Module Specification

Foundation Mathematics: Algebra and Calculus

Version: 2021-22, v5.0, 25 Apr 2022

Contents

Part 1: Information

Module title: Foundation Mathematics: Algebra and Calculus

Module code: UFMFBG-30-0

Level: Level 3

For implementation from: 2021-22

UWE credit rating: 30

ECTS credit rating: 15

Faculty: Faculty of Environment & Technology

Department: FET Dept of Engineering Design & Mathematics

Partner institutions: None

Delivery locations: Frenchay Campus, Global College of Engineering and Technology (GCET)

Field: Engineering, Design and Mathematics

Module type: Standard

Pre-requisites: None

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: See Learning Outcomes

Outline syllabus: Numbers and Calculations

Indices, Standard Form, Percentages, Logarithms. Compound Interest and Continuous compounding.

Algebra

Basic Algebra. Factorisation. Algebraic Fractions, Linear Equations. Rearranging Formulae. Simultaneous Linear Equations. Linear Equations and Graphs. Quadratic Equations. Solving Quadratics by completing the square. Graphs of Quadratic Functions. Simultaneous Solution of Quadratic and Linear Equations. Introduction to Partial Fractions. Arithmetic and Geometric Series.

Functions

Functions and inverses. Function of a Function. Properties of standard functions used in engineering: polynomial, rational, trigonometric, exponential and logarithmic functions.

Calculus

Differential Calculus. The Derivates of other Functions. Maxima and Minima. The Chain Rule (or Composite Rule). The Product Rule and Quotient Rule. The Second Derivative. Integration. The Definite Integral. Introduction to Integration by Parts and Integration by Substitution.

Part 3: Teaching and learning methods

Teaching and learning methods: By classroom teaching and directed reading:

Students will be provided with essential course reading material in the form of a comprehensive module handbook containing lecture notes. There is support material in the form of downloadable video and audio files.

The learning strategy is to guide students through highly structured workbooks that encourage active learning. The video and audio files allow students to consolidate their understanding. The aim is to ensure that foundation level students have mastery and fluency of concepts, methods and communication of this material which underpins much of the analytical work they would encounter at level 1.

Students will be guided to extra resources on the web where necessary and they may consult the indicative reading list below to assist understanding.

Scheduled learning includes lectures with tutorial sessions.

Independent learning includes hours engaged in solving worksheet problems and preparation for assessments.

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

MO1 Perform numerical calculations to an appropriate level of accuracy

MO2 Interpret an algebraic expression and select an appropriate method for changing the subject of the expression

MO3 Solve equations that involve standard mathematical functions used in engineering

MO4 Differentiate and integrate standard mathematical functions used in engineering

MO5 Select and apply suitable mathematical techniques to solve extended problems

MO6 Communicate mathematical arguments using clear, appropriate and consistent notation

Hours to be allocated: 300

Contact hours:

Independent study/self-guided study = 228 hours

Face-to-face learning = 72 hours

Total = 300

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/ufmfbg-30-0.html

Part 4: Assessment

Assessment strategy: The assessment strategy uses component B to provide formative feedback to students so that they can assess their progress throughout the year and an end of module examination to assess whether students have reached an appropriate standard in mathematics to progress to single honours programmes in Engineering and Mathematics.

Component A: consists of an end of module online examination to assess elements covered in both semesters.

Component B: consists of a series of e-assessments that provide instant feedback and a mid-sessional online examination that will provide feedback on written work.

The GCET delivery of this exam is a 3 hour face-to-face/invigilated exam. It was agreed that GCET can deliver the exam in a different way to UWE for in-country reasons for 2021/22 and 2022/23 providing there is no change to the UWE assessment during this time.

Assessment components:

Examination (Online) - Component A (First Sit)
Description: Online Examination: 5 hours
Weighting: 75 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4, MO5, MO6

Online Assignment - Component B (First Sit)

Description: e -Assessments

Weighting: 12 %

Final assessment: No

Group work: No

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

Examination (Online) - Component B (First Sit)

Description: Online Mid-sessional test (January)

24 hour submission period

Weighting: 13 %

Final assessment: No

Group work: No

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

Examination (Online) - Component A (Resit)

Description: Online Examination: 5 hours

Weighting: 75 %

Final assessment: Yes

Group work: No

Learning outcomes tested:

Online Assignment - Component B (Resit)

Description: e -Assessment

Weighting: 25 %

Final assessment: No

Group work: No

Learning outcomes tested:

Part 5: Contributes towards

This module contributes towards the following programmes of study:

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

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

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

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

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

Mathematics with Qualified Teacher Status {Foundation} [Sep][FT][Frenchay][3yrs] BSc (Hons) 2021-22

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

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

Energy Technology and Management {Foundation} [Oct][FT][GCET][4yrs] BSc (Hons) 2021-22

Energy Technology and Management {Foundation} [Feb][FT][GCET][4yrs] BSc (Hons) 2021-22

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

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

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

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

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

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

Aerospace Engineering with Pilot Studies {Foundation} [Sep][SW][Frenchay][5yrs] BEng (Hons) 2021-22

Aerospace Engineering with Pilot Studies {Foundation} [Sep][FT][Frenchay][4yrs] BEng (Hons) 2021-22

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

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

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

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

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

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

Mathematics {Foundation}[Sep][FT][Frenchay][4yrs] BSc (Hons) 2021-22

Computer Security and Forensics {Foundation} [Feb][FT][GCET][4yrs] BSc (Hons) 2021-22

Computer Security and Forensics {Foundation} [Oct][FT][GCET][4yrs] BSc (Hons) 2021-22

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

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

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

Civil and Environmental Engineering {Foundation} [Sep][SW][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

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

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

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

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

Mathematics {Foundation}[Sep][SW][Frenchay][5yrs] BSc (Hons) 2021-22

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

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

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

Instrumentation and Control Engineering {Foundation} [Feb][PT][GCET][8yrs] BEng (Hons) 2021-22

Instrumentation and Control Engineering {Foundation} [Oct][PT][GCET][8yrs] BEng (Hons) 2021-22

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