Module Specification

Applied Aerodynamics

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Part 1: Information

Module title: Applied Aerodynamics

Module code: UFMFH7-15-3

Level: Level 6

For implementation from: 2021-22

UWE credit rating: 15

ECTS credit rating: 7.5

Faculty: Faculty of Environment & Technology

Department: FET Dept of Engineering Design & Mathematics

Partner institutions: None

Delivery locations: Frenchay Campus

Field: Engineering, Design and Mathematics

Module type: Standard

Pre-requisites: Flight 2020-21, Fundamental Aerodynamics 2020-21

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: The module covers intermediate theoretical and practical aspects of aerodynamics

Features: Not applicable

Educational aims: See Learning Outcomes.

Outline syllabus: This module builds on the fundamentals of fluid dynamics at lower levels with the following concepts:-

- Revision of fundamentals of viscous flows: conservation laws, laminar boundary layer and turbulent boundary layer
- Momentum methods
- Pressure gradient and boundary layer separation.
- Flow transition: boundary layer transition process, prediction of the onset of transition.
- Compressible flow: governing equations for normal and oblique shock waves, expansion waves, shock interactions, and application to lifting surfaces, diffusers, nozzles and engine intakes.
- Low order numerical methods
- Use of the wind tunnel for internal and external aerodynamics

Part 3: Teaching and learning methods

Teaching and learning methods: Lectures/lectorials to convey concepts and principles
Tutorials and self-paced sessions to reinforce concepts and principles
Laboratory experiments and practical tasks designed to assimilate concepts and principles in a kinesthetic way and promote self-learning

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

MO1 Use relevant theory to predict boundary layer development, flow separation, transition and supersonic flow properties.

MO2 Apply momentum methods to predict aerodynamic loads.

MO3 Demonstrate appropriate expertise in the use of ground based experimental facilities to acquire and process suitable data, and analyse flow simulations

MO4 Demonstrate key transferable skills in problem formulation in aerodynamics applications, decision making, self-management and communication

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/ufmfh7-15-3.html

Part 4: Assessment

Assessment strategy: Component A is a 4 hour examination that will assess acquisition of skills, knowledge, concepts and principles in lectures, tutorials and experiments under controlled conditions

Component B ensures that students are able to demonstrate their understanding of underpinning principles within a practical or simulated practical environment where a portfolio of practical skills are assessed for example wind tunnel tests or coding of flow field prediction methods. The practical environment is intended to help assimilate principles and concepts in a kinesthetic manner and provide an opportunity for reflection of practice and theory

Assessment components:

Examination (Online) - Component A (First Sit)
Description: Online Examination on Aerodynamics: 4 hours
Weighting: 50 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2

Practical Skills Assessment - Component B (First Sit)

Description: Assignment in aerodynamics

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO2, MO3, MO4

Examination (Online) - Component A (Resit)

Description: Online Examination on aerodynamics: 4 hours

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2

Practical Skills Assessment - Component B (Resit)

Description: Assignment in aerodynamics

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO2, MO3, MO4

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Aerospace Engineering (Design) {Apprenticeship-COBC} [Sep][FT][COBC][4yrs] BEng (Hons) 2018-19

Aerospace Engineering [Sep][FT][Frenchay][3yrs] BEng (Hons) 2019-20

Aerospace Engineering (Systems) [Sep][FT][Frenchay][4yrs] MEng 2019-20

Aerospace Engineering with Pilot Studies [Sep][FT][Frenchay][3yrs] BEng (Hons) 2019-20

Aerospace Engineering with Pilot Studies (Design) [Sep][FT][Frenchay][3yrs] BEng (Hons) 2019-20

Aerospace Engineering with Pilot Studies [Sep][FT][Frenchay][4yrs] MEng 2019-20

Aerospace Engineering (Design) [Sep][FT][Frenchay][4yrs] MEng 2019-20

Aerospace Engineering with Pilot Studies (Systems) [Sep][FT][Frenchay][4yrs] MEng 2019-20

Aerospace Engineering with Pilot Studies (Design) [Sep][FT][Frenchay][4yrs] MEng 2019-20

Aerospace Engineering with Pilot Studies (Systems) [Sep][FT][Frenchay][3yrs] BEng (Hons) 2019-20

Aerospace Engineering [Sep][FT][Frenchay][4yrs] MEng 2019-20

Aerospace Engineering (Design) [Sep][FT][Frenchay][3yrs] BEng (Hons) 2019-20

Aerospace Engineering (Systems) [Sep][FT][Frenchay][3yrs] BEng (Hons) 2019-20

Aerospace Engineering with Pilot Studies [Sep][SW][Frenchay][5yrs] MEng 2018-19

Aerospace Engineering [Sep][SW][Frenchay][5yrs] MEng 2018-19

Aerospace Engineering with Pilot Studies [Sep][SW][Frenchay][4yrs] BEng (Hons) 2018-19

Aerospace Engineering with Pilot Studies {Foundation} [Sep][FT][Frenchay][4yrs] BEng (Hons) 2018-19

Aerospace Engineering with Pilot Studies (Design) {Foundation} [Sep][FT][Frenchay][4yrs] BEng (Hons) 2018-19

Aerospace Engineering (Systems) [Sep][SW][Frenchay][5yrs] MEng 2018-19

Aerospace Engineering with Pilot Studies (Systems) [Sep][SW][Frenchay][4yrs] BEng (Hons) 2018-19

Aerospace Engineering with Pilot Studies (Systems) {Foundation} [Sep][FT][Frenchay][4yrs] BEng (Hons) 2018-19

Aerospace Engineering with Pilot Studies (Design) [Sep][SW][Frenchay][4yrs] BEng (Hons) 2018-19

Aerospace Engineering with Pilot Studies (Systems) [Sep][SW][Frenchay][5yrs] MEng 2018-19

Aerospace Engineering (Design) [Sep][SW][Frenchay][5yrs] MEng 2018-19

Aerospace Engineering [Sep][SW][Frenchay][4yrs] BEng (Hons) 2018-19

Aerospace Engineering (Design) [Sep][SW][Frenchay][4yrs] BEng (Hons) 2018-19

Aerospace Engineering (Systems) [Sep][SW][Frenchay][4yrs] BEng (Hons) 2018-19

Aerospace Engineering {Foundation} [Sep][FT][Frenchay][4yrs] BEng (Hons) 2018-19

Aerospace Engineering (Design) {Foundation} [Sep][FT][Frenchay][4yrs] BEng (Hons) 2018-19

Aerospace Engineering (Systems) {Foundation} [Sep][FT][Frenchay][4yrs] BEng (Hons) 2018-19

Aerospace Engineering with Pilot Studies (Design) [Sep][SW][Frenchay][5yrs] MEng 2018-19

Aerospace Engineering with Pilot Studies {Foundation} [Sep][SW][Frenchay][5yrs] BEng (Hons) 2018-19

Aerospace Engineering {Foundation} [Sep][SW][Frenchay][5yrs] BEng (Hons) 2018-19