MODULE SPECIFICATION

Part 1: Information			
Module Title	Heat Transfer and Power		
Module Code	UFMFXP-30-2	Level	Level 5
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: The Heat Transfer and Power module introduces the principles of heat transfer and power, develop commercial awareness and review the methods of power generation. The key topics are the modes of heat transfer and how they are used to generate power.

Educational Aims: Learners will develop the theoretical understanding of heat transfer and entropy, and how this is applied in heat exchangers and power generation. Learners will develop the theoretical understanding and some professional behaviours needed to generate power utilising different sources of energy.

Outline Syllabus: The topics covered in this unit are:

Heat Transfer:

Heat transfer theory: conduction, convection and radiation

Conduction for simple geometries. Numerical methods for complex geometries

Forced convection: boundary layers and heat transfer coefficients

Natural convection

Heat exchangers: surface area, outlet temperature, pressure loss calculations

Radiation. Kirchoff's law and view factor calculation, black body radiation

Extended surface

Unsteady heat transfer

Power Generation:

Generation methods and evaluation of climate impact, carbon reduction, embedded energy, life cycle costing

Entropy concept and calculations: work and heat transfer. Isentropic efficiency

Efficiency and performance of IC engines, gas turbines and steam power plant

Combustion chemistry and system performance improvements using data

Compressible flows: nozzles, orifices, friction

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

Fourier Series

Fourier Transform

Teaching and Learning Methods: See Assessment

Part 3: Assessment

Component A – Written examination; 90 minute exam. The examination will assess the students' knowledge and skills of heat transfer and principles of heat exchangers through mathematical analysis. It will assess the students' knowledge and understanding of the methods of power generation and the concepts of entropy.

Component B – Group Presentation and Written Report – The learners will conduct a scoping and feasibility study on planned improvements to piece of workshop equipment within the heat transfer and power context. The presentation will discuss the scope of the project and the individual written component will support this discussion and include an explanation of heat transfer and power generation principles. The group presentation will be in subject discipline.

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**
Written Assignment - Component B		30 %	Written Report (1500 words)
Presentation - Component B		45 %	Group Presentation
Examination - Component A	✓	25 %	Written Exam (90 minutes)

Resit Components	Final Assessment	Element weighting	Description
Written Assignment - Component B		30 %	Written Report (2000 words)
Presentation - Component B		45 %	Individual Presentation
Examination - Component A	✓	25 %	Written Exam (90 minutes)

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 mathematical analysis on heat exchange and experimental data.	MO1
Analyse the principles of heat transfer and power generation.	MO2
Evaluate the environmental sustainability of power generation.	MO3
Evaluate cost drivers, risks and health and safety in power generation.	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: Mechanical Engineering with Nuclear {Apprenticeship} [Sep][PT][BTC][4yrs] BEng (Hons) 2018-19 Electromechanical Engineering (Nuclear){Apprenticeship}(Sep][PT][BTC][3yrs] FdSc 2018-19