Module Specification

Principles of Propulsion

Version: 2025-26, v1.0, 29 Jul 2024

Contents

Part 1: Information

Module title: Principles of Propulsion

Module code: UFMEAQ-15-2

Level: Level 5

For implementation from: 2025-26

UWE credit rating: 15

ECTS credit rating: 7.5

College: College of Arts, Technology and Environment

School: CATE School of Engineering

Partner institutions: None

Field: Engineering, Design and Mathematics

Module type: Module

Pre-requisites: Aeronautical Principles 2024-25

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: An introductory knowledge of the principles of propulsion in aerospace is essential for the design of engines and to optimise performance. In this module apprentices will continue building on their knowledge gained at level 4 and apply their knowledge to realistic situations that would be encountered by an aerospace engineer. Performance of the engine is assessed through application of fundamental aerodynamics and thermodynamics.

Features: Not applicable

Educational aims: To analyse a stage-by-stage aerospace engine performance analytically and numerically for various flight conditions.
Apprentices will be exposed to analytical and numerical methods which will allow them to develop engineering analysis and mathematical skills.

Outline syllabus: The syllabus of this module may include:

Momentum Theory, Thrust and Efficiencies.
Gas Turbines and Jet Engine Cycles.
Principle and Layout of Jet Engines.
Compressible Fluid Flow.
Bypass Ratio Selection.
Design Analysis Cycle.
Component Characteristics.
Design issues, future developments and alternative energy

Part 3: Teaching and learning methods

Teaching and learning methods: This module will combine lectures and lectorials to learn concepts and principles, as well as computer based methods for flow and combustion simulation to allow apprentices to experience working on real engineering challenges.

During tutorials, apprentices will be applying their knowledge and skills in analytical methods using stage calculations for a variety of combustion scenarios. Apprentices will also use simulation software to analyse, optimise and post-process from a variety of gas turbine configurations for both on-design and off-design specification requirements.

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

MO1 Analyse and evaluate overall gas turbine thermodynamic cycles when it undergoes fluid property changes.

MO2 Perform calculations for specific engine stages and estimate the overall engine performance for different thermodynamic processes.

MO3 Propose suitable propulsion solutions when meeting design requirements for gas turbine engines.

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 114 hours

Face-to-face learning = 36 hours

Total = 0

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link https://rl.talis.com/3/uwe/lists/FFE02DD0-EF6C-1C04-7819-5615156B446D.html?lang=en-GB&login=1

Part 4: Assessment

Assessment strategy: A face-to-face end-of-semester exam of length 3 hours, to assess mathematical competencies in an engineering context as well as fundamental understanding of various aspects of gas turbine engine performance. The assessment will also check apprentices understanding of numerical methods and meeting design requirements for typical engine performance.

A resit assessment will be identical to the first sit.

Assessment tasks:

Examination (First Sit)
Description: Controlled conditions exam (3 hours)
Weighting: 100 %
Final assessment: Yes
Group work: No

Learning outcomes tested: MO1, MO2, MO3

Examination (Resit)
Description: Controlled conditions exam (3 hours)
Weighting: 100 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO3

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Aeronautical Engineering {Apprenticeship-UCW}[UCW] BEng (Hons) 2024-25