

PROGRAMME SPECIFICATION

1. Key Information

Programme Title:	MSc Sustainable Electrical Power Engineering
Awarding Institution:	Buckinghamshire New University
Teaching Institution(s):	Buckinghamshire New University
Subject Cluster:	Engineering
Award Title (including separate Pathway Award Titles where offered):	MSc Sustainable Electrical Power Engineering
Pathways (if applicable)	N/A
FHEQ level of final award:	7
Other award titles available (exit qualifications):	Postgraduate Diploma (PgDip) Postgraduate Certificate (PgCert)
Accreditation details:	The programme will be seeking for accreditation from the Institution of Engineering Technology (IET), UK, once a cohort is graduated.
Length of programme:	1 Year
Mode(s) of Study:	Full-time
Mode of Delivery:	In person (on-site) delivery
Language of study:	English
QAA Subject Benchmark(s):	Engineering (2023)
Other external reference points (e.g. Apprenticeship Standard):	UK Standard for Professional Engineering Competence and Commitment (UK-SPEC) The Accreditation of Higher Education Programmes (AHEP)
Course Code(s):	MSSEPEFT
UCAS Code(s):	
Approval date:	February 2025
Date of last update:	

2. Programme Summary

The MSc programme in Sustainable Electrical Power Engineering offers an advanced education in the design, operation, and optimization of electrical power systems with a focus on sustainability and renewable energy integration. In this programme you will gain comprehensive knowledge and practical skills necessary to address the global challenges of climate change and energy transition.

The learning strategy for the programme is grounded in a philosophy that emphasizes a multidisciplinary approach, integrating theoretical concepts with hands-on experience and practical applications.

The MSc programme will benefit from the new state-of-the-art facilities in engineering and built environment, supported by a generous funding from Office for Students (OfS). The cutting-edge laboratory facilities are equipped with advanced instrumentation and software tools for simulating, testing, and analysing electrical power systems and renewable energy technologies. You will have the opportunity to conduct experiments, collect data, and gain hands-on experience with renewable energy sources, power converters, and grid integration techniques.

The programme will foster collaboration with industry partners, allowing students to benefit from guest lectures, site visits, and industry-sponsored projects. Industry engagement will provide you with insights into current industry practices, emerging technologies, and career opportunities in the field of sustainable electrical power engineering.

3. Programme Aims and Learning Outcomes

Programme Aims

This programme aims to:

1. Equip students with a deep understanding of the principles, theories, and technologies underpinning sustainable electrical power engineering, including renewable energy sources, energy conversion systems, and grid integration techniques.
2. Foster critical thinking and problem-solving skills in students to address the complex challenges associated with the design, operation, and optimization of electrical power systems within the context of sustainability and environmental stewardship.
3. Provide students with practical experience and hands-on skills through laboratory work, projects, and industry collaborations, enabling them to apply theoretical knowledge to real-world scenarios and develop innovative solutions for sustainable energy generation and distribution.
4. Cultivate a multidisciplinary perspective among students by integrating concepts from electrical engineering, renewable energy, environmental science, and policy analysis, preparing them to navigate the interconnected issues surrounding energy sustainability and societal needs.
5. Empower students to become effective leaders and advocates for sustainable energy practices through effective communication, ethical decision-making, and a commitment to lifelong learning, enabling them to drive positive change within the energy industry and contribute to global efforts towards a low-carbon future.

Programme Learning Outcomes

Knowledge and Understanding (K)

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

ID	Learning Outcome
K1	Develop a comprehensive understanding of the principles and theories underlying sustainable electrical power engineering, including renewable energy technologies, power system analysis, energy conversion processes, and grid integration strategies.

K2	Acquire in-depth knowledge of the environmental, economic, and social impacts of electrical power generation and distribution, enabling informed decision-making in the pursuit of sustainable energy solutions.
K3	Gain insight into regulatory frameworks, policy incentives, and market dynamics shaping the adoption and integration of renewable energy sources within the electrical power industry.
K4	Explore environmental and societal impacts of power generation and distribution, focusing on decarbonization and sustainability goals.
K5	Comprehend the operation, design, and management of modern electrical power networks, including smart grids and microgrids.

Analysis and Criticality (C)

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

ID	Learning Outcome
C1	Apply analytical techniques and critical thinking skills to evaluate the performance, efficiency, and reliability of electrical power systems, identifying opportunities for optimization and improvement.
C2	Assess the environmental sustainability and lifecycle impacts of different energy generation technologies, considering factors such as resource availability, emissions profiles, and land use implications.
C3	Evaluate the technical and economic feasibility of renewable energy projects, conducting cost-benefit analyses, risk assessments, and sensitivity analyses to support decision-making processes.
C4	Interpret and critically appraise technical data, simulation results, and research findings to inform decision-making in sustainable energy projects.
C5	Examine and challenge current engineering practices, recommending advancements aligned with sustainability and innovation.

Application and Practice (P)

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

ID	Learning Outcome
P1	Apply theoretical knowledge and engineering principles to design, simulate, and optimize sustainable electrical power systems, incorporating renewable energy sources, energy storage technologies, and smart grid solutions.
P2	Utilize software tools and simulation platforms to model and analyse electrical power systems, assess system performance under varying operating conditions, and develop strategies for grid integration and demand-side management.
P3	Engage in practical experiments, laboratory work, and project-based learning activities to gain hands-on experience with renewable energy technologies, power electronics, control systems, and energy management techniques.
P4	Design energy systems integrating renewable energy sources, energy storage, and advanced control strategies for stability and reliability.
P5	Develop practical solutions for challenges such as power quality, demand-side management, and grid resiliency.

Transferable skills and other attributes (T)

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

ID	Learning Outcome
T1	Develop effective communication skills, both written and verbal, to convey technical concepts, project findings, and recommendations to diverse stakeholders, including peers, industry professionals, and policymakers.
T2	Cultivate teamwork and collaboration skills through group projects, case studies, and industry collaborations, demonstrating the ability to work effectively in multidisciplinary teams to achieve common goals.
T3	Enhance problem-solving and decision-making abilities, adapting analytical frameworks, methodologies, and tools to address complex challenges in sustainable electrical power engineering.
T4	Foster adaptability, resilience, and a commitment to lifelong learning, enabling graduates to thrive in dynamic and evolving professional environments and contribute to the advancement of sustainable energy practices globally.
T5	Demonstrate leadership qualities such as empathy, integrity, and accountability, fostering a positive team culture and inspiring others to achieve common goals.

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 your aspiration to join the industry as professional engineers or continue the development of your career into senior engineering roles. Postgraduate degree will have the ability to integrate your knowledge and understanding into engineering practice to solve a substantial range of complex engineering problems in unfamiliar situations in developing new products, systems and services (K1-K3) and devise health and safety, risk, legal, intellectual property, and change management strategies in the engineering businesses (P1-P3). Crucially, with sustainability as a key theme, you 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 sustainable technologies in creating innovative products, systems and services (C1-C3). You will be well-rounded reflective professionals equipped with the design, technical, and people management skills required of a senior engineer leading new sustainable electrical network design and associated manufacturing processes (P1-P3). You 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-T4).

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 Electrical and Electronic Engineering or other relevant engineering degrees with 2:2

or higher. The University will consider all such applications and will have the final decision whether to accept the candidate for entry to the programme.

- If English is not your first language, you will also need an IELTS score of 6.5 overall or equivalent.
- If you do not meet the entry requirements and have relevant professional work experience, we will consider your application on individual basis. You may be invited for an 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.

5. Programme Structure

Level	Modules (Code, Title and Credits)	Exit Awards
Level 7	Core modules: ENG7038 Smart Grids and Distributed Renewable Energy Technologies (20 Cr) ENG7037 Sustainable Electrical Power Systems and Protections (20 Cr) ENG7036 Advanced Power Electronics, Drives and Control (20 Cr) ABP7004 Project Management (20 Cr) ENG7033 Ethics, Sustainability and Environmental Assessment (20 Cr) ENG7039 Clean Growth and Electric Propulsion (20 Cr) ENG7035 Individual Research Project (60 Cr)	60 credits - PGCert Sustainable Electrical Power Engineering 120 credits - PGDip Sustainable Electrical Power Engineering 180 credits - MSc Sustainable Electrical Power Engineering

6. Learning, Teaching and Assessment

A comprehensive Induction Programme will be held in the first month to ensure you have the necessary base and study skills to benefit fully from the course. During the induction, you will be made aware of opportunities/resources to support your learning including, but not limited to library resources, the student centre, and wellbeing services.

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

The attendance in campus is the main mode of delivery, supported by online learning materials that will be made available through the virtual learning environment.

- **Lecturers and Tutorials:** A variety of teaching and learning strategies and methodologies are evident within the Programme structure. Lectures will be used to deliver the overarching topics. Tutorials will then be used to work through examples and case studies reinforcing the lectures.
- **Seminars:** In addition to the traditional lecture and tutorial approach, discursive seminars are used extensively to develop and reinforce group dynamics and interpersonal skills. This is particularly useful where higher level cognitive and presentation skills are required. The importance of previous learning experience is also identified as critical and the knowledge which you will bring to a group forum gives a value-added dimension to the learning experience. Case studies will be utilised particularly within the Engineering modules and specialist lecturers be invited and external experts will be integrated within appropriate modules. This will add industrial input to the module material and is another area which is of value to the learning process.
- **Workshops and presentations** are also used to help develop personal research and reflection skills as well as learning to express oneself by portraying a commanding presence.
- **Laboratory Sessions and practical demonstrations:** Laboratory sessions allow you to practically apply the theoretical aspects of the course which encourages 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.
- **Dissertation:** You will undertake a major project as part of your MSc study. During this period you are expected to draw on knowledge gained from studying the taught modules and apply it in an industrial context. A project handbook is issued to you at the beginning of the programme which contains all the necessary details regarding completion and presentation of the work. If a situation arises, where you are unable to find a suitable project for the dissertation, the course team will support you by agreeing topics projects which have industrial relevance from their research, development and consultancy activities.

Assessment

There are a variety of assessment vehicles, which are a selection of those found in the QAA Engineering Benchmark. Assignments are carried out in your own time, in-class

assignments, worksheets, presentations; laboratory and design/test exercises may also be used. The forms of assessment have been chosen to motivate you to achieve and to create positive learning opportunities, and to meet the learning outcomes of the programme.

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

- **Written Assignment** – This will be mainly in the form of written documents, where you are requested to present research material in specific subjects and edit it to fit the desired outcomes.
- **Reports** – You are encouraged to document your 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** – You will be expected to produce a portfolio as part of the group work. You 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, you 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. You 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.
Group work may be facilitated using the Virtual Learning Environment (VLE) where you will be sharing your work with each other, discuss and monitor progress. In a special circumstance, if there is no one available to work with you as a team, the tutor will suggest other options of collaborating such as finding other students to work with you in the team.

Assessment strategies support your understanding of the 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.

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 you are given opportunities to respond to feedback prior to submission. Formative feedback and feed forward are considered a vital part of the assessment process. More formal oral and/or written formative feedback is given at key identified points, usually during learner led presentations of work in progress. Self and peer-evaluation constitute an important part of formative assessment and, on occasion, of the formal summative assessment process.

Contact Hours

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

7. Programme Regulations

This programme will be subject to the *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
- 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.
- Academic Registry staff providing general guidance on University regulations, exams, and other aspects of students and course administration
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- 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)
- UK Standard for Professional Engineering Competence and Commitment (UK-SPEC)
- The Accreditation of Higher Education Programmes (AHEP), Engineering Council
- The QAA Engineering Subject Benchmark Statement – see detailed mapping below
- The QAA Master's Degree Characteristics Statement
- The Apprenticeship Standard – see detailed mapping below
- The BNU Qualifications and Credit Framework
- The BNU Grading Descriptors
- The University Strategy Thrive 28

Mapping of QAA Engineering Subject Benchmark Statement to Programme Learning Outcomes

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

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

Mapping of Programme Learning Outcomes to Modules

Programme Learning Outcome	Knowledge and understanding (K)					Analysis and Criticality (C)					Application and Practice (P)					Transferable skills and other attributes (T)				
	K1	K2	K3	K4	K5	C1	C2	C3	C4	C5	P1	P2	P3	P4	P5	T1	T2	T3	T4	T5
Module Code																				
Level 7																				
ENG7038 Smart Grids and Distributed Renewable Energy Technologies	X	X	X		X		X		X	X	X	X	X		X	X	X	X	X	X
ABP7004 Project Management	X		X	X	X			X		X	X	X	X			X	X	X	X	X
ENG7037 Sustainable Electrical Power Systems and Protections	X	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X		X
ENG7036 Advanced Power Electronics, Drives and Control	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	K1	K2	K3	K4	K5	C1	C2	C3	C4	C5	P1	P2	P3	P4	P5	T1	T2	T3	T4	T5
ENG7033 Ethics, Sustainability and Environmental Assessment	X			X				X				X					X			X	
ENG7035 Individual Research Project			X	X		X	X		X	X				X			X		X	X	X
ENG7039 Clean Growth and Electric Propulsion			X		X				X		X		X							X	