Module Specification

Aero-Acoustics

Version: 2024-25, v3.0, 23 Jan 2024

Contents

Part 1: Information

Module title: Aero-Acoustics

Module code: UFMEWD-15-M

Level: Level 7

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: None

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: The aero-acoustic module covers aerodynamic noise sources and sound propagation related to flying and road vehicles in moving media, as well as the use of computer software to predict the acoustic field. It reflects the Flightpath2050 on the noise reduction target, as the aeroacoustics is of great importance in engineering settings involving high- and low-speed flows, including transportation (aeroplane, aero-engine, automobile, train, etc), industrial processes (vibration), environment (building acoustics) and the sustainable design of consumer devices.

Features: A combination of formal lectures, in-class problem-based learning and discussions, computing practices, guest lectures, visiting physical test facilities (acoustic chamber, acoustic tunnel) whenever possible.

Educational aims: This module equips students with advanced theory, computational methods and analysis for the study of aero-acoustic effects in low-speed and high-speed aerodynamics flows.

Outline syllabus: Theory and solution methods in generation and propagation of sound.
Analytical and numerical analysis
Computational acoustics
Computational fluid dynamics (CFD methods)
Measurement of sound and human factors, techniques and apparatus.
Aerospace acoustics case study, exploring factors internal and external to an aerospace vehicle.

Part 3: Teaching and learning methods

Teaching and learning methods: The course involves theoretical concepts which will be delivered via teaching notes and lectures which also involve demonstrations. Detailed discussions and consolidation of understanding will take place in tutorials. The module material requires computational methods of solution which will be supported by computer practical sessions.

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

MO1 Describe and analyse a problem in aero-acoustics with reference the practical and human factors.

MO2 Provide a detailed and accurate explanation of the theory, nature, origin and propagation of sound

MO3 Apply appropriate methods of noise reduction in relation to acoustic problems arising in aerospace

MO4 Justify and evaluate specific techniques with regard to acoustic analysis and measurement

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 114 hours

Face-to-face learning = 36 hours

Total = 150

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/ufmewd-15-m.html

Part 4: Assessment

Assessment strategy: Strategy: individual coursework

The Assessment:

An individual coursework element designed to assess the students' understanding of aero-acoustics concepts, CFD knowledge and skills, and abilities on problem solving via the use of suitable numerical simulation software packages and their applications to aerospace related noise source and propagation predictions.

Students are required to conduct an individual investigation in a critically evaluation and analysis of modelling results from a computational acoustics problem. The output from this investigation will be an overview of state-of-the-art researches of their chosen subject, and a further detailed case study submitted in the form of a series of Power Point slides. A short presentation will be adopted whenever possible/necessary to further assess student's subject knowledge.

The resit assessment will take the same format as the first sit assessment.

Assessment tasks:

Report (First Sit)
Description: 1500 word technical report submitted in the form of a series of Power Point slides.
Weighting: 100 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4

Report (Resit)
Description: 1500 word technical report submitted in the form of a series of Power Point slides.
Weighting: 100 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Aerospace Engineering (Design) [Sep][SW][Frenchay][5yrs] - Not Running MEng 2020-21

Aerospace Engineering with Pilot Studies (Design) [Sep][SW][Frenchay][5yrs] - Not Running MEng 2020-21

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

Aerospace Engineering with Pilot Studies [Sep][FT][Frenchay][4yrs] MEng 2021-22

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

Aerospace Engineering with Pilot Studies [Sep][SW][Frenchay][5yrs] MEng 2020-21

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

Aerospace Engineering with Pilot Studies [Sep][SW][Frenchay][5yrs] - Withdrawn MEng 2020-21