UNIVERSITY OF LEICESTER

Module Specification

MA1014 Calculus and Analysis

Academic Year: 2019/0
Module Level: Year 1
Scheme: UG
Department: Mathematics
Credits: 30

Student Workload (hours)

Lectures	66
Seminars	4
Practical Classes & Workshops	5
Tutorials	19
Fieldwork	
Project Supervision	
Guided Independent Study	196
Demonstration	
Supervised time in studio/workshop	10
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	300

Period: Academic Year
Occurence: E
Coordinator: Katrin Leschke
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Coursework	20				
002	Skills Tests	30				
003	Examination (final)	50		2		
103	Examination	100		2		Y

Intended Learning Outcomes

- Analyse limits and convergence (of functions/sequences/series)
- Apply and reproduce main theorems of Analysis and proofs
- Determine continuity/differentiability of functions of 1 or 2 variables
- Determine integrability of functions of 1 variable
- Integrate/differentiate a range of functions and solve a number of standard types of differential equations
- Reflect on and articulate motivations, strengths and experience of developing one or more transferable skills

Teaching and Learning Methods

Lectures, feedback lectures, weekly feedback classes for guidance with examples sheets, mixed-module surgeries, computer-aided learning. The module will provide explicit guidance on how to identify personal motivations, strengths and development areas, how to develop transferable skills, and how to record skills and experience in a basic CV. This will be delivered through a combination of course materials, appropriately contextualised instruction and experiential learning opportunities.

Assessment Methods

Coursework, tests, examination

Pre-Requisites

-

Co-Requisites

-

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Directed reading, computer practice, review of lecture recordings and lecture notes, project work, solving problem sheets/ workbooks, homework and examination revision.

Last Published: 17 November 2019

Module Specification

MA1061 Probability

Academic Year: 2019/0
Module Level: Year 1
Scheme: UG
Department: Mathematics
Credits: 10

Student Workload (hours)

Lectures	
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	

Period: Academic Year
Occurence: E
Coordinator: Bo Wang
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Coursework	20				
002	Class Test	20				
003	Examination (Final)	60		2		
103	Examination (Final)	100		2		Y

Intended Learning Outcomes

- Define basic concepts in probability and calculate probabilities, including those involving independence and conditional probabilities
- Explain what is meant by a random variable, discrete and continuous, and define the main functions of a random variable
- Describe and use Binomial, Poisson, Geometric and Normal distributions
- Explain the content and consequences of the DeMoivre-Laplace and Central Limit Theorems and apply to problems

Teaching and Learning Methods

Lectures, feedback lectures, weekly feedback classes for guidance with examples sheets, surgeries.

Assessment Methods

Exam, test, coursework

Pre-Requisites

-

Co-Requisites

-

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Directed reading, review of lecture recordings and lecture notes, practice for the test, solving problem sheets/workbooks, and preparing/revising for class test and examination.

Last Published: 17 November 2019

UNIVERSITY OF LEICESTER

Module Specification

MA1104 Elements of Number Theory

Academic Year: 2019/0
Module Level: Year 1
Scheme: UG
Department: Mathematics
Credits: 10

Student Workload (hours)

Lectures	
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	

Period: Semester 1
Occurence: E
Coordinator: Andrew Tonks
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Coursework (Final)	50				
002	Class test	50				
003	Project	100				Y

Intended Learning Outcomes

- Construct proofs by induction and well-ordering. Define and compute GCDs. Prove basic results on prime numbers and divisibility. Apply and understand the fundamental theorem of arithmetic.
- Solve problems using modular arithmetic, compute modular inverses. State and prove Fermat's little theorem.
- Encrypt and decrypt using the RSA cryptosystem

Teaching and Learning Methods

Lectures, problem sheets, class tests, feedback sessions, feedback lectures.

Assessment Methods

Coursework (can include group work), class tests

Pre-Requisites

-

Co-Requisites

-

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Directed reading, review of lecture recordings and lecture notes, solving problem sheets/workbooks, preparing for class tests, project work.

Last Published: 17 November 2019

UNIVERSITY OF LEICESTER

Module Specification

MA1114 Linear Algebra

Academic Year: 2019/0
Module Level: Year 1
Scheme: UG
Department: Mathematics
Credits: 30

Student Workload (hours)

Lectures	
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	

Period: Academic Year
Occurence: E
Coordinator: Julia Goedecke
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Coursework	20				
002	Skills Tests	30				
003	Examination (final)	50		2		
103	Examination	100		2		Y

Intended Learning Outcomes

- Apply and reproduce main theorems of Linear Algebra and proofs.
- Apply the concepts of vectors, linear independence, bases, subspaces and linear transformations in the context of abstract vector spaces as well as concrete problems.
- Calculate and manipulate vectors, matrices and determinants, inner products of vectors, eigenvalues and eigenvectors.

Teaching and Learning Methods

Lectures, feedback lectures, weekly feedback classes for guidance with examples sheets, mixed-module surgeries, computer-aided learning.

Assessment Methods

Coursework, Tests, Exam

Pre-Requisites

-

Co-Requisites

-

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Directed reading, computer practice, review of lecture recordings and lecture notes, solving problem sheets/workbooks, homework, examination revision, project work.

Last Published: 17 November 2019

UNIVERSITY OF LEICESTER

Module Specification

MA1202 Introductory Statistics

Academic Year: 2019/0
Module Level: Year 1
Scheme: UG
Department: Mathematics
Credits: 10

Student Workload (hours)

Lectures	
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	

Period: Semester 2
Occurence: E
Coordinator: Julia Goedecke
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	SKILLS TEST	20				
002	COURSEWORK	20				
003	EXAM (Final)	60		2		
103	EXAM (Final)	100		2		Y

Intended Learning Outcomes

- Explain basic statistical concepts and calculate properties of simple estimators
- Explain the concept of a confidence interval and apply in continuous and discrete cases
- Calculate properties of simple estimators, confidence intervals and construct statistical tests using R
- Explain the general procedures for statistical testing, apply tests and assess them

Teaching and Learning Methods

Lectures, feedback lectures, weekly feedback classes for guidance with examples sheets, surgeries.

Assessment Methods

Exam, Coursework

Pre-Requisites

-

Co-Requisites

-

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Directed reading, computer practice, review of recorded lectures, homework and examination revision

UNIVERSITY OF LEICESTER

Module Specification

MA1254 Mathematics in Business

Academic Year: 2019/0
Module Level: Year 1
Scheme: UG
Department: Mathematics
Credits: 10

Student Workload (hours)

Lectures
Seminars
Practical Classes & Workshops
Tutorials
Fieldwork
Project Supervision
Guided Independent Study
Demonstration
Supervised time in studio/workshop
Work Based Learning
Placement
Year Abroad
Total Module Hours

Period: Semester 2
Occurence: E
Coordinator: Clive Rix
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Reports and presentations (Final)	70				
002	IT problems	30				
101	Written reports and presentations	100				Y

Intended Learning Outcomes

- Undertake basic mathematical modelling in business, commercial and industrial environments
- Apply mathematical techniques to the solution of practical business problems
- Produce reports for non-mathematical audiences. Deliver presentations on their findings
- Demonstrate effective communication in group sessions
- Solve IT problems in business applications

Teaching and Learning Methods

Case studies, observed group sessions, seminars and practical demonstrations.

Assessment Methods

Reports, Presentations, IT problems

Pre-Requisites

-

Co-Requisites

-

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Working in groups on typical business problems, working indiviudally on typical business IT problems. Writing reports and preparing presentations.

Last Published: 17 November 2019

UNIVERSITY OF LEICESTER

Module Specification

MA1257 Mathematics and its Impact on Society

Academic Year: 2019/0
Module Level: Year 1
Scheme: UG
Department: Mathematics
Credits: 15

Student Workload (hours)

Lectures	
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	

Period: Semester 1
Occurence: E
Coordinator: Clive Rix
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Coursework	60				
002	Examination (final)	40		2		
102	Examination (final)	100		2		Y

Intended Learning Outcomes

- Demonstrate an understanding of the impact of mathematics on the society in which it evolves
- Explain how society impacts on mathematics and how mathematics can evolve very differently in different cultures
- Discuss the impact mathematics has on modern society by means of examples
- Ability to use electronic resources for research

Teaching and Learning Methods

Lectures, case studies, seminars

Assessment Methods

Exam, coursework, written assignments and computer-marked test

Pre-Requisites

-

Co-Requisites

-

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Directed reading, electronic research, preparation of a presentation and exam revision.

Last Published: 17 November 2019

UNIVERSITY OF LEICESTER

Module Specification

MA1272 Plane Geometry

Academic Year: 2019/0
Module Level: Year 1
Scheme: UG
Department: Mathematics
Credits: 10

Student Workload (hours)

Lectures	
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	

Period: Semester 2
Occurence: E
Coordinator: Tatiana Tyukina
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Tests	60				
002	Coursework (final)	40				
003	Examination	100		2		Y

Intended Learning Outcomes

- Construct basic proofs using the classical axioms of Euclidean geometry. Determine and prove congruency and similarity criteria for triangles.
- Prove and apply theorems about angles and chords in circles.
- Solve problems using the methods and results mentioned above, plus further appropriate theorems of Euclidean geometry.
- Use analytical techniques and coordinates to solve geometric problems.

Teaching and Learning Methods

Lectures, seminars, group work.

Assessment Methods

Coursework and test.

Pre-Requisites

-

Co-Requisites

-

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Solving problems individually and in groups, revision of lecture notes and recordings, revision for test.

Last Published: 17 November 2019

UNIVERSITY OF LEICESTER

Module Specification

MA1402 Business Macroeconomics

Academic Year: 2019/0
Module Level: Year 1
Scheme: UG
Department: Mathematics
Credits: 15

Student Workload (hours)

Lectures	
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	

Period: Semester 2
Occurence: E
Coordinator: Nick Foster
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Exam (final)	70		2		
002	Mini project	30				
003	Examination	100		2		Y

Intended Learning Outcomes

- Discuss relevance of economics to business
- Assess main strands of economic thinking
- Analyse recent macroeconomic history
- Discuss relationship between government, markets and firms
- Assess how macroeconomic policies impact business

Teaching and Learning Methods

Lectures/workshops weekly, plus one feedback class per week to go through regular (non-assessed) coursework and a project class fortnightly to prepare students for tackling a real-life piece of economic analysis.

Assessment Methods

Exam and project

Pre-Requisites

-

Co-Requisites

-

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Literature review, economic modelling, problem sheets, reviewing lecture recordings, writing project report and exam revision.

Last Published: 17 November 2019

UNIVERSITY OF LEICESTER

Module Specification

MA1407 Business Microeconomics

Academic Year: 2019/0
Module Level: Year 1
Scheme: UG
Department: Mathematics
Credits: 15

Student Workload (hours)

Lectures	
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	

Period: Semester 1
Occurence: E
Coordinator: Leena Sodha
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Exam (final)	70		2		
002	Mini project	30				
102	Exam	100				Y

Intended Learning Outcomes

- Discuss relevance of economics to business
- Assess main strands of economic thinking
- Discuss competitive markets
- Discuss consumer demand and behaviour
- Discuss the efficient operation of a firm and demonstrate an awareness of associated policies and strategies

Teaching and Learning Methods

Lectures/workshops will be given each week, plus one feedback class per week to go through regular (non-assessed) coursework and a project class fortnightly to prepare students for tackling a real-life piece of economic analysis.

Assessment Methods

Exam and project

Pre-Requisites

-

Co-Requisites

-

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Literature review, economic modelling, problem sheets, writing project report and exam revision.

Last Published: 17 November 2019

UNIVERSITY OF LEICESTER

Module Specification

MA2021 Differential Equations and Dynamics

Academic Year: 2019/0
Module Level: Year 2
Scheme: UG
Department: Mathematics
Credits: 20

Student Workload (hours)

Lectures	
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	

Period: Semester 2
Occurence: E
Coordinator: Ivan Tyukin
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Coursework	30				
003	Examination (Final)	70		2		
103	Examination (Final)	100		2		Y

Intended Learning Outcomes

- Explain the differences between classes of differential equations
- Analyse initial value problems in order to determine whether or not they have unique solutions
- State, explain, and prove basic existence and uniqueness theorems
- Use and apply methods for finding general solutions of ordinary differential equations
- Apply and write programs for finding numerical solutions of ordinary differential equations

Teaching and Learning Methods

Lectures, feedback classes, computer classes, automated computer assignments

Assessment Methods

Final exam, coursework (problem sheets, computer assignments)

Pre-Requisites

-

Co-Requisites

-

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Directed reading, working on problem sheets, reviewing lecture recordings, preparing reports on computer practical assignments, revision for final exam

Last Published: 17 November 2019

UNIVERSITY OF LEICESTER

Module Specification

MA2032 Calculus and Analysis 3

Academic Year: 2019/0
Module Level: Year 2
Scheme: UG
Department: Mathematics
Credits: 20

Student Workload (hours)

Lectures	
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	

Period: Semester 1
Occurence: E
Coordinator: Sergei Petrovskiy
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Examination (Final)	70		2		
002	Coursework	30				
101	Examination (Final)	100		2		Y

Intended Learning Outcomes

- Differentiate and integrate vector valued functions, use Cartesian, polar and spherical coordinates with the corresponding Jacobians to calculate the change of variables.
- Compute line, path, surface and volume integrals of scalar and vector functions in two and three dimensions, apply Stokes, Green and Divergence theorems
- Use Taylor series for multivariable functions and perform estimates based on Taylor series, make calculations with basic Fourier series and use Parseval's theorem.

Teaching and Learning Methods

Lectures, feedback classes, computer-aided learning, problem sheets sheets.

Assessment Methods

Examination, coursework

Pre-Requisites

-

Co-Requisites

-

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Directed reading, reviewing of lecture recordings, solving coursework problems, exam revision.

Last Published: 17 November 2019

UNIVERSITY OF LEICESTER

Module Specification

MA2132 Linear Algebra 3

Academic Year: 2019/0
Module Level: Year 2
Scheme: UG
Department: Mathematics
Credits: 10

Student Workload (hours)

Lectures	
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	

Period: Semester 1
Occurence: E
Coordinator: Alexander Baranov
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Examination (Final)	70		2		
003	Coursework	30				
101	Examination	100		2		Y

Intended Learning Outcomes

- Apply and reproduce main theorems of Advanced Linear Algebra and proofs.
- Calculate the minimal polynomial and Jordan normal form of a matrix.
- Diagonalise matrices and define when this is possible.
- Diagonalise normal operators and quadratic forms

Teaching and Learning Methods

Lectures, problem classes and feedback lectures

Assessment Methods

Coursework and Exam

Pre-Requisites

-

Co-Requisites

-

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Directed reading, reviewing of lecture recordings, solving coursework problems, exam revision.

UNIVERSITY OF LEICESTER

Module Specification

MA2133 Algebra

Academic Year: 2019/0
Module Level: Year 2
Scheme: UG
Department: Mathematics
Credits: 20

Student Workload (hours)

Lectures	
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	

Period: Semester 2
Occurence: E
Coordinator: Teimuraz Pirashvili
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Coursework	30				
002	Examination (Final)	70		2		
003	Examination (Final)	100		2		Y

Intended Learning Outcomes

- Perform calculations in the context of groups and rings, especially in cyclic, dihedral and symmetric groups
- Define and apply the key concepts, including to investigate cosets, quotient groups and quotient rings
- Use Lagrange's theorem in order to find subgroups
- Apply the theorems in the module to solve problems

Teaching and Learning Methods

Lectures, feedback classes, continuous assessment based on written coursework, written exam.

Assessment Methods

Coursework and exam

Pre-Requisites

-

Co-Requisites

-

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Directed reading, reviewing lecture recordings, solving coursework problems, exam revision

UNIVERSITY OF LEICESTER

Module Specification

MA2206 Statistical Data Analysis

Academic Year: 2019/0
Module Level: Year 2
Scheme: UG
Department: Mathematics
Credits: 15

Student Workload (hours)

Lectures	
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	

Period: Semester 2
Occurence: E
Coordinator: Leena Sodha
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Coursework	30				
002	Examination (Final)	70		2		
003	Examination	100		2		Y

Intended Learning Outcomes

- Summarise data using appropriate statistical analysis, descriptive statistics and graphical presentation
- Describe, apply and interpret the results of the linear regression model and generalised linear models
- Explain the fundamental concepts of Bayesian statistics, use them to compute Bayesian estimators, and apply to credibility theory

Teaching and Learning Methods

Lectures, seminars, tutorials, Computer practical classes

Assessment Methods

Examination and coursework (problem sheets, computer assignments)

Pre-Requisites

MA2403

Co-Requisites

-

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Directed reading, computer practice, solving coursework problems and examination revision.

Last Published: 17 November 2019

UNIVERSITY OF LEICESTER

Module Specification

MA2252 Introduction to Computing

Academic Year: 2019/0
Module Level: Year 2
Scheme: UG
Department: Mathematics
Credits: 10

Student Workload (hours)

Lectures	
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	

Period: Semester 2
Occurence: E
Coordinator: Ruslan Davidchack
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
004	Coursework	100				

Intended Learning Outcomes

- Demonstrate knowledge of the main components of a programming language: variables, assignment, mathematical and logical operations.
- Demonstrate algorithmic thinking in designing procedures for completing computational tasks.
- Program simple numerical algorithms in Matlab.
- Analyse simple numerical methods and predict their performance.

Teaching and Learning Methods

Lectures, computer workshops and feedback sessions

Assessment Methods

Coursework (computer assignments, class test, computational project).

Pre-Requisites

-

Co-Requisites

-

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Directed reading, review of lecture recordings, working on solutions to computer assignments, preparing for the test.

UNIVERSITY OF LEICESTER

Module Specification

MA2261 Linear Statistical Models

Academic Year: 2019/0
Module Level: Year 2
Scheme: UG
Department: Mathematics
Credits: 20

Student Workload (hours)

Lectures	
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	

Period: Semester 1
Occurence: E
Coordinator: Simona Paoli
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Coursework	30				
002	Examination (Final)	70		2		
003	Examination	100		2		Y

Intended Learning Outcomes

- Fit multiple linear regression models to datasets
- Fit one way analysis of variance models to data
- Demonstrate an understanding of the theory of multiple linear regression

Teaching and Learning Methods

Lectures, problem classes and feedback lectures

Assessment Methods

Coursework and examination

Pre-Requisites

MA1061, MA1202

Co-Requisites

-

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Working through problems, studying lectures notes, reviewing lecture recordings, using statistical software, exam revision

Last Published: 17 November 2019

UNIVERSITY OF LEICESTER

Module Specification

MA2401 Actuarial Modelling 1

Academic Year: 2019/0
Module Level: Year 2
Scheme: UG
Department: Mathematics
Credits: 20

Student Workload (hours)

Lectures	
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	

Period: Semester 1
Occurence: E
Coordinator: Stephen Garrett
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Examination (Final)	70		2		
002	Coursework	30				
003	Examination (Final)	100		2		Y

Intended Learning Outcomes

- Apply and understand the basics of modelling and data treatment
- Apply the theory of interest to different scenarios
- Price, reserve and appraise different cashflows, using an equation of value

Teaching and Learning Methods

Lectures, feedback classes, computer practical classes

Assessment Methods

Exam and coursework

Pre-Requisites

-

Co-Requisites

-

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Directed reading, feedback classes, computer practice, homework and examination revision.

Last Published: 17 November 2019

UNIVERSITY OF LEICESTER

Module Specification

MA2402 Business Finance

Academic Year: 2019/0
Module Level: Year 2
Scheme: UG
Department: Mathematics
Credits: 20

Student Workload (hours)

Lectures	
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	

Period: Semester 2
Occurence: E
Coordinator: Leena Sodha
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Examination (Final)	70		2		
002	Coursework	30				
003	Exam	100		2		Y

Intended Learning Outcomes

- Discuss the fundamental framework of corporate finance and governance
- Explain appropriate ways to finance a company
- Construct and analyse financial statements of companies and financial institutions
- Prepare and interpret management information

Teaching and Learning Methods

Lectures, feedback class, regular (non assessed coursework) and a project class to prepare students for tackling real-life business problems

Assessment Methods

Examination, coursework

Pre-Requisites

-

Co-Requisites

-

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Directed reading, feedback classes, homework annd exam revision

UNIVERSITY OF LEICESTER

Module Specification

MA2403 Statistical Distributions and Inference

Academic Year: 2019/0
Module Level: Year 2
Scheme: UG
Department: Mathematics
Credits: 15

Student Workload (hours)

Lectures	
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	

Period: Semester 1
Occurence: E
Coordinator: Nigel Sell
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
002	Coursework	30				
003	Exam	100		2		Y
004	Examination (Final)	70		2		

Intended Learning Outcomes

- Describe essential features of statistical distributions
- Summarise data, using statistical analysis, descriptive statistics and graphical presentations
- Describe and apply principles of statistical inference

Teaching and Learning Methods

Lectures/workshops, feedback class to go through regular (non-assessed) coursework and a project class to prepare students for tackling a real-life piece of statistical analysis.

Assessment Methods

Examination and coursework

Pre-Requisites

MA1061, MA1202

Co-Requisites

-

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Literature review, economic modelling, problem sheets and exam revision

UNIVERSITY OF LEICESTER

Module Specification

MA2404 Markov Processes

Academic Year: 2019/0
Module Level: Year 2
Scheme: UG
Department: Mathematics
Credits: 20

Student Workload (hours)

Lectures	
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	

Period: Semester 1
Occurence: E
Coordinator: Bogdan Grechuk
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Examination (Final)	70		2		
002	Coursework	30				
003	Exam	100		2		Y

Intended Learning Outcomes

- Describe general principles of risk modelling
- Describe and classify stochastic processes
- Define and apply a Markov chain
- Define and apply a Markov process
- Explain and apply elementary principles of machine learning

Teaching and Learning Methods

Lectures, problem classes, tutorials. Written examination, independent research project/case-study report.
Students will be provided with material written specifically for the module. Three lectures per week will be used to teach the details of the material. Students are further supported with 1 feedback class per week.

Assessment Methods

2 hour written exam. Substantial independent research project/case-study report which is an individual open-ended task which requires the student to demonstrate self-direction and originality in tackling and solving problems, and act autonomously in planning and implementing tasks at a professional level. The project is 20% of the module mark. 2 in-class tests costing 5% each.

Pre-Requisites

-

Co-Requisites

-

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Reading lecture notes, view lecture recording, solve practice questions presented in lecture notes, coursework questions, and past exam questions. Working on project.

UNIVERSITY OF LEICESTER

Module Specification

MA2405 Actuarial Modelling 2

Academic Year: 2019/0
Module Level: Year 2
Scheme: UG
Department: Mathematics
Credits: 15

Student Workload (hours)

Lectures	
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	

Period: Semester 2
Occurence: E
Coordinator: Bo Wang
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Coursework	30				
002	Examination (Final)	70		2		
003	Examination	100		2		Y

Intended Learning Outcomes

- Define standard actuarial notation and fundamental life contracts
- Describe and model various life contracts, calculating associated quantities
- Value cashflows dependent on death, survival or other uncertain risks
- Discuss factors affecting mortality and morbidity rates

Teaching and Learning Methods

Lectures, feedback classes, computer practical classes

Assessment Methods

Examination and coursework

Pre-Requisites

MA2401

Co-Requisites

-

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Directed reading, computer practice, homework and examination revision.

Last Published: 17 November 2019

UNIVERSITY OF LEICESTER

Module Specification

MA2414 Mortality Modelling

Academic Year: 2019/0
Module Level: Year 2
Scheme: UG
Department: Mathematics
Credits: 10

Student Workload (hours)

Lectures	
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	

Period: Semester 2
Occurence: E
Coordinator: Andrey Morozov
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Examination (Final)	70		2		
002	Coursework	30				
003	Exam	100		2		Y

Intended Learning Outcomes

- Demonstrate the concepts underlying time series models and their applications
- Explain the concept of survival models; Describe estimation procedures for lifetime distributions
- Derive maximum likelihood estimators for transition intensities.
- Estimate transition intensities dependent on age
- Demonstrate graduation and graduation tests; Mortality Projections

Teaching and Learning Methods

Lectures, problem classes, tutorials. Assessment includes exam and mini-project.

Assessment Methods

Examination; coursework

Pre-Requisites

-

Co-Requisites

-

Excluded Combinations

-

Guided Independent Study: Indicative Activities

-

Last Published: 17 November 2019

UNIVERSITY OF LEICESTER

Module Specification

MA2510 Investigations in Mathematics

Academic Year: 2019/0
Module Level: Year 2
Scheme: UG
Department: Mathematics
Credits: 10

Student Workload (hours)

Lectures	
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	

Period: Semester 1
Occurence: E
Coordinator: Andrew Tonks
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Coursework (Final)	60		0		
003	Written Report	40				
004	Written Report	100				Y

Intended Learning Outcomes

- Explain the key points of the chosen topic and write a clear, logical report on the topic
- Demonstrate effective communication in group meetings
- Give a group presentation on the chosen topic

Teaching and Learning Methods

Seminars based on the topic of student's choice from a list of topics. Poster presentation, group presentation and a written report on the module.

Assessment Methods

Coursework (group work, presentation), written report

Pre-Requisites

-

Co-Requisites

-

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Directed reading, literature search, preparing poster presentation and writing a report

Last Published: 17 November 2019

UNIVERSITY OF LEICESTER

Module Specification

MA2511 Business Applications of Mathematics

Academic Year: 2019/0
Module Level: Year 2
Scheme: UG
Department: Mathematics
Credits: 10

Student Workload (hours)

Lectures	
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	

Period: Semester 2
Occurence: E
Coordinator: Clive Rix
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Coursework (Final)	100		0		

Intended Learning Outcomes

- Demonstrate knowledge of business terminology and the types of strategic issues that have to be addressed, and formulate strategic business plans
- Conduct formal meetings, set agendas, chair meetings and take minutes
- Apply mathematical techniques to real practical problems proposed by local and regional companies
- Compile reports relating to the business case studies for presenting to the client and give a presentation reflecting on experience of topics covered
- Articulate academic skills for graduate employment; produce an effective CV targeted towards a jobs advertisement/person specification

Teaching and Learning Methods

A competitive business management simulation exercise, undertaken in groups; case studies in groups, seminars and practical demonstrations; guidance on production of an effective CV and job interviews

Assessment Methods

Coursework (business management exercise, case studies, group work, employability skills)

Pre-Requisites

-

Co-Requisites

-

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Working in groups, holding formal meetings, writing reports and preparing presentations on case studies and for the Business Management Simulation Exercise. Working individually on CVs and individual reflective presentations.

Last Published: 17 November 2019

UNIVERSITY OF LEICESTER

Module Specification

MA2514 Actuarial Professional Skills and Employability

Academic Year: 2019/0
Module Level: Year 2
Scheme: UG
Department: Mathematics
Credits: 15

Student Workload (hours)

Lectures	
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	

Period: Semester 1
Occurence: E
Coordinator: Nick Foster
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
002	Coursework	100				

Intended Learning Outcomes

- Develop communication skills and teamworking skills
- Develop business awareness and employability skills
- Explain current issues in actuarial/financial sector
- Reflect on and articulate motivations, strengths and skills in relation to a future, work-related learning opportunity (e.g. placement, internship, employer-led project)
- Develop and understanding of the importance of professionalism

Teaching and Learning Methods

Guest speakers. Students are then required to reflect on those issues raised and prepare a short piece of work in response. Some aspects of group work will be incorporated. The module will provide explicit guidance on how to relate strengths, transferable skills and motivations to a professional opportunity, how to evaluate results from a psychometric test, and how to produce a tailored application (e.g. tailored CV and cover letter). This will be delivered through a combination of course materials and appropriately contextualised instruction.

Assessment Methods

Coursework

Pre-Requisites

-

Co-Requisites

-

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Company research, writing applications to companies, preparing group and individual presentations. On-line materials to support completion of Leicester Award Gold qualifying activities. Workshops on exploring career options and application and selection processes.

Last Published: 17 November 2019

UNIVERSITY OF LEICESTER

Module Specification

MA3002 Equations of Mathematical Physics

Academic Year: 2019/0
Module Level: Year 3
Scheme: UG
Department: Mathematics
Credits: 20

Student Workload (hours)

Lectures	30
Seminars	10
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	160
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	0
Total Module Hours	200

Period: Semester 1
Occurence: E
Coordinator: Nikolai Brilliantov
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Weekly Exercises	20				
002	Examination (Final)	80		3		
005	Examination (Final)	100		3		Y

Intended Learning Outcomes

To apply the classification of linear partial differential equations, in order to apply the basic methods of its solution for one, two and three dimensions. To apply the concepts of eigenfunctions, eigenvalues, and a Green function in solution of partial differntial equation of hyperbolic, parabolic and elliptic types. To use the Fourier series and some special functions in solving partial differential equation on domains of different geometry. To derive some basic equation of matematical physics of hyperbolic, parabolic and analyse the limits of its applications.

Teaching and Learning Methods

Lectures, feedback classes

Assessment Methods

There will be an intermediate 1 hour test based on the weekly problem sheets and 3 hour examination. It will have 4 questions with full marks obtained by correctly answering 4 of them.

Pre-Requisites

MA2021

Co-Requisites

MA1051

Excluded Combinations

-

Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

MA3012 Scientific Computing

Academic Year: 2019/0
Module Level: Year 3
Scheme: UG
Department: Mathematics
Credits: 20

Student Workload (hours)

Lectures	20
Seminars	
Practical Classes & Workshops	20
Tutorials	10
Fieldwork	
Project Supervision	
Guided Independent Study	150
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	0
Total Module Hours	200

Period: Semester 1
Occurence: E
Coordinator: Ruslan Davidchack
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Coursework	30				
002	Examination (Final)	70		2		
005	Exam (Final)	100		2		Y

Intended Learning Outcomes

Students should be able to utilise advanced methods of scientific computing in order to
- Solve linear systems of equations
- Solve nonlinear equations and systems of equations
- Interpolate functions using polynomials and trigonometric functions (Fourier transform)
- Calculate numerical approximations of derivatives and integrals of functions
- Construct and analyse numerical methods for solving ordinary differential equations

Teaching and Learning Methods

Lectures, feedback classes, instructor-assisted computer lab sessions, revision problem sheets.

Assessment Methods

Coursework: Computer assignments, revision sheets.
Exam: Two hour final examination

Pre-Requisites

MA2032, MA2132, MA2252

Co-Requisites

MA2021

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Last Published: 17 November 2019

UNIVERSITY OF LEICESTER

Module Specification

MA3071 Financial Mathematics I

Academic Year: 2019/0
Module Level: Year 3
Scheme: UG
Department: Mathematics
Credits: 20

Student Workload (hours)

Lectures	30
Seminars	14
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	156
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	200

Period: Semester 1
Occurence: E
Coordinator: Sergey Utev
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Examination (Final)	100		3		

Intended Learning Outcomes

On completion of this module, students will be able to apply the basic concepts and instruments of financial market, the main concepts of probability and stochastic processes, will be able to use the knowledge of probability & stochastics to analyse different models of financial market.

Teaching and Learning Methods

Lectures and surgeries with some handouts

Assessment Methods

3 hour written examination

Pre-Requisites

MA1061, MA2021

Co-Requisites

Excluded Combinations

-

Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

MA3074 Actuarial Mathematics

Academic Year: 2019/0
Module Level: Year 3
Scheme: UG
Department: Mathematics
Credits: 20

Student Workload (hours)

Lectures	20
Seminars	10
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	170
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	0
Total Module Hours	200

Period: Semester 1
Occurence: E
Coordinator: Andrey Mudrov
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Examination (Final)	100		3		

Intended Learning Outcomes

On completion of this module, students will apply cashflow models to financial and business scenarios, and be able to understand standard actuarial notation and fundamental financial concepts. The student will have a clear understanding of the role of actuaries in the financial sector.

The student will also practice the ability to self study - an important skill for lifelong learning in any chosen profession.

Teaching and Learning Methods

Students will be provided with material written specifically for self study which will be paced across the semester. One lecture will be given per week and the onus is on self study. This study will be supported via electronic means on blackboard. One example class per week will be given to go through regular (non-assessed) coursework.

Assessment Methods

The assessment for this module will consist of a 3hr examination on unseen questions.

Pre-Requisites

MA1061

Co-Requisites

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Last Published: 17 November 2019

UNIVERSITY OF LEICESTER

Module Specification

MA3077 Operational Research

Academic Year: 2019/0
Module Level: Year 3
Scheme: UG
Department: Mathematics
Credits: 20

Student Workload (hours)

Lectures	30
Seminars	
Practical Classes & Workshops	8
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	158
Demonstration	4
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	200

Period: Semester 1
Occurence: E
Coordinator: Ivan Tyukin
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Coursework	50				
002	Examination (Final)	50		2		
005	Examination (Final)	100		2		Y

Intended Learning Outcomes

The students will be able to formulate, and classify linear and nonlinear optimization problems. With regards to linear optimization (programming), they will be able to apply the theory of the simplex method, and be able to use the method for solving problems with linear cost functions and constraints in the form of a convex polyhedron. In addition, the students will apply techniques and methods for solving one-dimensional and multi-dimensional constrained and unconstrained nonlinear optimization problems. The students will be able to solve shortest path and minimal-tree problems, and should know basic notions and concepts from the theory of games. Application of programming skills to production of algorithms in VBA.

Teaching and Learning Methods

Lectures, feedback classes, computer practicals, automated computer assignments, plus optional VBA classes

Assessment Methods

Class tests, written reports on computer practicals, final exam, computer demonstration. Class computer test on linear programming and networks.

Pre-Requisites

Co-Requisites

Excluded Combinations

-

Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

MA3101 Squaring the Circle and Irreducible Polynomials

Academic Year: 2019/0
Module Level: Year 3
Scheme: UG
Department: Mathematics
Credits: 20

Student Workload (hours)

Lectures	30
Seminars	
Practical Classes & Workshops	10
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	160
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	200

Period: Semester 2
Occurence: E
Coordinator: Alexander Baranov
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Coursework	20				
002	Examination (Final)	80		2		
005	Examination (Final)	100		2		Y

Intended Learning Outcomes

Construct and work with factor rings.
Prove and to use tests for irreducibility.
Relate irreducible elements and maximal ideal in the ring of polynomials over a field.
Explain the significance and properties of the minimal polynomial.
Construct extension fields and use the concept of the degree of an extension.
Apply the concepts introduced in the course to ruler and compass constructions.
Solve the three classical Greek questions discussed in this moduels.

Teaching and Learning Methods

Lectures and feedback classes

Assessment Methods

Examination and group project with WIKI entry creation or poster presentation.

Pre-Requisites

MA1112, MA1113, MA2133

Co-Requisites

none

Excluded Combinations

-

Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

MA3121 Complex Analysis

Academic Year: 2019/0
Module Level: Year 3
Scheme: UG
Department: Mathematics
Credits: 20

Student Workload (hours)

Lectures	30
Seminars	5
Practical Classes & Workshops	
Tutorials	10
Fieldwork	
Project Supervision	
Guided Independent Study	155
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	200

Period: Semester 2
Occurence: E
Coordinator: Jeremy Levesley
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Examination (Final)	50		2		
002	Test	50				
005	Examination (Final)	100		2		Y

Intended Learning Outcomes

Students should know and be able to apply the key concepts of this module:
Holomorphic functions, path integrals, Taylor and Laurent series, singularities and residues of complex functions. Students should be able to explain the main proofs given in the lectures and be able to
determine whether a complex function is differentiable, define and evaluate path integrals, find Taylor and Laurent expansions of complex functions, calculate residues and use the residue theorem to evaluate real integrals and sums of real series.

Teaching and Learning Methods

Lectures and feedback classes, coursework.

Assessment Methods

Class test and written exam

Pre-Requisites

MA1012, MA1013

Co-Requisites

none

Excluded Combinations

-

Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

MA3152 Curves and Surfaces

Academic Year: 2019/0
Module Level: Year 3
Scheme: UG
Department: Mathematics
Credits: 20

Student Workload (hours)

Lectures	30
Seminars	
Practical Classes & Workshops	
Tutorials	10
Fieldwork	
Project Supervision	
Guided Independent Study	160
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	200

Period: Semester 1
Occurence: E
Coordinator: Katrin Leschke
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Group Project (Final)	30				
002	Skills test	40				
003	Class test	30				
007	Examination	100		2		Y

Intended Learning Outcomes

To know the definitions and the key concepts of curves and surfaces.
To be able to reproduce and apply the main results and proofs given in the module.
To demonstrate familiarity with the topic and to be able to solve routine problems.
To know how to connect visual information with geometric properties.
To be able to produce mathematical exhibits and to communicate mathematical content to non-experts.
To be able to apply methods of the module to investigate new geometric situations.

Teaching and Learning Methods

Lectures, feedback classes, example sheets, group project

Assessment Methods

Written skills test, computer tests, group project

Pre-Requisites

MA2032, MA2132

Co-Requisites

none

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Last Published: 17 November 2019

Module Specification

MA3153 Number Theory

Academic Year: 2019/0
Module Level: Year 3
Scheme: UG
Department: Mathematics
Credits: 20

Student Workload (hours)

Lectures	30
Seminars	
Practical Classes & Workshops	
Tutorials	10
Fieldwork	
Project Supervision	
Guided Independent Study	160
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	200

Period: Semester 2
Occurence: E
Coordinator: Frank Neumann
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Examination (Final)	90		2		
002	Group Work	10				
005	Examination	100		2		Y

Intended Learning Outcomes

To define the definitions and the key concepts of elementary number theory and to be able to reproduce and apply the main results and proofs given in the module. To define how to formulate number theoretical problems in rigorous mathematical language. To demonstrate familiarity with the topic and to be able to solve routine problems.

Teaching and Learning Methods

Lectures, feedback classes, group work

Assessment Methods

Group work, written examination

Pre-Requisites

MA1104

Co-Requisites

-

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Last Published: 17 November 2019

UNIVERSITY OF LEICESTER

Module Specification

MA3201 Generalized Linear Models

Academic Year: 2019/0
Module Level: Year 3
Scheme: UG
Department: Mathematics
Credits: 20

Student Workload (hours)

Lectures	30
Seminars	
Practical Classes & Workshops	10
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	160
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	200

Period: Semester 2
Occurence: E
Coordinator: Simona Paoli
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Coursework	20				
002	Examination (Final)	80		3		
005	Examination	100		3		Y

Intended Learning Outcomes

Students will be able to apply the assumptions made in using the generalized linear regression model and be able to calculate confidence intervals and use hypothesis tests for model parameters. They will also be able to assess the fit of a log-linear model using a nested hierarchy of log-linear models.

Teaching and Learning Methods

Class sessions with some handouts.

Assessment Methods

Marked problem sheets and examination.

Pre-Requisites

MA1202, MA2261, MA2262

Co-Requisites

none

Excluded Combinations

-

Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

MA3206 Actuarial Statistics

Academic Year: 2019/0
Module Level: Year 3
Scheme: UG
Department: Mathematics
Credits: 20

Student Workload (hours)

Lectures	30
Seminars	
Practical Classes & Workshops	11
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	159
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	200

Period: Semester 1
Occurence: E
Coordinator: Nick Foster
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Exam	70		2		
002	Case Study	30				
003	Examination	100		2		Y

Intended Learning Outcomes

Students will explain the idea of Bayesian statistics and calculate the posterior distribution and Bayesian estimation.
Students will discuss the creditbility approach and demonstrate how Bayesian statistics is applied in credibility theory.
Students will apply the statistics and theory are applied to the actuarial industry.
They will develop independent research and problem solving skills.
Motivate the use of GLM in a financial context. Reproduce underlying mathematics. Apply in standard situations.
Motivate the use of time series methods. Reproduce underlying mathematics. Apply in standard situations.
Motivate the use of Monte Carlo simulations. Reproduce underlying mathematics. Modify existing simulations.
Full syllabus from www.actuaries.org.uk/students/pages/syllabus-exams (CT6 from (v), (vii), (viii), (ix)).

Teaching and Learning Methods

Students will be provided with material written specifically for this module. Three lectures per week will be given. Students will be further supported with one problem class per week. An individual open ended case study that requires the student to demonstrate self direction and originality in tackling and solving problems will be set.

Assessment Methods

2 hour written exam intended to assess technical skills.
A substantial independent research project/case study report. This is an individual open ended task which requires the student to demonstrate self direction and originality in tackling and solving problems and to act autonomously in planning and implementing the tasks at a professional level. It is also intended to develop the students transferable skills in line with QAA.

Pre-Requisites

Co-Requisites

Together with MA2266 this module covers the full CT6 syllabus

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Independent mini project work, assignments, exam preparation.

UNIVERSITY OF LEICESTER

Module Specification

MA3405 Actuarial Products and Liabilities

Academic Year: 2019/0
Module Level: Year 3
Scheme: UG
Department: Mathematics
Credits: 20

Student Workload (hours)

Lectures	30
Seminars	11
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	159
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	200

Period: Semester 2
Occurence: E
Coordinator: Bo Wang
Mark Scheme: UG Honours Level Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Examination	70		2		
002	Project	30				

Intended Learning Outcomes

Define standard actuarial notation and fundamental life contracts;
Use mathematical methods to describe and model various life contracts;
Calculate the associated quantities in varios life contracts;
Value cashflows dependent on death, survival or other uncertain risks
Discuss factors affecting mortality and morbidity rates.
Full syllabus CT5: http://www.actuaries.org.uk/students/pages/syllabus-exams

Teaching and Learning Methods

Students will be provided with material specifically written for this module. Three lectures per week will be used to teach the details of the material (shared with MSc students on MA7405). Students are further supported with one problem class per week.

Assessment Methods

2 hour written exam intended to assess technical skills
Substantial independent research project/case study report. This is an individual open ended task which requires the student to demonstrate self direction and originality in tackling and solving problems and act autonomously in planning and implementing tasks at a professional level. It is also intended to develop the students transferrable skills in line with QAA descriptors.

Pre-Requisites

CT1, CT3, CT4

Co-Requisites

Excluded Combinations

-

Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

MA3418 Financial Engineering

Academic Year: 2019/0
Module Level: Year 3
Scheme: UG
Department: Mathematics
Credits: 20

Student Workload (hours)

Lectures	30
Seminars	
Practical Classes & Workshops	11
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	159
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	200

Period: Semester 2
Occurence: E
Coordinator: Aihua Zhang
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Examination	70		2		
002	Case Study	30				

Intended Learning Outcomes

On completion of this module students will be able to:
Describe and discuss the application of utility theory to economic and financial problems.
Discuss the advantages and disadvantages of different measures of investment risk.
Describe and discuss the assumptions of mean-variance portfolio theory and its principal results.
Describe and discuss the properties of single and multifactor models of asset returns.
Describe asset pricing models, discussing the principal results and assumptions and limitations of such models.
Discuss the various forms of the Efficient Markets Hypothesis and discuss the evidence for and against the hypothesis.
Demonstrate a knowledge and understanding of stochastic models of the behaviour of security prices.
These map to components (i)- (vii) of the latest CT8 syllabus. The full CT8 syllabus can be found from the link www.actuaries.org.uk/studying/prepare-your-exams/syllabus-and-changes-syllabus

Teaching and Learning Methods

Students will be provided with material written specifically for this module. Three lectures per week (shared with MSc students on MA7418) will be used to teach the details of the material. Students are further supported with one problem class per week (shared with MSc students). An individual open ended case study that requires the student to demonstrate self-direction in tackling and solving problems will be set.

Assessment Methods

2 hour written exam intended to assess technical skills
Substantial independent research project / case study report

Pre-Requisites

Co-Requisites

Excluded Combinations

-

Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

MA3511 Communicating Mathematics

Academic Year: 2019/0
Module Level: Year 3
Scheme: UG
Department: Mathematics
Credits: 20

Student Workload (hours)

Lectures	16
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	124
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	60
Placement	
Year Abroad	0
Total Module Hours	200

Period: Semester 2
Occurence: E
Coordinator: Stephen Garrett
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Coursework (Final)	100				

Intended Learning Outcomes

1. Apply presentation skills,
2. Demonstrate the ability to select information appropriately for presentation to a target audience,
3. Demonstrate skills in analysing mathematical information from books or journals,
4. Demonstrate writing skills,
5. Demonstrate the ability to work effectively in a team setting,
6. Demonstratethe ability to apply knowledge in ways that are relevant to the learning environment,
7. Demonstrate the ability to critically evaluate communication skills within a school/university setting.

Teaching and Learning Methods

Seminars and in school/university experience.

Assessment Methods

The placement component of the coursework will be assessed via your written evaluation of your special project, and an assessment by the member of staff with whom you worked. In total this counts for 55% of the mark.
The taught university component counts for 45% and will be assessed via written work, oral presentations, and groupwork.

Pre-Requisites

{IMPORTANT NOTE}: Any student who wishes to take this module MUST complete an application form prior to being interviewed and accepted. Electronic application forms will sent directly to students who have chosen the module by the central School and College Services team. It is expected that interviews will take place before the end of term in March 2019. DBS checks and training must be completed in semester 1 in preparation for placement in schools in semester 2. The student will have to cover the cost of the DBS check.

Co-Requisites

none

Excluded Combinations

Guided Independent Study: Indicative Activities

Module Specification

MA3513 Mathematics Business Project

Academic Year: 2019/0
Module Level: Year 3
Scheme: UG
Department: Mathematics
Credits: 20

Student Workload (hours)

Lectures	5
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	10
Guided Independent Study	175
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	10
Placement	
Year Abroad	
Total Module Hours	200

Period: Semester 2
Occurence: E
Coordinator: Alexander Baranov
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous assessment	100				

Intended Learning Outcomes

Students will be able to identify and mathematically model a problem in business. They will be able to apply simple programming with appropriate software. They will be able to implement a mathematical algorithm for solving the problem if appropriate. They will be able to test and evaluate the end product and document the process. They will present their findings as to a director of a company.
Students will complete a project with a supervisor from local business.
Students will demonstrate academic integrity in their submitted work through appropriate use of academic citation and referencing conventions in their discipline

Teaching and Learning Methods

Individual supervision.

Assessment Methods

Assessment methods:
Project Plan
Case Study
Oral Presentation
Project report
External Client Score

Pre-Requisites

Co-Requisites

Excluded Combinations

-

Guided Independent Study: Indicative Activities

- Learning to code in VBA, Python or R
- Learning to use packages such as tensorflow
- Report writing
- Developing a good presentation

Last Published: 17 November 2019

UNIVERSITY OF LEICESTER

Module Specification

MA3514 Professional Skills

Academic Year: 2019/0
Module Level: Year 3
Scheme: UG
Department: Mathematics
Credits: 10

Student Workload (hours)

Lectures	
Seminars	16
Practical Classes & Workshops	8
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	76
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	0
Total Module Hours	100

Period: Semester 1
Occurence: E
Coordinator: Nick Foster
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Presentation and Report	90				
002	Attendance	10				
003	Written Report	100				Y

Intended Learning Outcomes

Students will develop their communication and business awareness skills in preparation for interviews and work. Students will explain the current issues in the financial/actuarial sector and will be able to articulate these both verbally and in writing to a variety of audiences, including their peers.

Teaching and Learning Methods

Guest speakers drawn from the University and the actuarial sector will be used to motivate a particular aspect of communication or a current issue each week within a seminar environment. Students are then required to reflect on those issues raised and prepare a short piece of work in response. The responses will either be written or oral (with a 50/50 split over the semester). Some aspects of group work will be incorporated.

Assessment Methods

Written and spoken presentations will be marked against a predetermined scale of descriptors determined in conjunction with each guest speaker.
Attendance at 80% of seminars will be required for full attendance marks. In the event of absence from presentation sessions a written assignment will be set.

Pre-Requisites

Co-Requisites

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Individual and group presentation work, written assignments, employer research.

Last Published: 17 November 2019

UNIVERSITY OF LEICESTER

Module Specification

MA3515 Actuarial Mathematics Project

Academic Year: 2019/0
Module Level: Year 3
Scheme: UG
Department: Mathematics
Credits: 30

Student Workload (hours)

Lectures	
Seminars	1
Practical Classes & Workshops	4
Tutorials	
Fieldwork	
Project Supervision	15
Guided Independent Study	280
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	0
Total Module Hours	300

Period: Academic Year
Occurence: E
Coordinator: Paul King
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous work	50				
002	Final report	50				

Intended Learning Outcomes

Students will complete a significant individual project concerning the application of actuarial science mathematics to an actuarial/business problem.
Demonstrate appropriate techniques, select and implement as appropriate.
Test and evaluate the solution against the requirements of the problem.
Appropriate documentation of the process and presentation of the results.

Teaching and Learning Methods

Individual research and meetings with supervisor

Assessment Methods

Continous work (50%) is split:
Specification of the group project (5 marks, week 3, semester 1)
Interim report (15 marks, end semester 1)
Specification of individual project (5 marks semester 2)
Final presentation (or other as determined by supervisors) (25 marks, semester 2)
Final report (50%)

Pre-Requisites

Co-Requisites

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Individual and group presentation work, individual and group written assignments, individual and group research.

UNIVERSITY OF LEICESTER

Module Specification

MA3517 Mathematics Research Journal

Academic Year: 2019/0
Module Level: Year 3
Scheme: UG
Department: Mathematics
Credits: 20

Student Workload (hours)

Lectures	30
Seminars	10
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	160
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	200

Period: Semester 2
Occurence: E
Coordinator: Bogdan Grechuk
Mark Scheme: UG Honours Level Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Coursework	100				
002	Paper Submission	100				Y

Intended Learning Outcomes

On successful completion of the module, students should be able to:
1. Engage with academic literature by preparing an assigned academic paper for presentation to peers. This presentation should: clearly highlight the importance of the research topic; the underlying theory and how this relates to modules already studied; the research methodology and analysis used; key conclusions.
2. Write short scientific papers, based on their synoptic knowledge of the course so far, using existing knowledge in novel situations for publication in an open access, online undergraduate journal.
3. Review peers' papers and presenting their critique and decision regarding publication in a clear and concise manner so that their review is an effective resource for an editorial board.
4. Participate in editorial board duties (chairperson, note keeper and ordinary member) and make unbiased, critical decisions on which papers should be published in light of referee comments.

Teaching and Learning Methods

Lectures, seminars.
Coursework: Presentation of academic papers to peers in journal seminars
Coursework: Respond to questions posed by peers and academics on the academic paper presented
Coursework: Participation in editorial boards Coursework: Submitting referee reports in peers' work
Coursework: Publication of short scientific papers in online undergraduate journal

Assessment Methods

Coursework

Pre-Requisites

Co-Requisites

Excluded Combinations

Guided Independent Study: Indicative Activities

Preparation for workshops (including reading, videos) Production of referee's reports and short scientific papers. Engage with the University Press Office if a student paper is selected for a Press release or is otherwise picked up by the wider media.

UNIVERSITY OF LEICESTER

Module Specification

MA4011 Computational Partial Differential Equations with Finite Elements

Academic Year: 2019/0
Module Level: Year 4
Scheme: UG
Department: Mathematics
Credits: 20

Student Workload (hours)

Lectures	30
Seminars	
Practical Classes & Workshops	10
Tutorials	10
Fieldwork	
Project Supervision	
Guided Independent Study	150
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	0
Total Module Hours	200

Period: Semester 2
Occurence: E
Coordinator: Emmanuil Georgoulis
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Computer Practicals	20				
002	Examination (Final)	80		2		
003	Exam	100		2		Y

Intended Learning Outcomes

This module provides learners with the mathematical foundation as well as implementation aspects of computational schemes for Partial Differential Equations (PDEs), using both finite difference and finite element methods. At the end of this module, learners should be able to:
- classify a PDE and recognize the significance of the various terms and boundary conditions appearing in classical PDE models from mathematical physics;
- apply standard analytical solution techniques, such as the method of characteristics and separation of variables, to linear first and second order problems.
- demonstrate the basic concepts and methods from numerical analysis of PDEs, such as: construct an appropriate scheme for the discretization of PDEs based on the finite difference method, analyse its consistency, stability and convergence properties;
- demonstrate basic knowledge of linear functional analysis and its relevance in PDE theory, with the ability to deduce the right functional setting for a given PDE problem and to write its variational formulation;
- construct finite element formulations for linear PDE models;
- analyse the stability and convergence properties of basic finite elements;
- implement these numerical methods in MATLAB or using freely available finite element libraries.

Teaching and Learning Methods

Class sessions/lectures, computer labs and feedback classes.

Assessment Methods

The coursework will consist of regularly assigned exercise sheets, including problem sets and computer assignments. A substantial individual work will be required for a student to grasp the theoretical material (problem sets) and to get enough computational practice (computer exercises) to be able to solve PDEs numerically. The examination will have 4 questions based on the thought theory and some exercises. Full mark are obtained by answering all 4 questions correctly.

Pre-Requisites

-

Co-Requisites

none

Excluded Combinations

-

Last Published: 17 November 2019

UNIVERSITY OF LEICESTER

Module Specification

MA4011 Computational Partial Differential Equations with Finite Elements

Guided Independent Study: Indicative Activities

-

UNIVERSITY OF LEICESTER

Module Specification

MA4022 Data Mining and Neural Networks

Academic Year: 2019/0
Module Level: Year 4
Scheme: UG
Department: Mathematics
Credits: 20

Student Workload (hours)

Lectures	30
Seminars	11
Practical Classes & Workshops	11
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	148
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	200

Period: Semester 2
Occurence: E
Coordinator: Ivan Tyukin
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Examination (Final)	50		2		
002	Coursework	20				
003	Computational Tasks	30				
004	Exam	100		3		Y

Intended Learning Outcomes

Students will demonstrate the structure of the data mining process and explain the basic notions and operation:data preprocessing, data cleaning. dimensionality reduction, binning, sampling, supervision and unsupervising learning, classification, clustering, regression, probability distribution estimation, entropy, information, information gain, independence and conditional independence, time series, stationary time series (in strong and in weak sense).
Calculate a data mining problem, recognize its type and select the adequate approach to solution, from evaluation and cleaning of the dataset to selection of the algorithms for data analysis. Calculate and validate the results.
Demonstrate the basic methods and algorithms to data analysis, in particular: for classification kNN and Decision tree algorithms, for clustering k-means, hierarchical clustering and density based algorithms, for prediction multivariate regression (linear regression and the kernel trick), for probability distribution estimation Bayes networks, for dimension reduction principal component analysis, for time series use the basic models(white noise, random walk, moving average processes, autoregressive processes, integrated and ARIMA processes), apply mean filter and median filter, analyze trend and perform segmentation. Construct basic neural networks for data analysis (Hopfield, Kohonen, cascade correlation and back-propagation of errors).

Teaching and Learning Methods

Lectures, feedback classes, computer practicals.

Assessment Methods

Marked fortnightly work, computer logs, written examination.

Pre-Requisites

MA2032

Co-Requisites

-

Excluded Combinations

-

Guided Independent Study: Indicative Activities

-

Last Published: 17 November 2019

UNIVERSITY OF LEICESTER

Module Specification

MA4061 Topics in Mathematical Biology

Academic Year: 2019/0
Module Level: Year 4
Scheme: UG
Department: Mathematics
Credits: 20

Student Workload (hours)

Lectures	30
Seminars	10
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	160
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	200

Period: Semester 2
Occurence: E
Coordinator: Sergei Petrovskiy
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Examination (Final)	90		2		
002	Class test	10				
003	Exam	100		2		Y

Intended Learning Outcomes

The student is required to demonstrate knowledge of the main principles of model building and analysis in population biology and ecology.

Teaching and Learning Methods

Lectures, seminars.

Assessment Methods

Continuous assessment is achieved through regular assessment of the student's work at problem classes. Summative assessment is also based on the results of written examination

Pre-Requisites

MA2032, MA2021

Co-Requisites

-

Excluded Combinations

-

Guided Independent Study: Indicative Activities

-

UNIVERSITY OF LEICESTER

Module Specification

MA4072 Financial Mathematics II

Academic Year: 2019/0
Module Level: Year 4
Scheme: UG
Department: Mathematics
Credits: 20

Student Workload (hours)

Lectures	30
Seminars	11
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	159
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	0
Total Module Hours	200

Period: Semester 2
Occurence: E
Coordinator: Sergey Utev
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Examination (Final)	100		3		

Intended Learning Outcomes

By the end of this module a student should be able to define the main concepts of financial market instruments; the student should be able to apply the martingale technique and stochastic analysis to option pricing.

Teaching and Learning Methods

Lectures, feedback classes.

Assessment Methods

The final assessment of this module will consist of 100% from a three hour examination.

Pre-Requisites

MA3071

Co-Requisites

-

Excluded Combinations

-Only available to MMath degree Year 4 students only

Guided Independent Study: Indicative Activities

-

UNIVERSITY OF LEICESTER

Module Specification

MA4080 Mathematical Modelling

Academic Year: 2019/0
Module Level: Year 4
Scheme: UG
Department: Mathematics
Credits: 20

Student Workload (hours)

Lectures	10
Seminars	10
Practical Classes & Workshops	20
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	160
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	0
Total Module Hours	200

Period: Semester 1
Occurence: E
Coordinator: Alexander Gorban
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Mini-projects	60				
002	Conference Presentation and Paper	40		3		
003	Exam	100		3		Y

Intended Learning Outcomes

The module will give an introduction to methodology of mathematical modelling and to mathematical methods of their analysis including analysis of critical effects.
At the end of the module a student should be able to:
•Explain the basic concepts and instruments of mathematical modelling.
•Create simple models for real phenomena with special focus on economic, financial and social systems.
•Demonstrate these models for real phenomena and interpret the results.
•Analyse these models with special attention to anticipation of critical transitions and communicate the results.
•Explain existing models for real phenomena when presented.

Teaching and Learning Methods

An electronic textbook will be provided for self study and lectures.

Assessment Methods

Mini-projects, assessed by 3,000 word report (60%)
Internal conference presentation (20%) and paper (20%)

Pre-Requisites

-

Co-Requisites

-

Excluded Combinations

-

Guided Independent Study: Indicative Activities

-

UNIVERSITY OF LEICESTER

Module Specification

MA4161 Galois Theory

Academic Year: 2019/0
Module Level: Year 4
Scheme: UG
Department: Mathematics
Credits: 20

Student Workload (hours)

Lectures	30
Seminars	10
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	160
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	200

Period: Semester 1
Occurence: E
Coordinator: Teimuraz Pirashvili
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Examination (Final)	50		3		
002	Test	50				

Intended Learning Outcomes

To enable student to:
Understand and define the Galois Group of a field extension and the Galois group of a polynomial.
Understand and prove the Galois correspondence, including the relationship between normal subject structure of the Galois groupd and normality of the intermediate extensions.
Understand the definition of a solvable group and be able to determine whether or not a group of reasonable size is solvable.
Appreciate the significance of the Galois group of a polynomial as a group of permutations of the roots.
Prove that the alternating group of degree at least 5 is simple.
Understand the definition of a radical extension and prove that such an extension has a solvable Galois group.
Understand that the symmetric group is the Galois group of the general polynomial.
Be able to construct polynomials whose Galois group is not solvable.
Be able to apply Galois Theory for certain transcendence proofs in Number Theory.

Teaching and Learning Methods

Lectures, Problem classes

Assessment Methods

Test and exam

Pre-Requisites

-

Co-Requisites

none

Excluded Combinations

-

Last Published: 17 November 2019

UNIVERSITY OF LEICESTER

Module Specification

MA4504 Mathematics Project

Academic Year: 2019/0
Module Level: Year 4
Scheme: UG
Department: Mathematics
Credits: 40

Student Workload (hours)

Lectures	28
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	372
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	0
Total Module Hours	400

Period: Academic Year
Occurence: E
Coordinator: Teimuraz Pirashvili
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Coursework (Final)	100				

Intended Learning Outcomes

The student will establish the lines of enquiry to be followed and produce an interim report at the end of the first semester, demonstrating both progress to date and a detailed plan of the further steps needed to complete the work. In the second semester, the student will complete the project work planned and produce a substantial Mathematics dissertation.

Teaching and Learning Methods

Weekly supervisions and independent study

Assessment Methods

Project description document, diary, presentations, written thesis.

Pre-Requisites

Only 4th year students on the MMath students are allowed to take this module.

Co-Requisites

-

Excluded Combinations

-

Guided Independent Study: Indicative Activities

-

Last Published: 17 November 2019

UNIVERSITY OF LEICESTER

Module Specification

MA4701 Advanced Readings in Mathematics

Academic Year: 2019/0
Module Level: Year 4
Scheme: UG
Department: Mathematics
Credits: 20

Student Workload (hours)

Lectures	
Seminars	20
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	180
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	200

Period: Semester 1
Occurence: E
Coordinator: Alberto Paganini
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Coursework (Final)	100				

Intended Learning Outcomes

At the end of this module, students should be able to demonstrate knowledge and understanding of the chosen topic studied in this reading module, and have communicated this through seminar discussions, written work and oral presentations.

Teaching and Learning Methods

Seminars, guided reading, problems/project.

Assessment Methods

Problem classes, writing exercise, oral presentation

Pre-Requisites

-

Co-Requisites

-

Excluded Combinations

- Students may not take both MA4701 and MA4702

Guided Independent Study: Indicative Activities

-

Last Published: 17 November 2019

UNIVERSITY OF LEICESTER

Module Specification

MA4702 Advanced Readings in Mathematics

Academic Year: 2019/0
Module Level: Year 4
Scheme: UG
Department: Mathematics
Credits: 20

Student Workload (hours)

Lectures	
Seminars	20
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	180
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	200

Period: Semester 2
Occurence: E
Coordinator: Teimuraz Pirashvili
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Coursework (Final)	100				

Intended Learning Outcomes

At the end of this module, students should be able to demonstrate knowledge and understanding of the chosen topic studied in this reading module, and have communicated this through seminar discussions, written work and oral presentations.

Teaching and Learning Methods

Seminars, guided reading, problems/project.

Assessment Methods

Problem classes, writing exercise, oral presentation

Pre-Requisites

-

Co-Requisites

-

Excluded Combinations

- Students may not take both MA4701 and MA4702

Guided Independent Study: Indicative Activities

-

Last Published: 17 November 2019