Module Specification

Applications of Mathematics in Civil and Environmental Engineering

Version: 2021-22, v2.0, 29 Jul 2021

Contents

Part 1: Information

Module title: Applications of Mathematics in Civil and Environmental Engineering

Module code: UFMFF7-15-2

Level: Level 5

For implementation from: 2021-22

UWE credit rating: 15

ECTS credit rating: 7.5

Faculty: Faculty of Environment & Technology

Department: FET Dept of Engineering Design & Mathematics

Partner institutions: None

Delivery locations: Frenchay Campus, Northshore College of Business and Technology

Field: Engineering, Design and Mathematics

Module type: Standard

Pre-requisites: Mathematics for Civil and Environmental Engineering 2021-22

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: In this module students will be introduced to advanced mathematical techniques used in the solution of engineering problems. Applications

taken from heat flow and structural mechanics will be used to illustrate the techniques.

Outline syllabus: Mathematical content:

Complex algebra: Basic algebraic operations, complex solutions to quadratic equations.

Linear algebra: Determination of eigenvalues and eigenvectors

Fourier series: Properties of periodic functions, odd and even functions. Computation and convergence of Fourier series.

Differential equations: 2nd order linear constant coefficient differential equations, resonance. 1st and 2nd order partial derivatives. Solution of separable partial differential equations.

The module is delivered by means of lectures and workshops. To prepare for assessment, students will be expected to undertake self-directed learning in addition to the directed learning which supports taught classes.

Part 3: Teaching and learning methods

Teaching and learning methods: See Assessment

Module Learning outcomes:

MO1 Select and apply advanced techniques from engineering mathematics to the solution of a given engineering problem

MO2 State and apply physical laws to the solution of engineering problems

MO3 Interpret a mathematical model in terms of the physical problem being described with reference to the underlying assumptions and limitations of the model

MO4 Communicate mathematical ideas and concepts in written form

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/ufmff7-15-2.html

Part 4: Assessment

Assessment strategy: The examination is summative and assesses the students understanding of mathematical concepts and techniques, and their ability to apply those techniques to a variety of problems that test understanding of the engineering context. Students will have the opportunity to prepare for applied/modelling type scenarios which will then form the basis of a structured examination question.

The computer based tests provide frequent and instant feedback to students about their progress through the module.

Assessment components:

Examination (Online) - Component A (First Sit)
Description: Online Written exam
Weighting: 75 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4

In-class test - Component B (First Sit)
Description: Computer based tests
Weighting: 25 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1

Examination (Online) - Component A (Resit)

Description: Online Examination

Weighting: 75 %

Final assessment: Yes

Group work: No

Learning outcomes tested:

In-class test - Component B (Resit)

Description: Computer based tests

Weighting: 25 %

Final assessment: No

Group work: No

Learning outcomes tested:

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Building Services Engineering [Sep][FT][Frenchay][3yrs] BEng (Hons) 2020-21

Civil and Environmental Engineering [Sep][SW][Frenchay][5yrs] MEng 2020-21

Civil and Environmental Engineering [Sep][FT][Frenchay][4yrs] MEng 2020-21

Civil and Environmental Engineering [Sep][SW][Frenchay][4yrs] BEng (Hons) 2020-21

Civil Engineering [Sep][FT][Frenchay][3yrs] BEng (Hons) 2020-21

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

Civil Engineering [Sep][SW][Frenchay][4yrs] BEng (Hons) 2020-21

Civil Engineering [Sep][SW][Frenchay][5yrs] MEng 2020-21

Civil Engineering [Jan][FT][Northshore][4yrs] MEng 2020-21

Civil Engineering [Jan][FT][Northshore][4yrs] BEng (Hons) 2020-21

Civil and Environmental Engineering [Sep][FT][Frenchay][3yrs] BEng (Hons) 2020-21

Civil and Environmental Engineering [Sep][PT][Frenchay][5yrs] BEng (Hons) 2019-20

Civil and Environmental Engineering {Apprenticeship-UWE} [Sep][FT][Frenchay][5yrs] BEng (Hons) 2019-20

Civil and Environmental Engineering {Foundation} [Sep][FT][Frenchay][4yrs] BEng (Hons) 2019-20

Civil and Environmental Engineering {Foundation} [Sep][SW][Frenchay][5yrs] BEng (Hons) 2019-20

Architecture and Environmental Engineering [Sep][SW][Frenchay][5yrs] BEng (Hons) 2019-20

Architecture and Environmental Engineering [Sep][FT][Frenchay][4yrs] BEng (Hons) 2019-20

Building Services Engineering {Apprenticeship-UWE} [Sep][FT][Frenchay][5yrs] BEng (Hons) 2019-20

Civil and Environmental Engineering [Sep][PT][Frenchay][7yrs] MEng 2019-20

Architecture and Environmental Engineering {Foundation} [Sep][SW][Frenchay][6yrs] BEng (Hons) 2018-19

Architecture and Environmental Engineering {Foundation} [Sep][FT][Frenchay][5yrs] BEng (Hons) 2018-19