Module Specification

Avionic Systems

Version: 2023-24, v2.0, 30 Jan 2023

Contents

Part 1: Information

Module title: Avionic Systems

Module code: UFMFGB-15-M

Level: Level 7

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: None

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: Not applicable

Features: Module Entry requirements: Engineering Graduate Level Work Experience

Educational aims: See learning outcomes.

Outline syllabus: The module comprises the following:

Introduction and overview of avionic systems and technology.

Systems engineering; concept of “systems-of-systems, requirements capture, systems design, development processes and certification.

Airborne computing; environment, packaging, interfacing, databuses, fault tolerant architectures, federated, open-systems and modular avionics.

Electrical system; including power generation, conversion, distribution and protection systems and More Electric Aircraft concepts.

On-board sensors; including air data, magnetic and inertial systems.

Flight control; including actuation, auto-stabilisation, fly-by-wire/light, flight director, autopilot, autothrottle and autoland.

Engine control (FADEC); fuel gauging and management, hydraulic systems and landing gear, environmental control systems and health and usage monitoring systems.

Communications and Nav-Aids; including VHF, HF, UHF and SATCOM; ADF, VOR, DME, and LORAN; ILS; ATC ModeS and TCAS.

Navigation and Flight Management Systems; including instrument flying, radio navigation, Future Air Navigation Systems and TAWS.

Civil Flight Deck; including primary flight instruments, “glass” flight deck PFD, ND & ECAM/EICAS displays, synthetic and enhanced vision systems, display technology and visual factors.

Military Crew Station; including Head-Up Display, Head-Down Displays, Helmet-Mounted Displays, HOTAS, voice control and night vision aids.

Military Mission Systems; including air-air and air-ground radar target location and tracking, electro-optical systems and sensor data fusion

Part 3: Teaching and learning methods

Teaching and learning methods: There is directed pre-module reading and descriptive material provided.

Scheduled learning:

Material is presented in lectures, case studies and demonstrations, with a number of expert speakers making presentations on subjects of topical interest. The emphasis will be mainly on descriptive analysis and demonstration.

In addition, the expert speakers support the on-going case study activities. A key feature is the self-learning developed throughout the case study activities, to enable immediate embedding of the skills on return to the workplace.

Such material would be available in alternative delivery formats, but it is expected that expert speakers would be replaced by local experts within the student's particular learning environment.

Independent learning:

This is required of the students to embed the learning and is demonstrated within the assessment activity. Support to develop the skills for this learning is offered as part of the scheduled learning.

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

MO1 Describe and analyse the fundamental performance requirements and constituent elements of all the significant avionic systems to be found in modern civil and military air-vehicles

MO2 Understand the requirements for and develop the functionality of any avionic system element within the context of a fully integrated “system of systems”

MO3 Formulate and integrate avionic systems from requirements definition, through concept development to final implementation in the context of their operational role

MO4 Understand and apply the architectural principles and the design process to be employed in order to certificate safe and reliable avionic systems

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/ufmfgb-15-m.html

Part 4: Assessment

Assessment strategy: Formative assessment can be achieved in a number of ways, including - but not restricted to pre-course work, interaction during the contact week, case studies and presentations.

Pre-course work consists of directed pre-module reading and descriptive material which is provided. Students may also be set assignment tasks to identify current topic-related issues.

Summative assessment is via a post-module assignment. Students will be given tasks involving the critical assessment of topic-related activities undertaken within their own companies. They will be required to produce a report, demonstrating that

they have achieved the learning outcomes. As a focused, intensive module taught in block format, the assessment aims to determine the student's ability to implement and reflect upon the skills learnt. Alternative delivery methods may mean different submission requirements – to be determined as part of the relevant learning contract.

The assessment requires demonstration of independent learning of theory and critical reflection of the student's work, both in the classroom and especially during the assignment period outside the classroom. Students are expected to be able to show through the reflective element how they have achieved the module's learning outcomes.

A mix of general and individual written feedback will be provided. The assessment's content will be judged on quality of content and conciseness of expression in order to maximise communication effectiveness and avoid reproduction of taught material, and normally be expected to be around 5000 words, or equivalent. Use of media formats such as PowerPoint or simulation and video are allowed with the agreement of the module leader.

Assessment tasks:

Report (First Sit)
Description: Mini-project assignment
Weighting: 100 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4

Report (Resit)
Description: Mini-project assignment
Weighting: 100 %
Final assessment: Yes
Group work: No
Learning outcomes tested:

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Aerospace Engineering [Sep][FT][Frenchay][4yrs] - Not Running MEng 2020-21

Aerospace Engineering (Systems) [Sep][FT][Frenchay][4yrs] - Not Running MEng 2020-21

Aerospace Engineering (Systems) [Sep][FT][Frenchay][3yrs] - Not Running BEng (Hons) 2020-21

Aerospace Engineering with Pilot Studies [Sep][FT][Frenchay][4yrs] - Not Running MEng 2020-21

Aerospace Engineering with Pilot Studies (Systems) [Sep][FT][Frenchay][4yrs] - Not Running MEng 2020-21

Aerospace Engineering [Sep][SW][Frenchay][5yrs] MEng 2019-20

Aerospace Engineering with Pilot Studies [Sep][SW][Frenchay][5yrs] MEng 2019-20

Aerospace Engineering with Pilot Studies (Systems) [Sep][SW][Frenchay][5yrs] MEng 2019-20

Aerospace Engineering (Systems) [Sep][SW][Frenchay][5yrs] MEng 2019-20