MODULE SPECIFICATION

Part 1: Information			
Module Title	Aero-Propulsion		
Module Code	UFMFW6-15-3	Level	Level 6
For implementation from	2019-20		
UWE Credit Rating	15	ECTS Credit Rating	7.5
Faculty	Faculty of Environment & Technology	Field	Engineering, Design and Mathematics
Department	FET Dept of Engin Design & Mathematics		
Module type:	Standard		
Pre-requisites	Fluid Dynamics 2019-20		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description

Overview: The course aims to provide a basic education in propulsion across all aspects of aerospace.

Educational Aims: See Learning Outcomes.

Outline Syllabus: Linear Momentum Equation and Hydrodynamics Forces.
Engineering Applications: Force required to restrain a Convergent Nozzle, Rocket Engine Thrust, Turbojet Engine Thrust, Flow Through a Sudden Enlargement, Jet Pump/Ejector/Injector, Turbofan-Engine Thrust, Reaction Force on a Pipe Bend, Reaction Force on a Pipe Junction, Flow Through a Cascade of Guidevanes, Jet Impinging on a Flat Plate.
The working of the gas turbine engine and engine power plants.
Turbojet/Turbofan, technical description and development.
Shaft Power Cycles.
Turbojet/Turbofan – Performance, losses.
Heat Transfer and Cooling Blade Cooling Performance.
Combustion, fuel and combustion chemistry; fuel-air mixtures; engine limits
Compressible duct flow: speed of sound; isentropic flow; effects of area change at sub-, trans- and supersonic Mach numbers; convergent-divergent ducts; nozzle expansion ratios; intake mass flow requirements.
Space propulsion engines including rockets, heat exchangers, ramjets and scramjets.

Introduction to Helicopters.
Applicable regulations for certification and flight including FAA, JAR, CAA, and ATA.

Teaching and Learning Methods: Scheduled learning includes lectures, computer tutorials using industry standard software, worked tutorial sessions, demonstration, practical classes and workshop activities.

Independent learning includes hours engaged with essential reading, preparation, assignment preparation and completion.

Contact: 54 hours
Assimilation and skill development: 26 hours
Coursework: 50 hours
Exam preparation: 20 hours
Total: 150 hours

Contact hours include workshop time under technician supervision.

Part 3: Assessment

Component A is a two hour exam.

Component B contains an assessment of modelling an engine through the various stages of its operation along with basic combustion modelling experience. This will be through numerical simulation supported by experimental results.

First Sit Components	**Final Assessment**	**Element weighting**	**Description**
Project - Component B		50 %	Project/case study
Examination - Component A	✓	50 %	Examination (2 hrs)
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Project - Component B		50 %	Project/case study
Examination - Component A	✓	50 %	Examination (2 hrs)

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
Show a detailed knowledge of the assessment and modelling of a propulsion system or flow situation	MO1
Understand the nature of the thermodynamic and chemical changes undergone by a fluid in each process making up a thermodynamic cycle	MO2
Calculate the changes in fluid properties at specific points around a thermodynamic cycle and, from these, estimate engine performance	MO3
Estimate the airscrew performance and output from basic flow measurements and aerofoil data	MO4
Understand and interpret the forms of engine documentation and related data presentation methods	MO5

Contact Hours

Independent Study Hours:	
Independent study/self-guided study	96
Total Independent Study Hours:	96
Scheduled Learning and Teaching Hours:	
Face-to-face learning	54
Total Scheduled Learning and Teaching Hours:	54
Hours to be allocated	150
Allocated Hours	150

Reading List

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

https://uwe.rl.talis.com/modules/ufmfw6-15-3.html

Part 5: Contributes Towards

This module contributes towards the following programmes of study: