Module Specification

Stress Analysis

Version: 2023-24, v7.0, 18 Sep 2023

Contents

Part 1: Information

Module title: Stress Analysis

Module code: UFMFQA-15-2

Level: Level 5

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: Stress & Dynamics 2023-24

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: Not applicable

Features: Not applicable

Educational aims: One of the key disciplines that underpin mechanical engineering is introduced in this module and supported by practical laboratory exercises. This foundation of knowledge presented here will be used to extend specialist knowledge in future years.

Outline syllabus: Stress Analysis:

Stress Concentration

Un-symmetric bending

Curved beams

Bending of composite beams

Torsion (non-circular cross sections)

Elementary elastic plastic analysis

Buckling of struts

Beams deflections

Mohr's Circle for stress and strain

Rosette analysis

Failure criteria for ductile and brittle materials

Experimental Stress Analysis:

Torsion (non-circular cross sections), Buckling of struts, Beams deflections, Rosette analysis, Un-symmetric bending, Curved beams

Part 3: Teaching and learning methods

Teaching and learning methods: Large group lecture supported by small tutorials and laboratory sessions. Study time outside of contact hours will be spent on going

through exercises and example problems.

Lab sessions (Group work) will provide experience of empirical methods and comparison with theoretical analysis

Scheduled learning includes lectures, tutorials and lab sessions.

Independent learning includes hours engaged with essential reading, assignment preparation and completion.

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

MO1 Show a detailed knowledge and understanding of theoretical and experimental Stress analysis and structural behaviour with regard to the standard engineering components and artefacts.

MO2 Demonstrate subject specific skills with respect to solving complex problems in the general stress analysis of realistic engineering components and understand the design principles involved.

MO3 Select, apply and evaluate advanced stress analysis techniques for a wide range of engineering problems.

MO4 Demonstrate a comprehensive understanding of analytical and experimental methods for the solution of strength and stiffness.

MO5 Demonstrate a comprehensive understanding of structures subjected to a variety of load types and be able to predict modes of failure.

MO6 Model and simplify real problems, and apply mathematical methods of analysis.

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/ufmfqa-15-2.html

Part 4: Assessment

Assessment strategy: Assessment Task: Exam
Assessed via end of semester Exam to assess the students understanding of concepts and techniques.

Assessment Task: A series of online e-assessment tests to encourage engagement and provide formative feedback.

Assessment tasks:

Examination (Online) (First Sit)
Description: Online Examination: 3 hours + 2 hours for submission
Weighting: 75 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4, MO5, MO6

Online Assignment (First Sit)
Description: Online tests
Weighting: 25 %
Final assessment: No
Group work: No
Learning outcomes tested: MO1, MO2, MO4, MO6

Examination (Online) (Resit)
Description: Online Examination: 3 hours + 2 hours for submission
Weighting: 75 %
Final assessment: Yes

Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4, MO5, MO6

Online Assignment (Resit)
Description: Online tests
Weighting: 25 %
Final assessment: No
Group work: No
Learning outcomes tested: MO1, MO2, MO4, MO6

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Mechanical Engineering (Mechatronics) [AustonSingapore] BEng (Hons) 2023-24

Mechanical Engineering (Mechatronics) [BIET] BEng (Hons) 2023-24

Mechanical Engineering and Technology {Foundation} [Feb][FT][GCET][4yrs] BEng (Hons) 2021-22

Mechanical Engineering and Technology (Manufacturing) {Foundation} [Oct][FT][GCET][4yrs] BEng (Hons) 2021-22

Mechanical Engineering and Technology (Vehicle Technology) {Foundation} [Feb][FT][GCET][4yrs] BEng (Hons) 2021-22

Mechanical Engineering and Technology (Manufacturing) {Foundation} [Feb][FT][GCET][4yrs] BEng (Hons) 2021-22

Mechanical Engineering and Technology {Foundation} [Oct][FT][GCET][4yrs] BEng (Hons) 2021-22

Mechanical Engineering and Technology (Vehicle Technology) {Foundation} [Oct][FT][GCET][4yrs] BEng (Hons) 2021-22

Mechanical Engineering and Vehicle Technology {Foundation} [Feb][FT][GCET][4yrs] - Withdrawn BEng (Hons) 2021-22

Mechanical Engineering and Vehicle Technology {Foundation} [Oct][FT][GCET][4yrs] - Withdrawn BEng (Hons) 2021-22

Aerospace Engineering (Design) [Sep][PT][Frenchay][8yrs] - Not Running MEng 2020-21

Aerospace Engineering with Pilot Studies (Design) [Sep][PT][Frenchay][6yrs] - Not Running BEng (Hons) 2020-21

Aerospace Engineering [Sep][PT][Frenchay][8yrs] - Not Running MEng 2020-21

Aerospace Engineering with Pilot Studies [Sep][PT][Frenchay][6yrs] - Not Running BEng (Hons) 2020-21