Module Specification

Advanced Heat Transfer

Version: 2023-24, v2.0, 25 Jan 2023

Contents

Part 1: Information

Module title: Advanced Heat Transfer

Module code: UFMF7T-15-3

Level: Level 6

For implementation from: 2023-24

UWE credit rating: 15

ECTS credit rating: 7.5

Faculty: Faculty of Environment & Technology

Department: FET Dept of Engineering Design & Mathematics

Partner institutions: None

Field: Engineering, Design and Mathematics

Module type: Module

Pre-requisites: Applied Thermofluids 2022-23

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: Building on previous Thermofluids work this module will enable students to understand the importance of heat transfer when analysing energy consumption in complex systems.

Fundamental phenomena will be explored both theoretically and through a range of experimental work.

Incorporating a section on thermography the potential of this non-destructive testing technique will be explored using industry standard equipment and software.

Features: Not applicable

Educational aims: To develop a detailed understanding of real world heat transfer applications. The module will include an introduction to the use of industry standard thermography equipment.

Outline syllabus: Introduction to Thermography
1-D Heat Transfer in pipes, slabs and cylinders
Forced Convection
Heat Exchangers
Natural Convection
Steady State Conduction in 2/3 Dimensions
Extended Surfaces
Transient Heat Transfer
Radiation

Part 3: Teaching and learning methods

Teaching and learning methods: Interactive lectures using formative feedback.
Hands-on laboratory experiments and computer modelling designed to promote self-learning
Self paced peer assisted work groups

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

MO1 Acquire the ability to apply and integrate thermographical knowledge, whilst understanding its limitations, to heat transfer applications (SM3m)

MO2 Develop an understanding of the thermal characteristics of materials and their impact on heat transfer processes (P2)

MO3 Demonstrate the ability to apply different quantitative and computational methods to complex heat transfer problems and understand the limitations and impact of the solution (EA3m)

MO4 Be able to work with information that may be incomplete or uncertain and to quantify the effect of this on the application. Where appropriate use heat transfer theory or experimental research to mitigate deficiencies (D3m)

MO5 Apply advanced heat transfer knowledge to engineering processes (EA1m)

Hours to be allocated: 150

Contact hours:

Laboratory work = 8 hours

Total = 44

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/AADEF5FB-C74D-47C5-7D5E-F571D16C277F.html?lang=en-GB&login=1

Part 4: Assessment

Assessment strategy:

The exam will be based on a strategy that will ensure that students are able to demonstrate and apply their knowledge and understanding through engagement with problems and scenarios encountered throughout the module.

Specifically questions will be based on data obtained from experiments conducted independently in laboratory work throughout the module alongside some traditional questions.

Small amount of marks are allocated for the data collection. Students who have not collected will have data provided to them in the examination assessment.

Resit assessment strategy is a written examination

Assessment tasks:

Examination (First Sit)
Description: Via controlled conditions using group data obtained from experiments conducted independently throughout the Semester alongside some traditional questions.
Open book exam to demonstrate ability to understand, analyse and apply knowledge and think critically (3 hours).
Weighting: 100 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4, MO5

Examination (Resit)
Description: Via controlled conditions using group data obtained from experiments conducted independently throughout the Semester alongside some traditional questions.
Open book exam to demonstrate ability to understand, analyse and apply knowledge and think critically (3 hours).
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-UCW} {Top-Up} [Frenchay] BEng (Hons) 2023-24

Mechanical Engineering {Apprenticeship-UCS} {Top-Up} [Frenchay] BEng (Hons) 2023-24

Mechanical Engineering {Apprenticeship-GlosColl} {Top-Up} [Frenchay] BEng (Hons) 2023-24

Mechanical Engineering (Nuclear) {Apprenticeship-UCW} {Top-Up} [Sep][FT][MOD][2yrs] BEng (Hons) 2023-24

Mechanical Engineering [Sep][FT][Frenchay][3yrs] BEng (Hons) 2021-22

Automotive Engineering [Sep][FT][Frenchay][3yrs] BEng (Hons) 2021-22

Automotive Engineering [Sep][FT][Frenchay][4yrs] MEng 2021-22

Mechanical Engineering [Sep][FT][Frenchay][4yrs] MEng 2021-22

Automotive Engineering [Sep][SW][Frenchay][4yrs] BEng (Hons) 2020-21

Mechanical Engineering [Sep][SW][Frenchay][5yrs] MEng 2020-21

Mechanical Engineering [Sep][SW][Frenchay][4yrs] BEng (Hons) 2020-21

Automotive Engineering [Sep][SW][Frenchay][5yrs] MEng 2020-21

Mechanical Engineering {Foundation}[Sep][FT][Frenchay][4yrs] BEng (Hons) 2020-21

Automotive Engineering {Foundation}[Sep][FT][Frenchay][4yrs] BEng (Hons) 2020-21