Module Specification

Avionics

Version: 2025-26, v3.0, Approved

Contents

Part 1: Information

Module title: Avionics

Module code: UFMFWU-15-3

Level: Level 6

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: Aerospace Systems Design 2024-25

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: This module explores modern avionics and associated standards present within the aerospace industry. This will include avionics architectures, electrical and electronic systems, actuation, guidance, navigation and autonomy, flight deck, and avionics standards and certification.

Students also undertake an avionics design and prototype project where they apply relevant avionics concepts and the aerospace systems design principles delivered

prior to an avionics design and integration project using commercial-off-the-shelf hardware.

Features: Not applicable

Educational aims: The aim of this module to provide a broad study of modern avionics with illustrated and practical examples, computational exercises and group project work so that students can experience how complex avionics are designed, developed and certified.

Outline syllabus: Introduction and evolution of avionics in aerospace, Cockpit environment

Cockpit displays (main, head up, head down, helmet mounted)

Civil and military Navigation Fundamentals I (GPS, inertial navigation, Airdata systems, Pitot tube, altimeters)

Civil and military Navigation Fundamentals II (Radio navigation aids; direction finding, VOR, DME, NDB, ILS, Marker beacon, Terrain based navigation)

Flight Control System I (Autopilot basis, control laws, sensors)

Flight Control System II (Autopilot modes, Glide slope , Localizer, FMS, actuators, fly by wire, redundancy and safety)

Military airborne seekers and radars (basics of radar, RCS, noise and clutter, decoys, chaff, different types of seekers)

Civil airborne surviallance systems and radars (Pulsed and continuous wave, Weather radar, ACAS, TAWS)

Guidance , path planning and obstacle avoidance, other airborne sensors and applications on aerial vehicles

Electrical, Electronics, Communication Systems – VHF, HF, SATCOM, data links

Flight simulation and simulators (hardware in the loop, software in the loop)

Part 3: Teaching and learning methods

Teaching and learning methods: Avionics systems and related concepts are introduced to students in lectures so that they understand the scope of each topic area. Small group discussions and case studies form the activity that takes place in tutorial sessions allowing students to learn collaboratively and consolidate their understanding of the material.

Students will have the opportunity to further consolidate their learning through the avionics design and prototype activity.

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

MO1 Explain in detail the fundamental operation and underlying technology behind modern avionic systems in civil and military aircraft. (SM1b, SM4m, P9m, P10m)

MO2 Comprehending the principles behind the application of various avionics systems in flight and the functions of their individual subsystems (EA2, EA4m, D2, EL5m, P4m, P6, G4).

MO3 Implement and evaluate avionic systems in simulation, use relevant simulation or modelling tools and using commercial-off-the-shelf hardware. (SM5m, P8, G1)

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 114 hours

Case study(ies) = 12 hours

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/9F41E396-748C-3470-31B8-DF6D364474E6.html?lang=en-US&login=1

Part 4: Assessment

Assessment strategy: The assessment for this course will be based on individual presentations derived from group project work.

Students will work in groups to complete a designated project, with each member assigned specific tasks or components as their individual contribution. While the project will be developed collaboratively, each student will be responsible for fully understanding and delivering the work related to their own contribution, the course material presented in the class.

The final assessment, held in the format of an individual presentation, will require each student to:

Demonstrate a clear understanding of the overall avionics subject according to the course materails and course presentations,

Demonstrate a clear understanding of the overall project topic and its objectives.

Present and explain in detail their own specific tasks, contributions, and results within the project.

Show awareness of how their work integrates into the complete project outcome.

This approach ensures that each student is assessed on both their individual performance and their understanding of the group’s collective work.

The resit strategy is the same as the first sit.

Assessment tasks:

Presentation (First Sit)
Description: Assessment will be based on individual performance and presentation. While the project will be developed collaboratively in groups, each student is expected to demonstrate a thorough understanding of the course material, the overall scope of their group's project, and, in particular, the specific tasks they have completed within the project.
Weighting: 100 %
Final assessment: Yes
Group work: Yes
Learning outcomes tested: MO1, MO2, MO3

Presentation (Resit)
Description: Assessment will be based on individual performance and presentation. While the project will be developed collaboratively in groups, each student is expected to demonstrate a thorough understanding of the course material, the overall scope of their group's project, and, in particular, the specific tasks they have completed within the project.
Weighting: 100 %
Final assessment: Yes
Group work: Yes
Learning outcomes tested: MO1, MO2, MO3

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Aerospace Engineering with Pilot Studies [Frenchay] BEng (Hons) 2023-24

Aerospace Engineering with Pilot Studies [Frenchay] MEng 2023-24

Aerospace Engineering {Foundation} [Sep][SW][Frenchay][5yrs] BEng (Hons) 2021-22

Aerospace Engineering [Frenchay] BEng (Hons) 2023-24

Aerospace Engineering [Frenchay] MEng 2023-24

Aerospace Engineering [Frenchay] MEng 2023-24

Aerospace Engineering [Frenchay] BEng (Hons) 2023-24

Aerospace Engineering with Pilot Studies [Frenchay] BEng (Hons) 2023-24

Aerospace Engineering with Pilot Studies [Frenchay] MEng 2023-24

Aerospace Engineering with Pilot Studies [Frenchay] MEng 2022-23

Aerospace Engineering with Pilot Studies [Frenchay] MEng 2023-24

Aerospace Engineering [Frenchay] MEng 2022-23

Aerospace Engineering [Frenchay] MEng 2023-24

Aerospace Engineering with Pilot Studies [Frenchay] MEng 2022-23

Aerospace Engineering [Frenchay] MEng 2022-23

Aerospace Engineering with Pilot Studies {Foundation} [Sep][SW][Frenchay][5yrs] BEng (Hons) 2021-22

Aerospace Engineering {Foundation} [Frenchay] BEng (Hons) 2022-23

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

Aerospace Engineering [Frenchay] MEng 2022-23

Aerospace Engineering with Pilot Studies {Foundation} [Frenchay] BEng (Hons) 2022-23

Aerospace Engineering with Pilot Studies [Frenchay] MEng 2022-23

Aerospace Engineering with Pilot Studies [Frenchay] BEng (Hons) 2022-23