Module Specification

Mathematics for Civil and Environmental Engineering

Version: 2023-24, v5.0, 18 Sep 2023

Contents

Part 1: Information

Module title: Mathematics for Civil and Environmental Engineering

Module code: UFMFYG-15-1

Level: Level 4

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 Computing and Creative Technologies

Partner institutions: None

Field: Computer Science and Creative Technologies

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: In this module students will study standard mathematical techniques used in the solution of engineering problems.

Features: Not applicable

Educational aims: See Learning Outcomes

Outline syllabus: Algebraic Manipulation and Standard engineering functions: Dimensions, polynomials, rational functions, exponential and logarithmic functions,

trigonometric and hyperbolic functions, the inverse function, solving non-linear equations.

Matrix and Vector Algebra: Properties of matrices and determinants, the inverse matrix, Gaussian elimination. Vector and scalar quantities, resolution of forces, properties of vector quantities, vector addition, unit vectors, position vectors, scalar product, vector product.

Differential and Integral Calculus: Limits, average rate and instantaneous rate of change, differentiation, linearity, product rule, quotient rule and chain rule. Higher order derivatives, classification of turning points. Integration, indefinite and definite integration, integration by parts, numerical integration. First order differential equations, separation of variables.

Part 3: Teaching and learning methods

Teaching and learning methods: Scheduled learning includes lectures and workshops with tutorial sessions.

Independent learning includes hours engaged in problem solving and preparation of tutorial questions.

Contact time: 36 hours

Assimilation and skill development: 54 hours

Coursework: 15 hours

Exam preparation: 45 hours

Total: 150 hours

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

> **MO1** Select and apply appropriate techniques from calculus to the solution of a given problem

MO2 Select and apply appropriate techniques from linear algebra to the solution of a given problem

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

MO4 Use appropriate notation and terminology to communicate mathematical concepts

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/ufmfyg-15-1.html

Part 4: Assessment

Assessment strategy: Assessment tasks:

An end of module examination has been chosen to test the understanding and knowledge of functions, calculus and linear algebra techniques under controlled conditions.

An e-assessment strategy to provide regular and rapid feedback to help students consolidate their knowledge as the module progresses.

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

Online Assignment (First Sit)

Description: E-assessment

Weighting: 25 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2

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

Online Assignment (Resit)

Description: E-assessment

Weighting: 25 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Architecture and Environmental Engineering [Frenchay] MDes 2023-24

Architecture and Environmental Engineering [Frenchay] BEng (Hons) 2023-24

Civil Engineering [Frenchay] BEng (Hons) 2023-24

Civil Engineering [Frenchay] MEng 2023-24

Building Services Engineering [Frenchay] BEng (Hons) 2023-24

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

Civil and Environmental Engineering [Sep][PT][Frenchay][5yrs] - Not Running BEng (Hons) 2022-23

Civil and Environmental Engineering {Foundation} [Sep][FT][Frenchay][4yrs] - Not Running BEng (Hons) 2022-23

Civil and Environmental Engineering {Foundation} [Sep][SW][Frenchay][5yrs] - Not Running BEng (Hons) 2022-23

Building Services Engineering {Foundation} [GCET] BEng (Hons) 2022-23

Civil Engineering {Apprenticeship-UWE} [Frenchay] BEng (Hons) 2022-23

Building Services Engineering {Apprenticeship-UWE} [Frenchay] BEng (Hons) 2022-23

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

Civil Engineering [Frenchay] MEng 2022-23

Architecture and Environmental Engineering {Foundation} [Frenchay] BEng (Hons) 2022-23

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