Module Specification

Thermofluid Systems

Version: 2024-25, v6.0, 17 Jul 2024

Contents

Part 1: Information

Module title: Thermofluid Systems

Module code: UFMFTA-15-3

Level: Level 6

For implementation from: 2024-25

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: Thermofluids 2023-24

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: Fluid flow (both liquid and gas) and heat flow are two most common processes that occur together in a vast array of industrial applications and these two processes have a significant impact on many other engineering processes too.

Thermofluid Systems module advances the understanding of combined fluid flow and heat flow and the underpinning physics, covering a good range of practical industrial applications in both mechanical engineering and in building services

engineering. In class demonstrations and videos will enhance the learning experience.

Features: Not applicable

Educational aims: The aim of this module is for students to be able to apply thermofluid concepts to the design and solution of industry relevant practical problems in both mechanical engineering and in building services engineering.

Outline syllabus: Refrigeration (vapour compression and vapour absorption), multi-stage refrigeration, primary and secondary refrigerants, energy requirements, heat pumps.

Air conditioning, psychrometry, mixing of air-streams, designing of air conditioning systems, calculating heating and cooling loads.

Advanced gas turbine and steam turbine cycles, combined heat and power (CHP), energy recovery.

Compressible flow machines (fans, compressors), radial and axial flow machines, limitations of design process, improving existing designs.

Inompressible flow machines (Pumps), selection of pumps, operational issues, limitations of design process, improving existing designs.

Part 3: Teaching and learning methods

Teaching and learning methods: Large group lecture supported by small group tutorial sessions. Additional laboratory demonstrations may be used to illustrate certain points. This material may be provided as video or likewise if student numbers are too high for laboratory visits. Study time outside of contact hours will be spent on going through exercises and example problems.

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

MO1 Critically analyse processes involving refrigeration, air-conditioning, fluid machinery and advanced power cycles with reference to fundamental operating principles (EA1m)

MO2 Demonstrate a fundamental knowledge of equipment and working fluids used in refrigeration, air-conditioning, fluid machinery and advanced power cycles. (P2)

MO3 Select and apply models and computational techniques to the analysis and solution of problems involving thermofluid systems. (EA3m)

MO4 Describe and explain the principles that govern the operation of refrigeration, air conditioning, heating and ventilation systems with reference to limitations of current practice (P9m)

MO5 Use a system approach, energy usage and cost drivers for the selection of thermofluid systems. (SM3m)

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

Part 4: Assessment

Assessment strategy: Assessed by a single end of module examination which focuses on scenarios requiring the application of advanced analytical techniques for critically assessing the design and performance of thermofluid industrial processes.

Assessment tasks:

Examination (Online) (First Sit)
Description: Online Examination: 3 hours + 2 hours for submission
Weighting: 100 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4, MO5

Examination (Online) (Resit)
Description: Online Examination: 3 hours + 2 hours for submission
Weighting: 100 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4, MO5

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Mechanical Engineering {Apprenticeship-GlosColl} {Top-Up} [Frenchay] BEng (Hons) 2024-25

Mechanical Engineering {Apprenticeship-UCS} {Top-Up} [Frenchay] BEng (Hons) 2024-25

Mechanical Engineering {Apprenticeship-UCW} {Top-Up} [Frenchay] BEng (Hons) 2024-25

Mechanical Engineering {Apprenticeship-GlosColl} {Top-Up} [Frenchay] BEng (Hons) 2024-25

Mechanical Engineering {Foundation}[Sep][SW][Frenchay][5yrs] BEng (Hons) 2020-21

Mechanical Engineering [Sep][PT][Frenchay][6yrs] BEng (Hons) 2020-21

Mechanical Engineering [Sep][PT][Frenchay][7yrs] MEng 2020-21

Mechanical Engineering and Technology {Foundation} [Oct][FT][GCET][4yrs] BEng (Hons) 2021-22

Mechanical Engineering and Technology {Foundation} [Feb][FT][GCET][4yrs] BEng (Hons) 2021-22

Mechanical Engineering {Foundation}[Sep][FT][Frenchay][4yrs] BEng (Hons) 2021-22

Mechanical Engineering [Sep][SW][Frenchay][4yrs] BEng (Hons) 2021-22

Mechanical Engineering [Sep][SW][Frenchay][5yrs] MEng 2021-22

Mechanical Engineering [Frenchay] MEng 2022-23

Mechanical Engineering [Frenchay] BEng (Hons) 2022-23