MODULE SPECIFICATION

Part 1: Information			
Module Title	Nuclear Science, Materials and Design		
Module Code	UFMFRP-30-1	Level	Level 4
For implementation from	2019-20		
UWE Credit Rating	30	ECTS Credit Rating	15
Faculty	Faculty of Environment & Technology	Field	Engineering, Design and Mathematics
Department	FET Dept of Engin Design & Mathematics		
Module type:	Standard		
Pre-requisites	None		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description

Overview: Learners will be working as part of a team designing a product for use in industry. The module develops a theoretical foundation of nuclear science and materials and mathematical analysis skills.

Educational Aims: This module covers a foundation knowledge of science and engineering knowledge for the selection of materials and methods. The concepts of radioactivity, chemistry and health physics are introduced in this module.

Exploration of products, materials and processes will develop the knowledge and understanding of classification and processes related to materials. CAD is introduced during this module and it will explain different design methodologies and manufacturing processes.

Outline Syllabus: Topics covered in this module are:

Nuclear Science:

Nuclear Physics including fusion and fission process
Nuclear Chemistry including binding energy potentials
Nuclear Biology including radiochemistry and health physics

Material Classification and Processes:

Material Classification
Primary (Forming) Processes
Secondary (Removal) Processes
Tertiary (Finishing) Processes

Design and Manufacturing Methods:

Design Methodology
Computer Aided Design
Production & Manufacture

In this module the following mathematical topics will be introduced and developed:

Dimensions and Physical Quantities
Complex Numbers
Engineering Functions
Differentiation and Integration
Differential Equations
Numerical Methods
Solving Differential Equations using computer software

Teaching and Learning Methods: See Assessment, Hours and Outline Syllabus

Part 3: Assessment

Component A – Core Analytical Competency – 2 hour – examination The exam will assess the student's ability to conduct mathematical analysis of health physics and radionuclide calculations. It will also assess the students' knowledge and understanding of chemistry and health physics process.

Component B – Design Report and Group Presentation – Students will produce designs and production manufacture documentation for a nuclear maintenance application. They will also present to their peers and a panel of experts. In the presentation students will be expected to explain the process of their design and a possible manufacturing process they would employ to produce their designs. Students will also need to describe the materials they would use. If a student fails this component they must write a report on their product.

The resit assessment tasks for this module will involve a reworked design report including an additional 500 words of critical reflection on the original submission (B1) and a rework of their individual contribution to the group presentation (B2).

First Sit Components	**Final Assessment**	**Element weighting**	**Description**
Report - Component B		30 %	Design report (1500 words)
Presentation - Component B		45 %	Group presentation
Examination - Component A	✓	25 %	Written Exam (2 Hours)
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Report - Component B		30 %	Design Report (2000 words)
Presentation - Component B		45 %	Individual Presentation
Examination - Component A	✓	25 %	Written Exam (2 Hours)

Part 4: Teaching and Learning Methods

Learning Outcomes

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

Module Learning Outcomes	Reference
Conduct basic radionuclide and health physics calculations	MO1
Describe materials by exploring their behaviour and structure.	MO2
Examine manufacturing processes for a given applications.	MO3
Produce designs and production/manufacture documentation for a nuclear science or engineering application.	MO4

Contact Hours

Independent Study Hours:	
Independent study/self-guided study	228
Total Independent Study Hours:	228
Scheduled Learning and Teaching Hours:	
Face-to-face learning	72
Total Scheduled Learning and Teaching Hours:	72
Hours to be allocated	300
Allocated Hours	300

Reading List

The reading list for this module can be accessed via the following link:

https://uwe.rl.talis.com/index.html

Part 5: Contributes Towards

This module contributes towards the following programmes of study: