



## **Module Specification**

### **Aircraft Structural Design**

Version: 2023-24, v3.0, 25 Jan 2023

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## Part 1: Information

**Module title:** Aircraft Structural Design

**Module code:** UFMEWB-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:** Module Entry requirements, the module is intended for science and engineering graduates, or equivalent, with strong mathematical skills.

**Features:** Not applicable

**Educational aims:** See learning outcomes.

**Outline syllabus:** Design requirements, airworthiness, aircraft loading actions.

Fatigue and damage considerations, safe life, fail safe and damage tolerant design philosophies.

Materials selection for strength and stiffness, joining methods and design for manufacture issues.

Aircraft Construction: - Layout, configuration and roles of structural members elements and layout, jointing, design for manufacture.

Design Analysis: - Basic material and stress data, buckling, postbuckling of compression and shear members, bending and torsion of thin-walled box beam structures to meet required strength and stiffness limitations, detail stressing.

### **Part 3: Teaching and learning methods**

**Teaching and learning methods:** Lectures will introduce the general theoretical concepts and present examples in the use of these techniques.

Further learning will take place through discussion groups, case studies and tutorials.

Students will be expected to learn independently and carry out reading and directed study beyond that available in taught classes.

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

**MO1** Airframe design philosophies, design criteria and requirements

**MO2** Material properties and design for manufacturing issues

**MO3** The external loads acting on aircraft

**MO4** The layout, configuration and roles of structural members

**MO5** The evaluation and implementation of solutions to airframe design problems

**MO6** The theories, methods and analysis tools used in the design of airframes and sizing of members

**MO7** The derivation of net airframe loads from given external loading actions

**MO8** The design, layout and preliminary sizing of primary structural elements and members

**MO9** The detail stress analysis of structural members

**MO10** Awareness of professional literature

**MO11** Problem formulation and decision making [

**MO12** Progression to independent learning

**MO13** Self-management skills

**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](https://uwe.rl.talis.com/modules/ufmewb-15-m.html) via the following link <https://uwe.rl.talis.com/modules/ufmewb-15-m.html>

## **Part 4: Assessment**

**Assessment strategy:** The module is examined via an exam of 3 hours which will cover the taught issues.

**Assessment tasks:**

**Examination (Online) (First Sit)**

Description: Online examination

Weighting: 100 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO10, MO11, MO12, MO13, MO2, MO3, MO4, MO5, MO6, MO7, MO8, MO9

### **Examination (Online) (Resit)**

Description: Online examination

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 (Design) [Sep][FT][Frenchay][4yrs] - Not Running MEng 2020-21

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

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

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

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

Aerospace Engineering with Pilot Studies [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