



Module Specification

Structural Integrity in Design

Version: 2023-24, v6.0, 28 Jun 2023

Contents

Module Specification	1
Part 1: Information	2
Part 2: Description	2
Part 3: Teaching and learning methods	3
Part 4: Assessment.....	5
Part 5: Contributes towards	6

Part 1: Information

Module title: Structural Integrity in Design

Module code: UFMEBP-15-M

Level: Level 7

For implementation from: 2023-24

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: Structural integrity is the study of the safe design and assessment of components and structures under load. It integrates aspects of stress analysis, materials behaviour and the mechanics of failure into the engineering design process.

The module covers concepts and theories for the safe design and assessment of load-bearing structures in their entirety. Aspects of structural integrity are

implemented in almost every engineering design process, both in terms of the overall structure and its component parts.

The failure of a structure may have a number of causes and the stress engineer specialising in structural integrity needs to understand how applied forces lead to internal stresses in structures, failure modes and Fracture mechanics.

The module forms a relevant end point of the stress analysis theme that is developed through core modules at level 4 and 5 and then taken up in the option modules at level 6 and 7 and is an example of an advanced application of the engineering principles and methodologies developed throughout the programme.

Features: Not applicable

Educational aims: See Learning Outcomes.

Outline syllabus: The syllabus includes:

Structural integrity concepts

Failure criteria

Designing against fatigue

Non-destructive testing/inspection techniques

Structural health monitoring,

Application of fracture mechanics principles in the design/analysis of components for various loading conditions and materials

Part 3: Teaching and learning methods

Teaching and learning methods: These will be based on a combination of lectures, discussions in small groups, case studies and tutorials.

This module is based on a lecture series outlining the fundamentals of structural integrity with regard to its application in the practice of engineering analysis and design.

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

Scheduled learning includes lectures and tutorials.

Independent learning includes hours engaged with essential reading, case study preparation, assignment (tutorial questions) preparation and completion etc.

There is a total of 24 scheduled contact hours for lecturing and tutoring Structural Integrity in Design per 15-credit module.

There is also a total of 12 office contact hours (1 hour per week) for formative feedback and support.

Additional 12 virtual contact hours (1 hour per week) for the preparation of teaching materials and other technology-aided related course materials.

Lectures/tutorials: 24 hours

Surgery hours: 12 hours

Scheduled virtual contact hours: 12 hours

Self-directed learning: 72 hours

Exam preparation: 30 hours

Total hours: 150 hours

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

MO1 Design and undertake substantial investigations to address significant areas of theory and/or practice

MO2 Select appropriate advanced methodological approaches and critically evaluate their effectiveness

MO3 Apply appropriate theoretical and practical methods to the analysis and solution of engineering problems

MO4 Demonstrate and critically evaluate current theoretical and methodological approaches through use of professional literature

MO5 Act with initiative in decision-making within professional or given guidelines

MO6 Communicate effectively using professional engineering terms

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 102 hours

Face-to-face learning = 48 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/ufmebp-15-m.html) via the following link <https://uwe.rl.talis.com/modules/ufmebp-15-m.html>

Part 4: Assessment

Assessment strategy: The assessment strategy is to employ one assessment vehicle — a 3 hour exam. Alongside the other modules at M-level, this forms a part of a more general strategy of mixed types of assessment.

The exam has been chosen since it provides a good opportunity to test, under controlled conditions, the breadth and depth of the student's knowledge in areas critical to the module. This mode of assessment is also favoured by the IMechE.

Assessment tasks:

Examination (Online) (First Sit)

Description: Online Examination: 3 hours + 2 hours for submission

Weighting: 100 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4, MO5, MO6

Examination (Online) (Resit)

Description: Online Examination: 3 hours + 2 hours for submission

Weighting: 100 %

Final assessment: Yes

Group work: No

Learning outcomes tested:

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Mechanical Engineering [Sep][PT][Frenchay][2yrs] - Not Running MSc 2022-23

Aerospace Engineering [Sep][FT][Frenchay][4yrs] MEng 2020-21

Aerospace Engineering with Pilot Studies [Sep][FT][Frenchay][4yrs] MEng 2020-21

Mechanical Engineering [Sep][FT][Frenchay][4yrs] MEng 2020-21

Automotive Engineering [Sep][FT][Frenchay][4yrs] MEng 2020-21

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

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

Automotive Engineering {Foundation} [Sep][FT][Frenchay][5yrs] MEng 2019-20

Automotive Engineering {Foundation} [Sep][SW][Frenchay][6yrs] MEng 2018-19

Mechanical Engineering {Foundation} [Sep][SW][Frenchay][6yrs] MEng 2018-19