**Module Specification**

# Networks

Version: 2028-29, v4.0, Approved

**Contents**

# Part 1: Information

**Module title:** Networks

**Module code:** UFMFXV-15-3

**Level:** Level 6

**For implementation from:** 2028-29

**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:** The application of network theory to solve a diverse range of problems has been an exciting and expanding field.  Applications include business, resource planning, marketing, social networks, transport, biological and physical sciences.  A theoretical understanding of networks provides professional mathematical scientists with tools to make a significant impact on the world.

**Features:** Not applicable

**Educational aims:** This module aims to develop the student's theoretical understanding of graph theory and its application to real-world networks.  It will introduce advanced techniques that will enable students to solve a variety of practical problems.

**Outline syllabus:** Topics are likely to include, but are not limited to:

Further concepts in graph theory that are required for algorithms and applications, for example, dynamic programming and game theory using graphs.

Graph theoretic heuristics, for example the Travelling Salesperson Problem,  local search, and the Lin-Kernighan heuristic.

Transportation networks, for example, maximum flow, transportation problems, and the Ford-Fulkerson Theorem.

Traffic network design, for example, equilibrium flow and Braess' paradox.

A selection of further applications, for example, facilities layout in industrial engineering, evolutionary trees in biology, applications in physics and in chemistry.

# Part 3: Teaching and learning methods

**Teaching and learning methods:** The module is delivered by means of lectures, tutorials and workshops, all interleaved within a single weekly class in a multi-purpose learning space.  The aim is to develop theoretical understanding of graphs, the building of network models, and problem-solving skills.

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

> **MO1** Select and appraise appropriate graph-theoretic, algorithmic and optimisation techniques to solve problems involving networks and network applications.

> **MO2** Communicate the strengths, limitations, and interpretation of graph-theoretic modelling and solution methods, including their use in practical situations.

**Hours to be allocated:** 150

**Contact hours:**

Independent study/self-guided study = 114 hours

Face-to-face learning = 36 hours

**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/ufmfxv-15-3.html

## Part 4: Assessment

**Assessment strategy:** The assessment strategy consists of a written assignment that assesses the student's understanding of underlying concepts and techniques, and their ability to apply these concepts and techniques to challenging problems. The written assignment involves a mix of theoretical work and appropriate use of software.

The resit assessment will have the same format as the first sit assessment.

Formative assessment will be conducted via weekly tasks that provide ongoing feedback both to students and to module teams, thereby allowing for timely adjustments to teaching strategies, and enabling students to monitor their progress and to address learning gaps before summative assessments take place.

**Assessment tasks:**

**Written Assignment** (First Sit)

Description: Written Assignment (max 10 pages)

Weighting: 100 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2

**Written Assignment** (Resit)

Description: Written Assignment (max 10 pages)

Weighting: 100 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2

## Part 5: Contributes towards

This module contributes towards the following programmes of study:

Mathematics {Foundation} [Frenchay] - WITHDRAWN BSc (Hons) 2024-25

Mathematics [Frenchay] BSc (Hons) 2025-26

Mathematics [Frenchay] BSc (Hons) 2026-27

Mathematics [Frenchay] BSc (Hons) 2026-27