MODULE SPECIFICATION

Part 1: Information			
Module Title	Nuclear Knowledge		
Module Code	UFMFYL-20-3	Level	Level 6
For implementation from	2019-20		
UWE Credit Rating	20	ECTS Credit Rating	10
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: MOD security cleared staff only

Educational Aims: See learning outcomes.

Outline Syllabus: The Nuclear Industry: Technological and political origins of nuclear weapons and nuclear power.

Atomic and Nuclear Physics: atomic structure, nuclear structure, radioactivity, nuclear reactions, particle/atom interactions, radiation detection and measurement, the nuclear fuel cycle.

Radiation Hazards and Protection: types and properties of radiation, biological effects of radiation, external radiation hazards, internal radiation hazards, environmental protection.

Nuclear and Radiological Regulation: the philosophy of radiation protection, the International Commission on Radiological Protection system of radiation protection, the UK regulatory framework for radiation protection and for nuclear safety, the UK nuclear safety philosophy and regulatory approach.

Accident Studies: world-wide nuclear and major industrial accident case studies, root cause analysis methodologies, learning from experience.

Nuclear Safety, Safeguards and Security: nuclear safety culture and its analysis, the international nuclear safeguards regime, nuclear security and regulation.

Teaching and Learning Methods: Scheduled learning includes lectures, seminars, tutorials, practical classes and workshops.

Independent learning includes hours engaged with essential reading, assignment preparation and completion etc. These sessions constitute an average time per level as indicated in the table below.

Part 3: Assessment

The submission components have been designed to enable students to demonstrate, for the purposes of assessment, their acquisition of the skills, knowledge, understandings and experiences that will enable them to meet the learning outcomes for this module. This includes the very specific safety issues and codes inherent in the operation of nuclear reactors in the UK and worldwide.

These will consist of:

A (two hour) closed-book controlled-conditions examination to ensure rigour and two assessed assignments, a coursework to ensure that students engage with the wider context of the discipline and a practical examination where students demonstrate essential practical skills.

The examination will be designed to enable demonstration of the understanding of the scientific principles and their application taught in Learning Outcomes (LO) 1-4 inc.

Two assignments designed to enable demonstration of the understanding and practical application of the principles taught in LOs 5-7 inc. these will be characterised by involving the application of knowledge in a work-based context and environment.

The output from B1 will be a 2000 word individual report.

First Sit Components	**Final Assessment**	**Element weighting**	**Description**
Report - Component B		25 %	Individual report
Examination - Component B		25 %	Practical exam
Examination - Component A	✓	50 %	Written examination
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Report - Component B		25 %	Individual report
Examination - Component B		25 %	Practical exam
Examination - Component A	✓	50 %	Written examination

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
Demonstrate knowledge of the scientific principles of the interactions of alpha, beta, gamma and neutron radiations with matter, including energy loss mechanisms	MO1
Explain the principles of operation of radiation detectors and critically evaluate their suitability for use in different environments	MO2
Demonstrate knowledge of the Gaussian plume model used for modelling atmospheric releases to enable appreciation of its applicability and limitations.	MO3
Analyse the effectiveness of protective measures used for both internal and external hazards in the context of the biological effects of radiation	MO4
Evaluate the nuclear regulatory philosophy of the UK and its use in the development of appropriate methodologies to meet statutory requirements	MO5
Demonstrate knowledge and understanding of the methodologies used to identify root causes of nuclear emergencies worldwide	MO6
Apply the principles that underpin a strong nuclear safety culture to the evaluation of organisations using appropriate performance indicators	MO7

Contact Hours

Independent Study Hours:	
Independent study/self-guided study	140
Total Independent Study Hours:	140
Scheduled Learning and Teaching Hours:	
Face-to-face learning	60
Total Scheduled Learning and Teaching Hours:	60
Hours to be allocated	200
Allocated Hours	200

Reading List

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

https://uwe.rl.talis.com/modules/ufmfyl-20-3.html

Part 5: Contributes Towards

This module contributes towards the following programmes of study: