PROGRAMME SPECIFICATION

1. Key Information

Programme Title	Manufacturing Engineer Degree Apprenticeship
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 Production Engineering
FHEQ level of final award:	6
Other award titles available (exit qualifications):	Certificate of Higher Education in Engineering Design Diploma of Higher Education in Engineering Design BEng (Hons) Engineering Design
Accreditation details:	This programme 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).
Length of programme:	4 years plus 6 months EPA
Mode(s) of Study:	Part Time
Mode of Delivery:	Work-based learning
Language of study:	English
QAA Subject Benchmark(s):	Engineering (2023)
Other external reference points (e.g., Apprenticeship Standard):	• Institute for Apprenticeships and Technical Education (Manufacturing Engineer-ST0025) • QAA Framework for Higher Education Qualifications (2014) • Equality & Diversity Teaching & Learning Toolkit • QAA Education for Sustainable Development
Course Code(s):	BNENGDAP
UCAS Code(s):	N/A
Approval date:	July 2023
Date of last update:	March 2024

2. Programme Summary

The apprenticeship programme is designed to enable learners in developing knowledge, skills and behaviours required to meet engineering industry standards and enhance

attributes to achieve career aspirations or entry to higher level qualifications. The curriculum intent will develop learners to be skilled in specialist areas in meeting employer requirements to investigate and solve day-to-day engineering problems through the collaboration of learners and academic, industry professional experts. The programme further develops occupational behaviours to ensure learners demonstrate problem solving orientation, a safety mindset, adaptability, emotional resilience and a logical approach to deepen engineering skills within their specialist areas.

This programme is designed to develop apprentices in core engineering and competencies that are transferable to empower learners to become highly skilled industry experts with flexibility to specialise in their chosen pathways to provide breadth of experience.

Role specific occupational pathways:

Mechanical Engineer Mechanical engineers research, design, develop, manufacture and install mechanical components and systems. This can range from the components in aircraft wings to heating systems for multi-storey buildings and robotic instruments for use in space. Although mechanical engineers' work varies greatly, it tends to be driven by complex-problems that need solving. Mechanical engineers will use their knowledge of maths, science and technology to understand the problem, and to research, design and deliver solutions.
Production Engineer Production Engineers work out how the product will be assembled on the production line including the design packaging enabling the right quantity of components/product are delivered to support the speed of the production line. The Production Engineer will review efficiencies and eliminate waste within the manufacturing process and deliver high quality products/components to clearly defined standards. Responsibilities include managing the whole production process whilst ensuring everything runs smoothly and effectively alongside planning and installing the systems that oversee the manufacturing of a product.

The programme is learner focused, providing the necessary knowledge, skills and behaviours to underpin specialisms in manufacturing and product design, it is externally supported, through the input from Industry and our industrial partners to provide the elements that will support fundamental mathematical and scientific principles. The programme aims to produce technically competent and highly motivated learners who will have the understanding, awareness and the resilience to work efficiently and effectively in a variety of relevant engineering roles including contemporary and emerging technologies within their workplace.

The assignments are designed to provide flexibility to link apprentices' workplace experience with principles of engineering and scientific laws, theorem and practice. Technology forms a fundamental part of the programme to develop digitally enabled learners who are prepared with a wide range of Computer Aided Design (CAD) simulation tools to be competitive in current and emerging technologies used in industry with discussions around advancement within the next 5–10 years. The programme implements a focus on green skills, English and mathematics, safeguarding, fundamental British values, prevent agenda and career aspirations to take advantage of opportunities, experiences and responsibilities that prepare learners for their progression routes in employment and further training.

The curriculum is designed to meet the UK's skill shortage with input from employers and academics to ensure its relevance to industry and fulfils both the academic requirements for BNU and the Manufacturing Engineer degree apprenticeship standard, providing further support of the growth in this area.

The apprenticeship will be delivered over 4 years plus 6 months for the End Point Assessment (EPA). EPA usually takes 6 months to complete, as set out in the assessment standard for the apprenticeship. A minimum of 6 hours per week will be provided by the employer during worktime.

Apprentices will receive guidance and support throughout their learning journey from the Apprenticeship Hub through regular tripartite progress reviews and contact.

3. Programme Aims and Learning Outcomes

This programme is designed to meet the aims and learning outcomes specified by the UK Engineering Council in its requirements for Accreditation of Higher Education Programmes (AHEP) that fully satisfy the educational requirements for Incorporated Engineer (IEng) status and partially satisfy the educational requirements for Chartered Engineering (CEng) status.

Programme Aims

This programme aims for apprentices to:

1. Offer a contemporary and comprehensive curriculum to provide a stimulating and challenging programme of engineering design that meets the knowledge, skills and behaviours of the apprenticeship standards and needs of employers in the engineering industry
2. Provide a thorough understanding and knowledge of scientific and engineering principles, methods, techniques, analysis, tools, and practices to develop the ability to formulate solutions to engineering problems and apply these to the design of manufactured products
3. Provide key employability skills to achieve optimum solutions to enginnering design and manufacturing problems in an efficient and effective manner, to further develop their design creativity and digital skills
4. Provide 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
5. Produce learners who are able to use a sound, evidence-based approach in applying innovative and hi-tech 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
6. Develop learners with critical understanding and leadership of professional framework and engineering 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	Outline 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	Identify 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	Define 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	Interpret 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	Develop 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 professional 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	Apply lean manufacturing principles effectively when using electrical and electronic engineering and computer-aided design and simulation software
T4	Investigate and define a problem and identify constraints including environmental and sustainability limitations; ethical, health, safety, security and risk issues, intellectual property; code of practice and standards.
T5	Evaluate business customer and user requirements to apply advanced problem-solving skills in creative product design

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 learners will gain comprehensive knowledge and understanding of engineering design (K1), be pragmatic and seek to achieve sustainable solutions (K4, C4, P4). Learners 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). Learners 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). Learners will have the ability to engage with dynamic traditions of thoughts (K2-K3), apply their knowledge in real-time practice across multi-disciplinary and multi-professional contexts (P3-P4) in designing engineering products and services. Learners 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 learners will engage in professional, intellectual, and ethical behaviour, and have the potential to be entrepreneurial and take leadership roles (K4-K5), be well prepared for living, learning, and working in a digital society (P2, T2-T3) within their chosen careers.

4. **Entry Requirements**

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

Individual employers will set the selection criteria for their Apprenticeships and appoint an appropriate candidate. To optimise success candidates will typically have 5 GCSEs at Grade C or above, including Mathematics, English and a Science, Technology or Engineering related subject, as well as A Levels at grade C or above in both a Mathematical based subject and a Science, Technology, Engineering or additional Mathematics related subject, or 90+ credits in an Engineering BTEC at level 3. Entrants from the direct entrant route who are not on the apprenticeship programme must have completed to level 3 of their studies and will not be required to do the NVQ L4.

We would also consider applications from those who have gained relevant skills through a wide range of vocational qualifications or responsible experience and experiential learning for mature applicants.

Applicants will normally be in full-time employment when applying for this award. The programme has a unique structure which works well with both contribution from employers and from the learner, this programme allows the learner to gain knowledge and experience in their field of study.

As a minimum, the applicant will be interviewed which is known as Initial Needs Assessment (INA). The interview (I.e.: INA) should be able to demonstrate that the applicant can do the following:

- Show that they have an understanding of the chosen course of study
- Demonstrate that they have the necessary (or required) practical, design and academic skills, as appropriate, to enable them to embark upon their chosen course of study
- Show that they are motivated to undertake the chosen course of study
- Show an awareness of, and interest in, Engineering, technology and the development of ideas

Recognition of Prior Learning

Mature applicants without the above qualifications will also be considered for entry by interview and submission of an up-to-date relevant CV. In addition, they will have a letter of support from their employer and demonstrate a significant knowledge gained through the workplace. This group of applicants may or may not be eligible for the apprenticeship levy depending on their prior learning and background.

Learners who have completed HNC/HND and Foundation Degree Engineering may have the opportunity to join this programme as part of the progression route at level 5 or level 6. These learners will be interviewed to identify their point of entry. These applicants may enter the programme with advanced standing as allowed for in the Apprentice descriptor or may wish to continue their study outside of the apprenticeship programme.

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.

All Applicants must have completed or will be required to complete BNU's own version of PEO (Practical Engineering Operations) portfolio at the start of the apprenticeship. This will be completed in the Initial year of the apprenticeship.

All learners take an online initial assessment- Basic Key Skills Builder (BKSB) to assess and develop skills in English and maths to support functional skills requirements. Something all apprentices much achieve before taking their End Point Assessment (EPA).

5. Programme Structure

Pathway 1: **Mechanical Engineering**

Level	Modules (Code, Title and Credits)	Exit Awards
Level 4	**Core modules:** CAD4079 Science and Materials for Engineers (20) CAD4080 Mathematics for Engineers (20) CAD4081 Principles of Engineering Design and Prototyping (20) CAD4082 Individual Professional Project (20) CAD4083 Computer Aided Design and Simulation (20) CAD4084 Mechanical Principles and Experiments (20)	**Certificate of Higher Education**, awarded on achievement of 120 credits at Level 4
Level 5	**Core modules:** CAD5099 Advanced Mechanical Principles, Dynamics and Control (20) CAD5100 Management Strategies, Economics and Finance (20) CAD5101 Thermodynamics, Heat Engines and ThermoFluids (20) CAD5103 Virtual Engineering and Mechanical Simulation (20) CAD5104 Industry-based Project (20) CAD5107 Advanced Manufacturing Technology and Automation (20)	**Diploma of Higher Education**, awarded on achievement of 240 credits, including a minimum of 120 credits at Level 5
Level 6	**Core modules:** CAD6056 Design for Manufacture (20) CAD6057 Design for Quality and Sustainability (20) CAD6058 Research project (40) CAD6059 Robotics, Automation and Industry 4.0 (20) CAD6060 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

Pathway 2: **Production Engineering**

Level	Modules (Code, Title and Credits)	Exit Awards
Level 4	**Core modules:** CAD4079 Science and Materials for Engineers (20) CAD4080 Mathematics for Engineers (20) CAD4081 Principles of Engineering Design and Prototyping (20) CAD4082 Individual Professional Project (20) CAD4083 Computer Aided Design and Simulation (20) CAD4084 Mechanical Principles and Experiments (20)	**Certificate of Higher Education**, awarded on achievement of 120 credits at Level 4
Level 5	**Core modules:** CAD5100 Management strategies, economics and finance (20) CAD5104 Industry-based project (20) CAD5105 Manufacturing Technologies and System Engineering (20) CAD5107 Advanced Manufacturing Technology and Automation (20) CAD5108 Design of electropneumatic, PLC and Microprocessor Based Systems (20) CAD5109 Quality, Process and Plant Management (20)	**Diploma of Higher Education**, awarded on achievement of 240 credits, including a minimum of 120 credits at Level 5
Level 6	**Core modules:** CAD6056 Design for Manufacture (20) CAD6057 Design for Quality and Sustainability in Engineering (20) CAD6058 Research Project (40) CAD6059 Robotics, Automation and Industry 4.0 (20) CAD6060 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

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

A substantial portion of the learning will be in the workplace with a minimum of 6 hours per week off the job training provided by the employer during worktime.

On the programme the academic/knowledge/theoretical aspect of the programme will be delivered by day release at one of the University bases. Modules on this programme will be taught in line with the University's Teaching, Learning and Assessment strategy for the Apprenticeship Degrees, and the Course Team will plan to ensure that all modules embrace current industrial practice and work-based learning for integrated practice. Where appropriate assessments will be drawn from the workplace and used as part of the work-based learning.

The teaching, learning and assessment methods adopted will embrace a wide range of approaches around a core of work-based projects and workshop tuition, where currency will be maintained through strong links with allied professions and industries. The programme is structured to allow learners to take increasing responsibility for the content and direction of their work, and to become increasingly independent in their studies as the programme progresses, they include the following strategies and techniques:

- Employment skills learned in the workplace will provide the practical application to the learning process through the work-based learning modules
- Workshop and Practical sessions development of required skills
- 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 and continued support
- Blackboard for e-learning and transfer of information
- 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. Computer-based simulation software will be used along with practical and discrete components to model, simulate and evaluate information such as modelling, development and analysis of engineering systems, specifications, bills for materials, green skills, 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 systems engineering, and services for effective design and operation of manufacturing technologies.

The teaching strategies employed throughout the programme 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:

Lectures

This is the most formal teaching strategy used during the programme. 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.

Support:

An apprenticeship partnership manager (APM) will be allocated to each apprentice to carry out regular tripartite progress reviews across their learning journey. The APM will also support on APTEM portal, signing off the online portfolio of evidence and will ensure the welfare of learners.

Tutorials

Group and individual tutorials are used throughout all levels of the programme. 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.

Most of the apprenticeship modules are designed with practical skills assessments. The learners will be applying a range of given practical skill-based case studies in the electro-mechanical and simulation labs to prepare for the assessments. The learners are expected to use the simulation lab to critically evaluate/analyse the practical-oriented engineering case studies for their work-based projects. The learners will also develop a range of prototypes for their coursework and work-based projects using the electro-mechanical lab and equipment.

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, curiosity and innovation.

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 to motivate and create positive learning opportunities which include:

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

Portfolio:

Portfolio renders learners the opportunity to explore and demonstrate work-based concrete examples to design and create live products. In engineering, a typical portfolio consists of problems and case studies for real-world applications. Learners will solve problems using principles, theories and laws and comment on their results/outcomes. For case studies, learners will use mathematical models, algorithms and scientific methods with a range of simulation and practical evidence using simulation, electromechanical, 3D design and practical laboratories and comment on the results/outcomes. Commentary must evaluate the outcomes and recommend the further action(s) as appropriate. The length of portfolio for:

- Level 4: 15-20 pages with 1000 words commentary [for 100% weighting]
- Level 5: 18-25 pages with 1000 words commentary [for 100% weighting]
- Level 6: 25-35 pages with 1000 words commentary [for 100% weighting]

Project output:

Learner to interpret company specific, customer and stakeholder requirements into technical specifications. For example, customer requirements for a product are to ensure safety in all-electric vehicles while the learners use relevant technical terms such as response time of a protection circuit/system. The assessment will be designed to set up response time such as 2 seconds and learners have to simulate the system to achieve ‘’repose time to 2 seconds prior to developing the live product/circuit’’.

Formative feedback on progress is given for project work, directed study activities and class exercises leading to summative assessments provided through 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.

A variety of assessment vehicles are used as appropriate to each module. These include laboratory exercises and formal examinations, assignments carried out in the learner’s own time, in-class assignments, worksheets and presentations. The methods of assessment have been chosen to motivate learners to achieve and create positive learning opportunities that meet their needs. Both formative and summative approaches will be used throughout the assessment process. The formative assessments will be used in the early stages of the process and as the learner progresses the summative approach will be used. Assessments will often be a work- based activity and assignments drawn from the apprentice's workplace. There will be two formal assessment points on the apprenticeship programme.

Personal Development Planning

The apprentice will develop a personal development portfolio over the course of the apprenticeship which will form part of the requirement for the end point assessment. This will take the form of a logbook for the work carried out in the workplace and will be monitored by the workplace assessor. The two main point of review of this will be the midpoint assessment and the endpoint assessment

End Point Assessment (EPA)
Once the practical training period has been achieved, apprentices are prepared for their End Point Assessment (EPA).

EPAs are a synoptic assessment of the knowledge, skills and behaviours that have been learnt throughout the apprenticeship. The purpose of the EPA is to make sure the apprentice meets the standard set by employers and is fully competent in the occupation.
The detail of the EPA is described in the Assessment Plan associated with the standard.
Prior to being eligible for the EPA, the apprentice will need to successfully meet the 'Gateway' requirements as determined by the standard. The employer and training provider will review their apprentice's knowledge, skills and behaviours to see if they have met the minimum requirements of the apprenticeship set out in the apprenticeship standard and are ready to take the assessment.

To meet the minimum requirements set out in the apprenticeship standard an apprentice needs to:
• Display occupational competency
• Have evidence of or pass functional skill levels in English and Maths
• Complete mandatory training
• Take any qualifications set out in the standard
• Meet the minimum duration for their apprenticeship training

Only apprentices who complete gateway successfully can start the EPA

Breakdown of Contact Hours

Apprentices can expect to receive approximately 6-9 hours of scheduled teaching activities per week. You will also be expected to undertake 18-20 hours of independent study (including research and practice and recorded in APTEM and tripartite progress review) per week towards the completion of your coursework.

Note: Hours are worked based on full-time study. 1 Academic Credit is equated to 10 notional learning hours. An apprentice learner will normally study 80 credits in an academic year from year one to year three and 120 credits in year four. Module Descriptors provide detailed breakdowns of the categories given below.

Year of course	Scheduled Learning and Teaching Activities	Work-based learning	Guided Independent Study	Total
Year one	200	240	360	800
Year two	200	240	360	800
Year three	200	240	360	800
Year four	300	500	400	1200
Total	**900**	**1220**	**1480**	**3600**

7. Programme Regulations

This programme will be subject to the *Regulations for Taught Degree Programmes (2023)*.

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
- Allocation of an Apprenticeship Partner Manager (APM) or the Apprenticeship Reviewer (AR) who will carry out tripartite progress reviews with you and your employer to support your journey and progression. The APM/AR will work as a mentor/coach to develop your knowledge, skills and behaviours that will be evidenced in your online reflective journal (Aptem)
- Information, Advice and Guidance (IAG) will be provided through; a Programme handbook, Induction, access to Library resources, includes access to books, journals and data bases – many of which are available in electronic format and support from trained library staff to support your apprenticeship throughout your course.
- IAG will also be provided for career progression purposes
- 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 learners and course administration
- Central learner services, including teams supporting academic skills development, career success, learner finance, accommodation, chaplaincy, disability and counselling
- Support from the Bucks Learners' Union, including the Learners' 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 learner 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 Thrive 28

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

(QAA statement)

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																				
Science, mathematics and engineering principles	x		x		x	X					x			x	x					
Engineering analysis, including use of computational tools and techniques			x		x				x		x	x		x	x		x	x		
design, creativity and innovation, including applying an integrated or systems approach			x			X			x				x						x	
Engineering and society, incorporating sustainability, ethics, risk, security and equity, diversity and inclusion	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**
Engineering practice, including teamwork, project management and use of practical equipment.		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 4																				
CAD4079 Science and Materials for Engineers	X				X	X				X	X					X		X		
CAD4080 Mathematics for Engineers			X			X								X				X		X
CAD4081 Principles of Engineering Design and Prototyping	X	X				X	X			X	X		X			X		X		X
CAD4082 Individual Professional Project	X		X				X	X	X				X	X				X		X
CAD4083 Computer Aided Design and Simulation	X		X		X	X			X					X		X		X		
CAD4084 Mechanical Principles and Experiments			X	X				X	X	X	X		X	X				X		
Level 5																				
CAD5099 Advanced Mechanical Principles	X	X	X					X	X	X		X		X		X		X		X
CAD5100 Management Strategies, Economics and Finance			X					X			X		X			X	X		X	X

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Module Code (Core)	**K1**	**K2**	**K3**	**K4**	**K5**	**C1**	**C2**	**C3**	**C4**	**C5**	**P1**	**P2**	**P3**	**P4**	**P5**	**T1**	**T2**	**T3**	**T4**	**T5**
CAD5101 Thermodynamics, Heat Engines and ThermoFluid's	X			X	X	X			X	X	X	X						X	X	
CAD5103 Virtual Engineering and Mechanical Simulation		X	X	X	X		X				X	X						X	X	
CAD5104 Industry-based Project	X	X	X		X		X		X		X	X				X		X		
CAD5105 Manufacturing Technologies and System Engineering	X	X	X		X	X		X		X	X	X		X			X	X		
CAD5107 Advanced Manufacturing Technology	X		X	X	X	X	X				X		X	X			X	X		
CAD5108 Design of electropneumatic, PLC and Microprocessor Systems	X		X	X			X	X	X			X	X			X		X		X
CAD5109 Quality, Process and Plant Management																				
Level 6																				
CAD6056 Design for Manufacturing				X			X	X	X			X	X					X	X	

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Module Code (Core)	**K1**	**K2**	**K3**	**K4**	**K5**	**C1**	**C2**	**C3**	**C4**	**C5**	**P1**	**P2**	**P3**	**P4**	**P5**	**T1**	**T2**	**T3**	**T4**	**T5**
CAD6057 Design for Quality and Sustainability			X		X			X	X	X	X	X						X		X
CAD6058 Research Project	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X			
CAD6059 Robotics, Automation and Industry 4.0	X	X	X	X	X	X	X	X	X	X	X			X				X		
CAD6060 Leadership and Management				X	X			X		X	X		X			X		X	X	X

Mapping of Apprenticeship Standard to Module Learning Outcomes (KSB mapping) link - .KSB mapping Manufacturing Engineer Apprenticeship (with pathways).docx (sharepoint.com)

Education Inspection Framework (EIF) requirements link - .Personal Development EIF requirements for Engineering Design Apprenticeship appendix.docx (sharepoint.com)