thoughts (K2-K3), the ability to apply their knowledge in real-time practice across multi-disciplinary and multi-professional contexts (P3-P4) in designing engineering products and services. They will appreciate the global dimensions of engineering, commerce, and communication, be able to formulate and operate within appropriate codes of conduct, be professional in their outlook, be capable of team working

and be effective communicators (T1-T5). The graduates will engage in professional, intellectual, and ethical behaviour, and have the potential to be entrepreneurial and take leadership roles (K4-K5), well prepared for living, learning, and working in a digital society (P2, T2-T3) with their chosen careers.

4. Entry Requirements

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

- A typical offer will require a UCAS tariff score of: 100 - 128
- A minimum of two full A-levels or 120 credits in an Engineering BTEC at level 3 (or equivalent) is required. Every application is considered on an individual basis.
- Applicants will need to complete an interview and/or demonstrate portfolio work, further guidance is given on the interview and portfolio advice pages.
- For further details of our international English entry requirements, please visit our international pages.
- This Level 6 programme is also offered as a Top Up qualification for students who have completed a HND, FdA or other equivalent qualification in a relevant subject and who wish to progress further to achieve an Honours degree.
- Students from an HNC and Foundation Degree Engineering or equivalent may have the opportunity to join this programme as part of the progression route at Level 5.

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: **BEng (Hons) Engineering Design (Mechanical Engineering)**

Level	Modules (Code, Title and Credits)	Exit Awards
Level 4	**Core modules:** CAD4051 Mathematics for Engineers (20) CAD4047 Science and Materials for Engineers (20) CAD4055 Principles of Engineering Design and Prototyping (20) CAD4056 Individual Professional Project (20) CAD4057 Computer Aided Design and Simulation (20) CAD4058 Mechanical Principles and Experiments (20) **Option modules:** No option modules are available at this level. **Opportunity modules: No Opportunity modules** You must choose 2 x 10 credit Level 4 Opportunity modules from the Opportunity module catalogue www.bnu.ac.uk/oppmodules	**Certificate of Higher Education**, awarded on achievement of 120 credits at Level 4
Level 5	**Core modules:** CAD5032 Management Strategies, Economics and Finance (20) CAD5039 Thermodynamics, Heat Engines and Thermofluids (20) CAD5041 Virtual Engineering and Mechanical Simulation (20) CAD5042 Industry-based Project (20) CAD5045 Advanced Mechanical Principles and Mechatronics (20) CAD5046 Advanced Manufacturing Technology (20)	**Diploma of Higher Education**, awarded on achievement of 240 credits, including a minimum of 120 credits at Level 5
Level 6	**Core modules:** CAD6020 Design for Quality and Sustainability (20) CAD6011 Design for Manufacture (20)	**Ordinary Degree**, awarded on achievement of 300 credits, including

	CAD6021 Research project (40) CAD6023 Robotics, Automation and Industry 4.0 (20) CAD6024 Leadership and Management (20)	60 credits at Level 6 and 120 credits at each of Levels 4 and 5 **Honours Degree**, awarded on achievement of 360 credits, including 120 credits at each of Levels, 4, 5 and 6

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.

Pathway 2: **BEng (Hons) Engineering Design (Electrical and Electronic Engineering)**

Level	Modules (Code, Title and Credits)	Exit Awards
Level 4	Core modules: CAD4051 Mathematics for Engineers (20) CAD4047 Science and Materials for Engineers (20) CAD4055 Principles of Engineering Design and Prototyping (20) CAD4056 Individual Professional Project (20) CAD4057 Computer Aided Design and Simulation (20) CAD4059 Electrical, Electronics and Digital Principles (20)	**Certificate of Higher Education**, awarded on achievement of 120 credits at Level 4
Level 5	**Core modules:** CAD5032 Management Strategies, Economics and Finance (20) CAD5047 Design of Electropneumatic, PLC and Microprocessor Systems (20) CAD5042 Industry-based Project (20)	**Diploma of Higher Education**, awarded on achievement of 240 credits, including a minimum of 120 credits at Level 5

	CAD5040 Measurement, Instrumentation and Control Systems Engineering (20) CAD5044 Mechatronics and Embedded Systems (20) CAD5049 Power System Analysis, Smart Grids and All-Electric Vehicles (20)	
Level 6	**Core modules:** CAD6020 Design for Quality and Sustainability (20) CAD6022 Power Electronics and Drives for Electrical Machines and Renewable Energy Systems (20) CAD6021 Research Project (40) CAD6023 Robotics, Automation and Industry 4.0 (20) CAD6024 Leadership and Management (20)	**Ordinary Degree**, awarded on achievement of 300 credits, including 60 credits at Level 6 and 120 credits at each of Levels 4 and 5 **Honours Degree**, awarded on achievement of 360 credits, including 120 credits at each of Levels, 4, 5 and 6

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.

Pathway 3: **BEng (Hons) Engineering Design (Production Engineering)**

Level	Modules (Code, Title and Credits)	Exit Awards
Level 4	**Core modules:** CAD4051 Mathematics for Engineers (20) CAD4047 Science and Materials for Engineers (20) CAD4055 Principles of Engineering Design and Prototyping (20) CAD4055 Individual Professional Project (20) CAD4057 Computer Aided Design and Simulation (20) CAD4058 Mechanical Principles and Experiments (20)	**Certificate of Higher Education**, awarded on achievement of 120 credits at Level 4
Level 5	**Core modules:** CAD5032 Management strategies, economics and finance (20) CAD5048 Quality, Process and Plant Management (20) CAD5042 Industry-based project (20) CAD5043 Manufacturing Technologies and System Engineering (20) CAD5046 Advanced Manufacturing Technology (20) CAD5044 Mechatronics and Embedded Systems (20)	**Diploma of Higher Education**, awarded on achievement of 240 credits, including a minimum of 120 credits at Level 5
Level 6	**Core modules:** CAD6020 Design for quality and sustainability (20) CAD6011 Design for Manufacture (20) CAD6021 Research Project (40) CAD6023 Robotics, Automation and Industry 4.0 (20) CAD6024 Leadership and Management (20)	**Ordinary Degree**, awarded on achievement of 300 credits, including 60 credits at Level 6 and 120 credits at each of Levels 4 and 5 **Honours Degree**, awarded on achievement of 360 credits, including 120 credits at each of Levels, 4, 5 and 6

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

Modules on this programme will be taught in line with the University's Teaching, Learning and Assessment strategy and the Course Team will strive to ensure that all modules embrace contemporary industrial practice and work-based learning, wherever possible. Where appropriate assessments will be drawn from the real-world examples and workplace and used as part of the work-based learning. A range of teaching methods will be used to ensure that the learner is able to learn at their best ability. Typical techniques will include the following but will not be exclusive to:

- Lectures to transfer the basic and complex theory of the topic
- Seminars will be used for smaller groups to discuss and analyse the subjects
- Tutorials used for one-to-one assistances
- Work based learning skill learned in the workplace will provide the practical application to the learning process through the work-based learning modules
- Blackboard for e-learning and transfer of information
- Workshop and Practical sessions development of required skills
- Laboratories will be used for the testing and proving of theory
- Research and industrial visits: to provide depth and context to the learning

Digital technologies and industry standard software will be used in the relevant modules. ECAD and MCAD software including MATLAB Simulink, SolidWorks will be used along with practical and discrete components to model, simulate and evaluate information such as specifications, programme, cost, environment, health and safety etc., in the teaching of relevant modules. This will foster deep learning enabling you to see how the contents delivered in different modules are interrelated to provide holistic concepts of engineering technology, sustainable design, and integration of model-based engineering services and systems for effective design and operation of manufacturing technologies.

The teaching strategies employed throughout the course are those judged to be the most appropriate for each module at each stage and level of the course with a strong emphasis on work-based learning and work placed mentoring. They include the following strategies and techniques:

Lectures

This is the most formal teaching strategy used during the course. It is generally used for the delivery of a body of theoretical information to a large group of learners, and this is most effective when followed by a seminar, tutorials or group discussion. The lecture format may also be used to introduce a module or a project to the whole cohort, and in all cases, lectures will be supported by supplementary information in the form of handouts, or links to Blackboard or similar virtual learning environment (VLEs). This supplementary information will reinforce through the workplace and possibly expand upon the information conveyed through the lecture and may well include tutorial or other exercises to be carried out in the learner's own time. On occasion, guest lecturers (GLs) and Associate Lecturers (ALs) will be used where specific areas of expertise are required, and to launch external competitions and industrial collaboration projects.

Seminars

These are seen as an essential teaching tool, and can vary from large group seminars, which provide formal debate, to impromptu discussion sessions with small groups, which

may follow on from a lecture, demonstration or video. Seminars will be promoted to encourage learners from a range of courses within the faculty to attend, to allow cross fertilisation of ideas.

Critiques

All learners are required to present their work to the rest of the cohort and to the course team on a regular basis. All learners, including those from other levels, are welcome to take part, but generally numbers are kept reasonably low, as this is less intimidating for those presenting. The onus is on the learner to take responsibility for presenting their work in the most appropriate manner. This is an extremely effective teaching strategy, encouraging learners to become increasingly articulate and confident in discussing their work as they enter into critical debate. It also acts as a communication vehicle to allow dissemination of good practice between all of the learners and the staff.

Tutorials

Group and individual tutorials are used throughout all levels of the course. Each learner also has a personal tutor; someone who follows their progress but is also available to discuss other more personal problems that may occur, and where necessary refer them elsewhere for assistance. Learners may request a personal tutorial as and when necessary. For the final Level 6 project dissertation, learners are given a regular weekly timetabled tutorial. The role of the tutor is to provide advice, support, guidance and feedback on the learner's work as it develops.

Blackboard

Blackboard is the University's choice of computer software for our virtual learning environment (VLE). It supports online teaching and learning and can be accessed by registered learners and staff via the University's intranet system or by the internet from any location. Blackboard has become a key learning support tool whereby staff and learner can communicate through text and image. Resources available within the „environment" include, course information, module materials that can comprise of anything from lecture notes to video clips, discussion forums for communication between staff and learners, administrative information such as calendars, and the setting and marking of online assessment. Blackboard facilitates an inordinately flexible and remotely available teaching and learning world.

Workshop and Practical Sessions

Practical sessions will allow the acquisition of specific skills and techniques, and highlight the health and safety requirements of materials, equipment and processes. Cohorts will be split into small group sizes to ensure that each learner has full access to each process. These will be expressed in their final project when they will have to demonstrate that they are able to coordinate their learning and use the knowledge learnt to apply to project management.

Laboratories

Lab sessions allow learners to practically apply the theoretical aspects of the course, for example mathematical and physical science that has been introduced in more formal

lectures, and therefore gain another perspective on the academic material. The more relaxed atmosphere of the lab environment allows and encourages learner experimentation.

Research/Industrial Visits / Study Tours

These may include visits to factories, service centres, galleries, exhibitions, museums, retail outlets and manufacturers, and are aimed at increasing the learners' awareness of the wider world and possibilities within their area of study. Normally, learners will be offered two optional annual study tours, aimed at promoting an international perspective on design, an awareness of other cultural attitudes and creating relationships with other institutions through visits, guided tours and collaborative projects.

Assessment

A variety of assessment vehicles are used as appropriate to each module. The forms of assessment have been chosen so as to motivate you to achieve and to create positive learning opportunities. The assessments are mainly coursework, which include:

- Written assignment
- Report (individual and group)
- Portfolio
- Computer-based tests
- Set exercises - worksheets, to be completed as required usually in the learner's own time
- Presentations (such as poster and oral, individual and group)
- Laboratory exercises and report
- Practical Skills assessment
- Proposal
- Dissertation
- Examination

Formative feedback on your progress on the project work, directed study activities, class exercises and progress on summative assessments will be provided using verbal feedback during individual tutorials, group critiques or seminar sessions and peer feedback. Formative feedback opportunities will be provided to monitor and reflect on progress, identifying areas of achievement as well as focusing on objectives for future development.

Assessment criteria reflect the progressively independent learning expected as you progress through the course. This supports the practical nature of the course, supported by theoretical research and critical writing.

Contact Hours

Learners can expect to receive approximately 12 hours of scheduled learning activities per week in the full-time study, for the part time mode of delivery the scheduled hours will normally be 6-8 hours. You will also be expected to undertake 18-20 hours (pro rata for part

time) 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:

- 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 Apprenticeship Standard – see detailed mapping below
- 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**	**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		x
Be skilled at solving problems by applying their numerical, computational, analytical			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**	**T1**	**T2**	**T3**	**T4**	**T5**
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						
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						x
Appreciate the global dimensions of engineering, commerce and communication		x										x		x				x	
Be able to formulate and operate within appropriate codes of conduct, when faced				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**	**T1**	**T2**	**T3**	**T4**	**T5**
with an ethical issue																			
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

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**	**T1**	**T2**	**T3**	**T4**	**T5**
Level 4																			
Mathematics for Engineers			X			X								X			X		X
Science and Materials for Engineers	X	X				X	X			X	X		X		X		X		X
Principles of Engineering Design and Prototyping	X		X				X	X	X				X	X			X		X
Individual Professional Project	X		X		X	X			X					X	X		X		
Computer Aided Design and Simulation			X	X				X	X	X	X		X	X			X		
Mechanical Principles and Experiments	X				X	X				X	X				X		X		
Electrical, Electronics and Digital Principles	X	X	X			X	X				X		X		X		X		
Level 5																			
Management Strategies, Economics and Finance			X					X			X		X		X	X		X	X
Thermodynamics, Heat Engines and Thermofluids	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)				
Module Code (Core)	**K1**	**K2**	**K3**	**K4**	**K5**	**C1**	**C2**	**C3**	**C4**	**C5**	**P1**	**P2**	**P3**	**P4**	**T1**	**T2**	**T3**	**T4**	**T5**
Quality, Process and Plant Management		X	X	X	X		X				X	X					X	X	
Design of Electropneumatic, PLC and Microprocessor Systems	X	X	X		X	X	X	X		X	X		X			X	X		X
Virtual Engineering and Mechanical Simulation	X	X	X		X		X		X		X	X			X		X		
Industry-based Project	X		X	X	X	X	X				X		X	X		X	X		
Manufacturing Technologies and Systems Engineering	X	X	X					X	X	X		X		X	X		X		X
Measurement, Instrumentation and Control System Engineering	X	X			X	X	X		X			X	X		X	X	X		
Advanced Manufacturing Technology	X	X	X		X	X		X		X	X	X		X		X	X		
Advanced Mechanical Principles	X		X	X			X	X	X			X	X		X		X		X
Mechatronics and Embedded Systems	X	X	X	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)				
Module Code (Core)	**K1**	**K2**	**K3**	**K4**	**K5**	**C1**	**C2**	**C3**	**C4**	**C5**	**P1**	**P2**	**P3**	**P4**	**T1**	**T2**	**T3**	**T4**	**T5**
Power System Analysis, Smart Grids and All-Electric Vehicles	X	X	X	X	X	X	X	X	X	X	X	X					X		
Level 6																			
Design for Quality and Sustainability				X			X	X	X			X	X				X	X	
Design for Manufacturing			X		X			X	X	X	X	X					X		X
Research Project	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X			
Power Electronics and Drives for Electrical Machines and Renewable Energy Systems	X	X	X	X	X	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		
Power electronics and drives for electrical machines and renewable energy systems	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