Module Specification

Applied Algebra and Geometry

Version: 2023-24, v2.0, 30 Jan 2023

Contents

Part 1: Information

Module title: Applied Algebra and Geometry

Module code: UFMFWG-15-3

Level: Level 6

For implementation from: 2023-24

UWE credit rating: 15

ECTS credit rating: 7.5

Faculty: Faculty of Environment & Technology

Department: FET Dept of Engineering Design & Mathematics

Partner institutions: None

Field: Engineering, Design and Mathematics

Module type: Module

Pre-requisites: Algebra, Combinatorics and Graphs 2023-24

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: Algebra and Geometry are two core themes of Mathematics. Their mutual interaction helps to unify Mathematics, and it provides the framework for solving many problems both within Mathematics itself and also in a wide variety of applications.

Features: Not applicable

Educational aims: This module is intended to give the student a clear indication as to the importance of Algebra and Geometry and their place within Mathematics, and also to discuss some interesting applications. The module builds on the student's knowledge of the following areas: logic and sets; number systems; abstract algebra, including linear algebra and group theory; graph theory. The module serves as an endpoint within the Mathematics degree programme in which several key threads are brought together and in which important links are made with other areas of study.

Outline syllabus: 1. Introduction: an overview of the geography of Mathematics, in particular the key rôles played by Algebra and by Geometry.

2. Further Group Theory: groups and geometry; conjugation; automorphism groups; factor groups; basic structure theorems; the classification of groups of small order.

3. Quaternions and Octonions: the construction of number systems; the algebra, geometry and applications of the quaternions; an introduction to the octonions

Part 3: Teaching and learning methods

Teaching and learning methods: Scheduled contact includes classical lectures and multi-purpose workshops. The latter serve partly to resolve issues brought up by the students on a week-by-week basis, and also to provide an arena for other learning activities appropriate to developing theory or to exploring applications.

Self-study includes: engaging with the resources provided; working on example sheets; locating and utilising other materials to support learning.

Activity (Hours)
Contact (36)
Assimilation and skill development (54)
Coursework (15)
Exam preparation (45)
Total (150)

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

MO1 To define mathematical concepts, to state theorems precisely, and to construct mathematical proofs at a level appropriate to the final year of a Mathematics honours degree

MO2 To perform computations and to derive results within the framework of the areas of algebra and of geometry in the syllabus

MO3 To communicate the results of their work effectively using correct language, notation and style

MO4 To select and to implement appropriate techniques to solve problems arising from within the areas of application studied in the module

MO5 To locate and to utilise their own resources in directed and undirected study

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/ufmfwg-15-3.html

Part 4: Assessment

Assessment strategy: An examination that assesses the student's understanding of concepts and techniques, and also their ability to apply these in relatively straightforward problems.

A piece of coursework that consists of questions of a more extended nature that

require careful thought and the use of appropriate resources. This coursework might develop material, including applications, that has not been explicitly discussed in the module lectures.

Assessment tasks:

Examination (First Sit)

Description: Examination (2 hours)

Weighting: 75 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3

Written Assignment (First Sit)

Description: Coursework

Weighting: 25 %

Final assessment: No

Group work: No

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

Examination (Resit)

Description: Examination (2 hours)

Weighting: 75 %

Final assessment: Yes

Group work: No

Learning outcomes tested:

Written Assignment (Resit)

Description: Coursework

Weighting: 25 %

Final assessment: No

Group work: No

Learning outcomes tested:

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Mathematics [Sep][FT][Frenchay][4yrs] - Not Running MMath 2021-22

Mathematics and Statistics [Sep][SW][Frenchay][4yrs] - Not Running BSc (Hons) 2020-21

Mathematics and Statistics {Foundation} [Sep][FT][Frenchay][4yrs] - Not Running BSc (Hons) 2020-21

Mathematics {Foundation} [Sep][FT][Frenchay][4yrs] - Not Running BSc (Hons) 2020-21

Mathematics [Sep][SW][Frenchay][5yrs] - Not Running MMath 2020-21

Mathematics and Statistics {Foundation} [Sep][SW][Frenchay][5yrs] BSc (Hons) 2019-20