2019/0 - MTHA4001A MATHEMATICAL SKILLS

Autumn Semester, Level 4 module
(Maximum 120 Students)
UCU: 20 Organiser: Professor Shaun Stevens
MODULE - 40% PASS ON AGGREGATE
Module Type: Examination with Coursework or Project
Timetable Slot:E

The module provides you with a thorough introduction to some systems of numbers commonly found in Mathematics: natural numbers, integers, rational numbers, modular arithmetic. It also introduces you to common set theoretic notation and terminology and a precise language in which to talk about functions. There is emphasis on precise definitions of concepts and careful proofs of results. Styles of mathematical proofs you will discuss include: proof by induction, direct proofs, proof by contradiction, contrapositive statements, equivalent statements and the role of examples and counterexamples. In addition, this unit will also provide you with an introduction to producing mathematical documents using Latex, and an introduction to solving mathematical problems computationally using both Symbolic Algebra packages and Excel.

2019/0 - MTHA6002A HISTORY OF MATHEMATICS

Autumn Semester, Level 6 module
(Maximum 50 Students)
UCU: 20 Organiser: Dr Mark Cooker
MODULE - 40% PASS ON AGGREGATE
Module Type: Coursework
Timetable Slot:G

BEFORE TAKING THIS MODULE YOU MUST TAKE MTHA5001Y AND TAKE MTHA5004Y

You will trace the development of mathematics from prehistory to the high cultures of ancient Egypt, Mesopotamia, and the Indus Valley civilisation, through Islamic mathematics, and on to mathematical modernity, through a selection of topics. You will explore the rise of calculus and algebra from the time of Greek and Indian mathematicians, up to the era of Newton and Leibniz. We also discuss other topics, such as mathematical logic: ideas of propositions, axiomatisation and quantifiers. Our style is to explore mathematical practice and conceptual developments, in different historical and geographical settings.

2019/0 - MTHB5009A MATHEMATICS FOR SCIENTISTS B

Autumn Semester, Level 5 module
(Maximum 75 Students)
UCU: 20 Organiser: Dr Mark Blyth

MODULE - 40% PASS ON AGGREGATE
Module Type: Examination with Coursework or Project
Timetable Slot:UKNOWN
Exam Paper(hrs):

This module serves as an introduction to fluid dynamics, vector calculus and Fourier analysis.

2019/0 - MTHD6005A GRAPH THEORY

Autumn Semester, Level 6 module
(Maximum 40 Students)
UCU: 20 Organiser: Dr Johannes Siemons
MODULE - 40% PASS ON AGGREGATE
Module Type: Examination with Coursework or Project
Timetable Slot:A

A graph is a set of 'vertices' - usually finite - which may or may not be linked by 'edges'. Graphs are very basic structures and therefore play an important role in many parts of mathematics, computing and science more generally. In this module, you will develop the basic notions of connectivity and matchings. You'll explore the connection between graphs and topology via the planarity of graphs. We aim to prove a famous theorem due to Kuratowski which provides the exact conditions for a graph to be planar. You will also be able to study an additional topic on graph colourings. One of the best known theorems in graph theory is the Four-Colour-Theorem. While this result is not within our reach, we shall aim to prove the Five-Colour-Theorem.

2019/0 - MTHD6015A MATHEMATICAL LOGIC

Autumn Semester, Level 6 module
(Maximum 90 Students)
UCU: 20 Organiser: Dr Jonathan Kirby
MODULE - 40% PASS ON AGGREGATE
Module Type: Examination with Coursework or Project
Timetable Slot:C
Exam Period:SPR-02

BEFORE TAKING THIS MODULE YOU MUST TAKE MTHA5003Y

Mathematical logic analyses symbolically the way in which we reason formally, particularly about mathematical structures. The ideas have applications to other parts of Mathematics, as well as being important in theoretical computer science and philosophy. We give a thorough treatment of predicate and propositional logic and an introduction to model theory.

2019/0 - MTHD6018A DYNAMICAL METEOROLOGY

Autumn Semester, Level 6 module
(Maximum 50 Students)

UCU: 20 Organiser: Professor Adrian Matthews

MODULE - 40% PASS ON AGGREGATE
Module Type: Examination with Coursework or Project
Timetable Slot:B

Exam Paper(hrs):

BEFORE TAKING THIS MODULE YOU MUST TAKE MTHA5002Y OR TAKE MTHB5007B

Dynamical meteorology is a core subject on which weather forecasting and the study of climate and climate change are based. This module applies fluid dynamics to the study of the circulation of the Earth's atmosphere. The fluid dynamical equations and some basic thermodynamics for the atmosphere are introduced. These are then applied to topics such as geostrophic flow, thermal wind and the jet streams, boundary layers, gravity waves, the Hadley circulation, vorticity and potential vorticity, Rossby waves, and equatorial waves. Emphasis will be placed on fluid dynamical concepts as well as on finding analytical solutions to the equations of motion.

2019/0 - MTHD6020A FLUID DYNAMICS

Autumn Semester, Level 6 module
(Maximum 75 Students)

UCU: 20 Organiser: Dr Richard Purvis

MODULE - 40% PASS ON AGGREGATE
Module Type: Examination with Coursework or Project
Timetable Slot:E, C1/

BEFORE TAKING THIS MODULE YOU MUST TAKE MTHA5002Y OR TAKE MTHB5006A OR TAKE ENV-5006A

Fluid dynamics has wide ranging applications across nature, engineering, and biology. From understanding the behaviour of ocean waves and weather, designing efficient aircraft and ships, to capturing blood flow, the ability to understand and predict how fluids (liquids and gasses) behave is of fundamental importance. You will consider mathematical models of fluids, particularly including viscosity (or stickiness) of a fluid. Illustrated by practical examples throughout, you will develop the governing differential Navier-Stokes equations, and then consider their solution either finding exact solutions, or using analytical techniques to obtain solutions in certain limits (for example low viscosity or high viscosity).