Programme Specification

Mechanical Engineering with Nuclear [Sep][FT][UCS][3yrs]

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Section 1: Key Programme Details

Part A: Programme Information

Programme title: Mechanical Engineering with Nuclear [Sep][FT][UCS][3yrs]

Highest award: BEng (Hons) Mechanical Engineering with Nuclear

Interim award: BEng Mechanical Engineering with Nuclear

Interim award: DipHE Mechanical Engineering with Nuclear

Interim award: CertHE Mechanical Engineering with Nuclear

Awarding institution: UWE Bristol

Affiliated institutions: University Centre Somerset

Teaching institutions: University Centre Somerset

Study abroad: No

Year abroad: No

Sandwich year: No

Credit recognition: No

School responsible for the programme: FET Dept of Engineering Design & Mathematics, Faculty of Environment & Technology

Contributing schools: Not applicable

Professional, statutory or regulatory bodies: Not applicable

Apprenticeship: Not applicable

Mode of delivery: Full-time

Entry requirements: For the current entry requirements see the UWE public website.

For implementation from: 01 September 2021

Programme code: H36942-SEP-FT-US-H36842

Section 2: Programme Overview, Aims and Learning Outcomes

Part A: Programme Overview, Aims and Learning Outcomes

Overview: The degree covers a range of disciplines such as nuclear science, electromechanical systems, heat transfer and power, fluid dynamics, stress analysis and computer modelling and is designed to produce graduate engineers that are able to make an immediate contribution to employment within the nuclear sector.

The degree meets priorities identified in the UK Government Industrial Strategy (2018) for higher education and will be delivered at the National College for Nuclear located at Bridgwater and Taunton College, one of five National Colleges created by the UK Government. The National College for Nuclear has a mission to create a new generation of graduate nuclear engineers to satisfy the demand created by rapid technological advances in new nuclear builds, operation, decommissioning and defence. The curriculum and delivery model has been created in partnership with employers to provide a higher vocational pathway for the UK nuclear industry that satisfies the current and future demands of the sector. A block week delivery model has been developed to provide access to work-based learners.

Educational Aims: The specific aims are that the graduate shall:

Have a broad knowledge and understanding of engineering theory, practices and applications and be able to use advanced techniques of analysis, synthesis and simulation, and implementation in the field of nuclear engineering, electromechanical systems, heat transfer and power, fluid dynamics, stress analysis and computer modelling.

Apply engineering design, systems and management concepts within the nuclear sector and be capable of analysis of the behaviour of complex systems within an nuclear engineering context.

Demonstrate a capacity for innovative and creative design and be able to draw on knowledge of fundamental principles and proven systems to further develop solutions which meet required specifications.

Demonstrate awareness and competence with respect to professional and safety requirements and be conversant with the regulatory framework that governs operations within the nuclear sector.

Have developed the ability, interest and motivation to conduct independent study and keep abreast of future changes in technology and engineering practices.

Be able to work in a largely unsupervised way to undertaken an individual research project and present the findings in a professional manner,

Be able to communicate clearly, concisely and persuasively with individuals and groups, using a professional standard of English, both orally and in writing.

Be able to provide solutions to today's industry problems that deepen the students' learning of applying engineering principles in a commercial setting.

Programme Learning Outcomes:
On successful completion of this programme graduates will achieve the following learning outcomes.

Knowledge and Understanding

A1. Have a broad knowledge and understanding of engineering theory, practices and applications and be able to use advanced techniques of analysis, synthesis and simulation, and implementation in the field of nuclear engineering, electromechanical systems, heat transfer and power, fluid dynamics, stress analysis and computer modelling

A2. Apply engineering design, systems and management concepts within the nuclear sector and be capable of analysis of the behaviour of complex systems within an nuclear engineering context

A3. Demonstrate a capacity for innovative and creative design and be able to draw on knowledge of fundamental principles and proven systems to further develop solutions which meet required specifications

A4. Demonstrate awareness and competence with respect to professional and safety requirements and be conversant with the regulatory framework that governs operations within the nuclear sector

A5. Have developed the ability, interest and motivation to conduct independent study and keep abreast of future changes in technology and engineering practices

A6. Be able to work in a largely unsupervised way to undertaken an individual research project and present the findings in a professional manner

A7. Be able to communicate clearly, concisely and persuasively with individuals and groups, using a professional standard of English, both orally and in writing

A8. Be able to provide solutions to today's industry problems that deepen the students' learning of applying engineering principles in a commercial setting

Intellectual Skills

B1. Work competently in a technical nuclear environment, understand and promote personal responsibility for Health, Safety, Radiation Protection, Environmental Protection, Quality, Security, Safeguards and principles of Risk Management

B2. Analyse engineering and scientific problems selecting and using mathematical, engineering and scientific tools to provide suitable solutions to nuclear applications, with considerations of the entire life cycle of a nuclear facility

B3. Develop and critically apply knowledge of the concepts, principles and theories of engineering science relevant to the interdisciplinary fields of nuclear technology

B4. Demonstrate an understanding of stakeholder requirements, commercial awareness, business improvement, project and business management techniques relevant to the nuclear industry

B5. Apply their science or engineering discipline knowledge to the development, operation, maintenance and progression of technologies used for Decommissioning (e.g. remote handling and robotics), Waste Management, Reprocessing, and Nuclear Power Generation

Subject/Professional Practice Skills

C1. Specify, plan, manage, conduct and report on nuclear projects

C2. Synthesise information from a variety of sources and apply to the solution of a particular nuclear technology application

C3. Accurately observe, record and draw conclusions from data and experimental evidence, recognising inherent uncertainties and limitations

C4. Apply design processes including materials selection that meet nuclear industry standards

C5. Demonstrate an understanding of Regulatory requirements both national and international

C6. Develop technical reports that meet requirements of the prevailing verification process

C7. Demonstrate knowledge of the nuclear industry (past, present and future) and the business, political and community environment in which the company operates including personal role within the organisation, ethical practice and codes of conduct

C8. Demonstrate an understanding of root cause analysis and learning from experience (LFE) process

C9. Demonstrate knowledge of the technology, safety, environmental and economics of nuclear fuels and the nuclear fuel cycle

C10. Apply the standards for nuclear professional practice as required by the industry and professional body institutions

Transferable Skills and other attributes

D1. Communicate effectively and appropriately using a full range of skills; technical speaking to a scientific / engineering audience, active listening, professional writing, professional body language, technical presentation

D2. Demonstrate reliability, integrity and respect for confidentiality on work related and personal matters

D3. Work autonomously and interact effectively within a wide, multi-disciplinary project team

D4. Understand the impact of work on others, especially where related to diversity and equality

D5. Manage time effectively, being able to plan and complete work to schedule

D6. Demonstrate a supportive attitude to change and respond positively to change management processes

D7. Take responsibility for personal development, demonstrating commitment to learning and self-improvement and be open to feedback

D8. Demonstrate a strong commitment to personal safety behaviours and understanding of the consequences as set out in the nuclear industry requirements

D9. Take responsibility to actively challenge unsafe behaviours and conditions in the workplace to help reinforce nuclear, radiological and conventional safety over competing goals to ensure the protection of people and the environment

D10. Demonstrate compliance by following rules, procedures and principles to ensure work completed is fit for purpose and pay attention to detail and carry out error checks throughout work activities

D11. Demonstrable commitment to sustainability in work design and application

D12. Be an enthusiastic advocate for the nuclear industry with the ability to represent this industry to a variety of audiences

Part B: Programme Structure

Year 1

Students must take 120 credits from the modules in Year 1.

Year 1 Compulsory Modules

Students must take 120 credits from the Compulsory Modules in Year 1.

Module Code	Module Title	Credit
UFMFQP-30-1	Electromechanical Systems Engineering 2021-22	30
UFMFRP-30-1	Nuclear Science, Materials and Design 2021-22	30
UFMFSP-30-1	Solid Mechanics 2021-22	30
UFMFTP-30-1	Thermofluidic Dynamics 2021-22	30

Year 2
Students must take 120 credits from the modules in Year 2.

Year 2 Compulsory Modules
Students must take 120 credits from the Compulsory Modules in Year 2.

Module Code	Module Title	Credit
UFMFYP-30-2	Advanced Nuclear Science and Project Management 2022-23	30
UFMFWP-30-2	Electromechanical Systems Analysis 2022-23	30
UFMFVP-30-2	Electromechanical Systems and Design 2022-23	30
UFMFXP-30-2	Heat Transfer and Power 2022-23	30

Year 3
Students must take 120 credits from the modules in Year 3.

Year 3 Compulsory Modules
Students must take 120 credits from the Compulsory Modules in Year 3.

Module Code	Module Title	Credit
UFMFGY-40-3	Engineering Project with Nuclear 2023-24	40
UFMFBQ-20-3	Industrial Nuclear Science and Technology 2023-24	20
UFMF9Q-30-3	Stress Analysis, Materials and Finite Element Analysis 2023-24	30
UFMFAQ-30-3	Thermofluid Systems and Computational Flow Dynamics 2023-24	30

Part C: Higher Education Achievement Record (HEAR) Synopsis

The programme provides graduates with the knowledge, skills and capabilities required by the civil and defence nuclear industries for the specification, design and delivery of solutions to problems involving mechanical and electromechanical systems.

Work-based learning is embedded in the programme designed to develop individuals who think and communicate effectively, who can conduct inquiry, solve problems, undertake critical analysis and deliver effective systems solutions.

Graduates from this programme are able to be effective and make an early impact on their work environment both prior to and after graduation.

Part D: External Reference Points and Benchmarks

QAA UK Quality Code for HE

Framework for higher education qualifications (FHEQ)
Subject Benchmark Statement: Engineering (Feb 2015)

UWE Bristol 2020 Strategy document

Guidance on how to meet the Learning Outcome requirements for Accreditation (IET Academic Accreditation)

The IET Handbook of Learning Outcomes for BEng and MEng Programmes

Part E: Regulations

Approved to University Regulations and Procedures.