



Module Specification

Applications of Mathematics in Civil and Environmental Engineering

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Part 1: Information

Module title: Applications of Mathematics in Civil and Environmental Engineering

Module code: UFMFF7-15-2

Level: Level 5

For implementation from: 2023-24

UWE credit rating: 15

ECTS credit rating: 7.5

Faculty: Faculty of Environment & Technology

Department: FET Dept of Computer Sci & Creative Tech

Partner institutions: None

Field: Computer Science and Creative Technologies

Module type: Module

Pre-requisites: Mathematics for Civil and Environmental Engineering 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: 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: On successful completion of this module students will achieve the following 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](https://uwe.rl.talis.com/modules/ufmff7-15-2.html) 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 tasks:**Examination (Online) (First Sit)**

Description: Online Written exam (24 hours)

Weighting: 75 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4

In-class test (First Sit)

Description: Computer based tests

Weighting: 25 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1

Examination (Online) (Resit)

Description: Online Examination (24 hours)

Weighting: 75 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4

In-class test (Resit)

Description: Computer based tests

Weighting: 25 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Civil Engineering [Frenchay] BEng (Hons) 2022-23

Civil Engineering [Jan][FT][Northshore][4yrs] - Not Running MEng 2022-23

Civil Engineering [Jan][FT][Northshore][3yrs] - Not Running BEng (Hons) 2022-23

Civil and Environmental Engineering [Sep][SW][Frenchay][4yrs] - Not Running BEng (Hons) 2022-23

Civil and Environmental Engineering [Sep][FT][Frenchay][3yrs] - Not Running BEng (Hons) 2022-23

Building Services Engineering [Frenchay] BEng (Hons) 2022-23

Civil Engineering [Frenchay] MEng 2022-23

Building Services Engineering {Apprenticeship-UWE} [Sep][FT][Frenchay][5yrs]
BEng (Hons) 2021-22

Civil Engineering {Apprenticeship-UWE} [Sep][FT][Frenchay][5yrs] BEng (Hons)
2021-22

Civil Engineering [Sep][PT][Frenchay][7yrs] MEng 2021-22

Civil and Environmental Engineering [Sep][PT][Frenchay][5yrs] - Not Running BEng
(Hons) 2021-22

Civil and Environmental Engineering {Foundation} [Sep][FT][Frenchay][4yrs] - Not
Running BEng (Hons) 2021-22

Civil and Environmental Engineering {Foundation} [Sep][SW][Frenchay][5yrs] - Not
Running BEng (Hons) 2021-22

Civil Engineering [Sep][PT][Frenchay][5yrs] BEng (Hons) 2021-22

Civil Engineering {Foundation} [Sep][FT][Frenchay][4yrs] BEng (Hons) 2021-22

Civil Engineering {Foundation} [Sep][SW][Frenchay][5yrs] BEng (Hons) 2021-22

Architecture and Environmental Engineering [Sep][FT][Frenchay][4yrs] BEng (Hons)
2021-22

Architecture and Environmental Engineering [Sep][SW][Frenchay][5yrs] BEng (Hons)
2021-22

Building Services Engineering [Sep][PT][Frenchay][5yrs] BEng (Hons) 2021-22

Building Services Engineering {Foundation} [Feb][FT][GCET][4yrs] BEng (Hons)
2021-22

Building Services Engineering {Foundation} [Oct][FT][GCET][4yrs] BEng (Hons)
2021-22

Architecture and Environmental Engineering {Foundation} [Sep][SW][Frenchay][6yrs]
BEng (Hons) 2020-21

Architecture and Environmental Engineering {Foundation} [Sep][FT][Frenchay][5yrs]
BEng (Hons) 2020-21