PROGRAMME SPECIFICATION

1. Key Information

Programme Title:	Postgraduate Diploma in Engineering Competence Apprenticeship
Apprenticeship standard	Postgraduate Engineer
Awarding Institution:	Buckinghamshire New University
Teaching Institution(s):	Buckinghamshire New University
Subject Cluster:	3D Design
Award Title (including separate Pathway Award Titles where offered):	PGDip in Engineering Competence
Pathways (if applicable)	N/A
FHEQ level of final award:	7
Other award titles available (exit qualifications):	PGCert in Engineering Competence IFATE Certificate in Postgraduate Diploma in Engineering Competence Degree Apprenticeship
Accreditation details:	This programme is designed to satisfy the learning outcomes specified by the UK Engineering Council in its requirements for AHEP 4 (Accreditation of Higher Education Programmes) that fully meet the educational requirements for Chartered Engineering (CEng) status
Length of programme:	1 year (PgCert) 2 years (PgDip)
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):	Postgraduate Engineer Standard ST0456
Course Code(s):	PDENGDAP (PGDip) PCENGDAP (PGCert)
UCAS Code(s):	N/A
Approval date:	July 2023
Date of last update:	

2. Programme Summary

The post graduate engineer apprenticeship programme is critical in meeting future skill needs and has been designed to develop the knowledge, skills and behaviours required of the Postgraduate Engineer Apprenticeship Standard (ST0456) to deepen fundamental applications in science, mathematics, and engineering principles. This programme will allow apprentices who have completed a BSc (Hons) Engineering Design programme or learners with a relevant engineering degree to further their study through the apprenticeship route with aspirations to become a Chartered Engineer (CEng).

The curriculum intent places greater emphasis on critical analysis, risk monitoring that encompasses an integrated approach to safety, problem identification to then deliver equitable and sustainable solutions, evolving engineers of the future to lead and manage complex engineering projects/systems. Characteristics of the engineering apprenticeship will embed personal development within modules to support learners as active citizens within society and the profession they represent. It is vital that learners understand the promotion of equality, diversity and inclusion that represent the engineering landscape in which they will operate.

The programme encompasses a work-based programme encouraging independent study leading to the creation of an innovative technique through the investigation of materials, technology and processes. The opportunity for learners to work in groups or in partnership will help develop leadership and collaborative working skills. Furthermore, the learners will be developing skills for technical leadership in developing new products and services or improve existing ones, evaluate commercial implications to the business, and follow professional ethics and sustainability. Their engagement in the various areas of design or technology will equip them to adapt their way of working and increase their specialist knowledge of the technology appropriate to their area or enter positions of responsibility within engineering and design companies. This programme fulfils the requirements of typical occupations such as Design and Development Engineer, Engineering Business Manager, Manufacture / Production Engineer, Quality Assurance/Compliance Manager, Research and Development Engineer and Supply Chain/Procurement specified in the apprenticeship standard (ST0456). The apprenticeship standard aligns with the UK Standard for Professional Engineering Competence (UK-SPEC) at CEng level.

Learners will be encouraged to expand their previous skills, knowledge and experience by evaluating and applying their research and ideas through investigation and analysis of their subject areas. Research of current market trends and manufacturing practices within a chosen area will be supported by contextual and business/entrepreneur focused studies designed to promote learners' understanding of their chosen industry and the current trends in the industry.

The programme also emphasises the importance of cultivating unique, personal entrepreneurial skills with the prospect of further engaging in the professional environment with the right skillset to effectively communicate with other departments and companies to produce outcomes that are aimed at international markets. As with any postgraduate programme, learners are expected to manage their own learning, including identifying areas where they need specific support (with guidance from their personal tutor or programme leader).

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

After completing the post graduate engineer apprenticeship, apprentices who would like to achieve MSc will be able to undertake Research Dissertation as a top-up module.

3. Programme Aims and Learning Outcomes

Programme Aims

This programme aims to:

1. Enable learners to deliver engineering projects efficiently, sustainably, ethically and safely as a senior Engineer
2. Equip learners with advanced understanding of theoretical concepts to solve problems in existing and emerging technologies, applying and developing analytical techniques
3. Foster opportunities to develop team-working, creativity and innovative skills through a group design and/or investigative project.
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 in order to make logical arguments and creative contributions to solve engineering problems.

Programme Learning Outcomes

Knowledge and Understanding (K)

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

ID	Learning Outcome
K1	Explore 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	Evaluate systematically the commercial, social and environmental risks associated with complex engineering projects.

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 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	Generate innovative designs in conjunction with developing manufacturing processes for products, systems, components or services to fulfil new needs.
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 programme will support the learners who are aspiring to join the industry as professional engineers or continue the development of their career into senior engineering roles. Postgraduate apprentices 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, learners 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). Learners 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.
- All applicants to the Postgraduate Apprenticeship programme must have an acceptable Level 2 qualification in English and Mathematics.

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 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 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

Level	Modules (Code, Title and Credits)	Exit Awards
Level 7	**Core modules:** CAD7037 Digital Twins and Manufacturing (20) CAD7038 Optimisation and Validation of Design and Fabrication (20) CAD7039 Project Management (20) CAD7040 Product Development for Business (20) CAD7041 Research Skills for Engineers (20) CAD7042 Manufacturing Automation, Robotics and IoT (20)	60 credits PG Cert in Engineering Design 120 credits PgDip Engineering Design

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

Detailed information on this specific programme is outlined below:

Significant parts of the learning will be done through the workplace as assessments, case studies will be drawn from these live environments and learners will be expected to use work-based examples from their workplace. There will still be a need for learners to attend lectures at a facility to ensure that there is a minimum of 6-hours off the job learning which fits with the requirement of the apprenticeship standard. The attendance at the University will take either block teaching or one day attendance every week for the duration of the module.

The learning and teaching strategy is focused on the needs of the engineering industry and will facilitate significant use of a virtual learning environment. Considerations will be made to foster the awareness and utilisation of emerging technologies facilitating close interaction between industrial partners, apprentice workplaces, the academia and professional organisations. The programme of study consists of six 20 credit modules which develop the thematic aspects of engineering design, manufacture and technical management. The variety and nature of the different learning outcomes underpin and retain a clear linkage with objectives in each subject area and the workplace. Most modules will utilise virtual learning environment both as a means of communication and support, as well as for assessment where possible. Case studies from the workplace will be utilised and specialist lectures by invited external experts will be integrated within appropriate modules. This adds realism to the module material and is another area which is of value in the learning process. Industry standard software and digital approaches will be used in the delivering of the modules where appropriate.

A comprehensive Induction will be held in the first month to ensure learners have the necessary base and study skills to benefit fully from the programme. 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 services to access additional support needs to ensure a valued, inclusive learning environment.

The learning and teaching methods will include:

- 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 prior 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 learner presentations: These are 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 demonstrations: Laboratory sessions allow learners to practically apply the theoretical aspects of the programme 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.

Contact Hours

1 unit of credit is the equivalent of 10 notional learning hours.

Year of Programme	Scheduled Learning and Teaching Activities	Work-based learning	Guided Independent Study	Total
Year one	200	240	160	600
Year two	200	240	160	600
Total	400	480	320	1200

Assessment Methods

The Assessment and Examination webpages provide further information on how assignments are marked and moderated, including a description of assessment activities. These also include further information about how feedback on assessed work is provided to learners, including our commitment to ensure this is provided to learners within 15 working days.

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 requirements of the apprenticeship standard and the EPA.

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.

End Point Assessment

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.

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 databases - 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 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)
- Postgraduate Engineer Apprenticeship standard (Engineering Competence)
- Engineering Council UK-SPEC for Chartered Engineer
- 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 Thrive 28

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																				
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		
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			x		x		
Engineering practice, including teamwork, project management and				x			x		x	x			x		x	x				x

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

Mapping of Programme Learning Outcomes to Modules

Programme Learning Outcome	**Knowledge and understanding (K)**					**Analysis and Criticality (C)**					**Application and Practice (P)**					**Transferable skills and other attributes (T)**				
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																				
CAD7037 Digital Twins and Manufacturing	x	x					x					x		x		x	x	x		
CAD7038 Optimisation and Validation of Design and Fabrication	x	x	x		x		x		x	x	x	x	x		x	x	x	x	x	x
CAD7039 Project Management	x		x	x	x			x		x	x	x	x			x	x	x	x	x
CAD7040 Product Development for Business	x	x	x	x	x	x	x	x		x		x	x	x	x	x	x	x		x
CAD7041 Research Skills for Engineers	x	x				x			x			x	x	x		x	x	x		
CAD7042 Manufacturing Automation, Robotics and IoT	x	x					x					x		x		x	x	x		