Module Specification

Advanced Nuclear Science and Project Management

Version: 2023-24, v3.0, 04 May 2023

Contents

Part 1: Information

Module title: Advanced Nuclear Science and Project Management

Module code: UFMFYP-30-2

Level: Level 5

For implementation from: 2023-24

UWE credit rating: 30

ECTS credit rating: 15

Faculty: Faculty of Environment & Technology

Department: FET Dept of Engineering Design & Mathematics

Partner institutions: None

Field: Engineering, Design and Mathematics

Module type: Module

Pre-requisites: None

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: This module focusses on impacts of radiation inducing issues over time and project management of the decommissioning of objects made of such material. The key areas for study are radiation interaction with media, lattice defects, radiolysis and biological consequences of radiation exposure in a decommissioning environment. The other parts concern how materials change over time in radiation environments and the practical and human considerations that must be made when decommissioning.

Features: Not applicable

Educational aims: This syllabus is designed to give advanced nuclear science, engineering and project management knowledge for the selection of nuclear materials and methods for planning and controlling a project in the nuclear environment.

Outline syllabus: The topics covered in this unit are:

Advanced Nuclear Science:
Nuclear Physics such as daughter products and their effects
Nuclear Chemistry such as the study of alternative fuel and coolant types
Nuclear Biology such as alternative shielding and ecological effects

Nuclear Material Dynamics:
Metal and Alloy Radiation Hardening and Creep
Polymer Aging and Oxidation
Ceramics Irradiation and Restructuring

Project Management:
Project Initiation and Planning
Project Control
Project Completion
Moral Competency
Nuclear Decommissioning Principles

Part 3: Teaching and learning methods

Teaching and learning methods: See Assessment

Module Learning outcomes: On successful completion of this module students will achieve the following learning outcomes.

MO1 Conduct nuclear physics, chemistry, and biological analysis calculations.

MO2 Explain the principles related to advanced nuclear science and radiation damage.

MO3 Explain the dynamic behaviours of in-service nuclear materials.

MO4 Create appropriate estimates for nuclear decommissioning applications.

Hours to be allocated: 300

Contact hours:

Independent study/self-guided study = 228 hours

Face-to-face learning = 72 hours

Total = 300

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link https://uwe.rl.talis.com/index.html

Part 4: Assessment

Assessment strategy: The module wil lbe assessed as follows:

Viva – The learners will sit before a panel of academics and nuclear decommissioning experts to defend their decommissioning plan against defined characteristics for success.

Decommissioning Project Plan – The learners formulate their own decommissioning plan from a case study by the application of nuclear science and engineering with project management theory. They will analyse the impact of environment and radiation exposure on materials commonly encountered in decommissioning.

The resit assessment tasks for this module will be the same as the first sit

Assessment tasks:

Presentation (First Sit)
Description: Viva (30 minutes)

Weighting: 25 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO4

Written Assignment (First Sit)
Description: Decommissioning Project Plan (2500 words)
Weighting: 75 %
Final assessment: No
Group work: No
Learning outcomes tested: MO1, MO2, MO3

Presentation (Resit)
Description: Viva (30 minutes)
Weighting: 25 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO4

Written Assignment (Resit)
Description: Decommissioning Project Plan (2500 words)
Weighting: 75 %
Final assessment: No
Group work: No
Learning outcomes tested: MO1, MO2, MO3

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Electromechanical Engineering (Nuclear) [Sep][PT][UCS][3yrs] FdSc 2021-22

Electrical, Electronic and Control Engineering with Nuclear {Apprenticeship-UCS} [Sep][FT][UCS][4yrs] BEng (Hons) 2021-22

Mechanical Engineering with Nuclear {Apprenticeship-UCS} [Sep][FT][UCS][4yrs] BEng (Hons) 2021-22

Electromechanical Engineering (Nuclear) {Apprenticeship-UCS} [Sep][FT][UCS][3yrs] FdSc 2021-22

Electrical, Electronic and Control Engineering with Nuclear [Sep][PT][UCS][4yrs] BEng (Hons) 2021-22

Mechanical Engineering with Nuclear [Sep][PT][UCS][4yrs] BEng (Hons) 2021-22

Electrical, Electronic and Control Engineering with Nuclear {Apprenticeship-UCS} [Sep][FT][UCS][5yrs] BEng (Hons) 2020-21

Mechanical Engineering with Nuclear {Apprenticeship-UCS} [Sep][FT][UCS][5yrs] BEng (Hons) 2020-21