School of Mathematics & Statistics

Interdisciplinary (ID) Modules

ID2003 Science Methods

SCOTCAT Credits:	10	SCQF Level 8	**Semester:**	1
Academic year:	2013/4			
Planned timetable:	1.00 pm Mon, 1.00 pm Tue, 4.00 pm Thu.			
This module provides an overview of the rationale, methods, history and philosophy of science. We explore the different definitions of science, the distinction between science and pseudo-science, the design of experiments, critical thinking, errors in reasoning, methods of making inferences and generalisations, the role of personal experience and anecdotes in science, the process of scientific publication and the role of anomalies in science. The module is collaboratively taught by staff from a number of schools in the university providing a useful methodological background for all science students.				
Programme module type:	Available to any degree programme.			
Learning and teaching methods and delivery:	**Weekly contact**: 2 lectures and 1 practical class.			
	Scheduled learning: 33 hours		**Guided independent study:** 67 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 50%, Practical Examinations = 0%, Coursework = 50%			
	As used by St Andrews: 1.5-hour Examination = 50%, Coursework = 50%			
Module Co-ordinator:	Dr C G M Paxton, Mathematics & Statistics			
Lecturer(s)/Tutor(s):	Dr C G M Paxton, Dr E Rexstad, Dr D Russell			

Mathematics & Statistics (MT) Modules

MT1001 Introductory Mathematics

SCOTCAT Credits:	20	SCQF Level 7	**Semester:**	1
Academic year:	2013/4			
Planned timetable:	9.00 am			
This module is designed to give students a secure base in elementary calculus to allow them to tackle the mathematics needed in other sciences. Students wishing to do more mathematics will be given a good foundation from which they can proceed to MT1002. Some of the work covered is a revision and reinforcement of material in the Scottish Highers and many A-Level syllabuses.				
Programme module type:	Compulsory for students on all programmes in the School who do not meet the direct entry requirements for MT1002. All other students should take MT1002 instead.			
Pre-requisite(s):	Higher or A-Level Mathematics (A/S level Mathematics with approval of Head of School).		**Anti-requisite(s):**	MT1003, CS1010
Required for:	MT1002			
Learning and teaching methods and delivery:	**Weekly contact**: 5 lectures, 1 tutorial and 1 laboratory.			
	Scheduled learning: 70 hours		**Guided independent study:** 130 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 90%, Practical Examinations = 0%, Coursework = 10%			
	As used by St Andrews: Written Examination = 90% (2-hour final exam = 70%, 2 class tests = 10% each), Coursework = 10%			
Module Co-ordinator:	Dr V Archontis			
Lecturer(s)/Tutor(s):	Dr V Archontis, Dr A L Haynes			

MT1002 Mathematics

SCOTCAT Credits:	20	SCQF Level 7	**Semester:**	1 & 2 (taught twice)
Academic year:	2013/4			
Planned timetable:	9.00 am			
This module is designed to introduce students to the ideas, methods and techniques which they will need for applying mathematics in the physical sciences or for taking the study of mathematics further. It aims to extend and enhance their skills in algebraic manipulation and in differential and integral calculus, to develop their geometric insight and their understanding of limiting processes, and to introduce them to complex numbers and matrices.				
Programme module type:	Compulsory for all programmes within the School. Compulsory for B.Sc. Management Science (single Honours) and all programmes within the School of Physics & Astronomy.			
Pre-requisite(s):	MT1001 or B at Advanced Higher Mathematics or B at A-Level Mathematics.			
Required for:	AS2001, MT1003, MT2001, MT2002, MT2004, MT2005, MT3832, PH2011, PH2012			
Learning and teaching methods and delivery:	**Weekly contact**: 5 lectures, 1 tutorial and 1 laboratory.			
	Scheduled learning: 70 hours		**Guided independent study:** 130 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 90%, Practical Examinations = 0%, Coursework = 10%			
	As used by St Andrews: Written Examination = 90% (2-hour final exam = 70%, 2 class tests = 10% each), Coursework = 10%			
Module Co-ordinator:	Prof K J Falconer (sem 1), Dr R K Scott (sem 2)			
Lecturer(s)/Tutor(s):	Semester 1: Prof K J Falconer, Dr A L Haynes, Dr A P Naughton; Semester 2: Dr R K Scott, Dr Y H Peresse, Dr M Todd			

MT1003 Pure and Applied Mathematics

SCOTCAT Credits:	20	SCQF Level 7	**Semester:**	2
Academic year:	2013/4			
Planned timetable:	9.00 am			
The aim of this module is to provide students with a taste of both pure and applied mathematics, to give them insight into areas available for study in later years and to provide them with the opportunity to broaden their mathematical experience.				
Programme module type:	Optional for all programmes within the School			
Pre-requisite(s):	MT1002			
Required for:	MT3600			
Learning and teaching methods and delivery:	**Weekly contact**: 5 lectures, 1 tutorial and 1 laboratory.			
	Scheduled learning: 70 hours		**Guided independent study:** 130 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 90%, Practical Examinations = 0%, Coursework = 10%			
	As used by St Andrews: Written Examination = 90% (2-hour final exam = 70%, 2 class tests = 10% each), Coursework = 10%			
Module Co-ordinator:	Prof C E Parnell			
Lecturer(s)/Tutor(s):	Prof C E Parnell, Dr Y H Peresse			

MT1007 Statistics in Practice

SCOTCAT Credits:	20	SCQF Level 7	**Semester:**	2
Academic year:	2013/4			
Planned timetable:	11.00 am			
This module provides an introduction to statistical reasoning, elementary but powerful statistical methodologies, and real world applications of statistics. Case studies, such as building an optimal stock portfolio, and data vignettes are used throughout the module to motivate and demonstrate the principles. Students get hands-on experience exploring data for patterns and interesting anomalies as well as experience using modern statistical software to fit statistical models to data.				
Programme module type:	Optional for all programmes within the School. Compulsory for B.Sc. Management Science (single & joint Honours).			
Pre-requisite(s):	An A grade at GCSE/Grade 1 at Standard Grade Mathematics or a C grade at AS level/Higher Mathematics.			
Required for:	MT3833			
Learning and teaching methods and delivery:	**Weekly contact**: 4 lectures, 1 tutorial and 1 laboratory.			
	Scheduled learning: 60 hours		**Guided independent study:** 140 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 50%, Practical Examinations = 0%, Coursework = 50%			
	As used by St Andrews: 2-hour Written Examination = 50%, Coursework = 50%			
Module Co-ordinator:	Dr A Overstall			
Lecturer(s)/Tutor(s):	Dr A Overstall, Dr J B Illian, Dr M L MacKenzie			

MT1008 Mathematical Information Technology

SCOTCAT Credits:	20	SCQF Level 7	**Semester:**	1
Academic year:	2013/4			
Planned timetable:	11.00 am			
This module provides an introduction to the use of Information Technology in Mathematical Science. The topics covered include basic IT skills, data handling and analysis, and the use of a computational algebra package such as MAPLE. Students will undertake small projects and present short written reports. No previous knowledge of computing is required.				
Programme module type:	Optional for all programmes within the School.			
Pre-requisite(s):	Higher or A-Level Mathematics		**Anti-requisite(s):**	CS1002, CS1006, any 2000-level CS module
Required for:	MT2005			
Learning and teaching methods and delivery:	**Weekly contact**: 5 lectures, 1 tutorial and 1 laboratory.			
	Scheduled learning: 72 hours		**Guided independent study:** 128 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 50%, Practical Examinations = 0%, Coursework = 50%			
	As used by St Andrews: Written Examination = 50% (class tests) Coursework = 50%,			
Module Co-ordinator:	Dr D H Mackay			
Lecturer(s)/Tutor(s):	Dr D H Mackay, Dr M L Burt			

MT2001 Mathematics

SCOTCAT Credits:	30	SCQF Level 8	**Semester:**	1 & 2 (taught twice)
Academic year:	2013/4			
Planned timetable:	12.00 noon			
The aims of this module are to extend the knowledge and skills gained by students in the module Mathematics MT1002, and in particular to enhance their skills in the theory and application of: differential and integral calculus of several real variables; limiting processes; linear mathematics.				
Programme module type:	Compulsory for all programmes in the School. Compulsory for all programmes in the School of Physics & Astronomy. Compulsory for B.Sc. Management Science (single Honours) and M.Sci. Materials Science (or PH2011).			
Pre-requisite(s):	MT1002			
Required for:	MT2003, MT3501, MT3503, MT3504, MT3600, MT3601, MT3802, MT3832, MT3833, MT4551, PH3007, PH3073, PH3081, PH3082, PH4038			
Learning and teaching methods and delivery:	**Weekly contact**: 5 lectures, 1 tutorial, 1 examples class and 1 practical.			
	Scheduled learning: 80 hours		**Guided independent study:** 220 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 70%, Practical Examinations = 0%, Coursework = 30%			
	As used by St Andrews: 3-hour Written Examination = 70%, Coursework = 30%			
Module Co-ordinator:	Dr A P Naughton (sem 1); Dr S Huczynska (sem 2)			
Lecturer(s)/Tutor(s):	Semester 1: Dr A P Naughton, Dr Y H Peresse, Dr C V Tran Semester 2: Dr A P Naughton, Prof D G Dritschel, Dr S Huczynska			

MT2002 Algebra and Analysis

SCOTCAT Credits:	30	SCQF Level 8	**Semester:**	1
Academic year:	2013/4			
Planned timetable:	11.00 am			
The aims of this module are to encourage students' understanding of the logical structure of mathematics and the nature of proof, and to introduce students to some fundamental concepts of abstract algebra and of analysis.				
Programme module type:	Compulsory for M.Math. Pure Mathematics Either MT2002 or MT2003 is compulsory for all joint Honours Mathematics programmes (including M.Chem. Chemistry with Mathematics and Mathematics 'with' degrees). Optional for all other programmes in the School.			
Pre-requisite(s):	MT1002			
Required for:	MT3600, MT4003, MT4004, MT4515, MT4517, MT4521, MT5829			
Learning and teaching methods and delivery:	**Weekly contact**: 5 lectures, 1 tutorial, 1 examples class and 1 practical.			
	Scheduled learning: 80 hours		**Guided independent study:** 220 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 90%, Practical Examinations = 0%, Coursework = 10%			
	As used by St Andrews: Written Examination = 90% (two class tests = 10% each, 3-hour final exam = 70%), Coursework = 10%			
Module Co-ordinator:	Prof L Olsen			
Lecturer(s)/Tutor(s):	Prof L Olsen, Dr J D Mitchell			

MT2003 Applied Mathematics

SCOTCAT Credits:	30	SCQF Level 8	**Semester:**	2
Academic year:	2013/4			
Planned timetable:	12.00 noon			
This module introduces students to applied mathematics through the construction, analysis and interpretation of mathematical models, and to the techniques of analysis used in mathematical modeling.				
Programme module type:	Compulsory for M.Math. Applied Mathematics. Either MT2002 or MT2003 is compulsory for all joint Honours Mathematics programmes (including M.Chem. Chemistry with Mathematics and Mathematics 'with' degrees). Optional for all other programmes in the School.			
Pre-requisite(s):	MT2001			
Required for:	MT3601, MT4005, MT4507, PH3007			
Learning and teaching methods and delivery:	**Weekly contact**: 5 lectures, 1 examples class and 1 practical.			
	Scheduled learning: 70 hours		**Guided independent study:** 230 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 70%, Practical Examinations = 0%, Coursework = 30%			
	As used by St Andrews: 3-hour Written Examination = 70%, Coursework = 30%			
Module Co-ordinator:	Dr A P Naughton			
Lecturer(s)/Tutor(s):	Dr A P Naughton, Dr A N Wright, Dr R K Scott			

MT2004 Statistics

SCOTCAT Credits:	30	SCQF Level 8	**Semester:**	2
Academic year:	2013/4			
Planned timetable:	10.00 am			
This module introduces students to the mathematical models of randomness used as part of statistical modelling and analysis. The module is a mix of fundamental mathematical statistics and applied statistical analysis and provides the background necessary for the 3000 level modules in statistics.				
Programme module type:	Compulsory for M.Math. Statistics, B.Sc./M.A. Statistics and all joint Honours Statistics programmes. Optional for all other programmes in the School. Compulsory for M.Sci. Applied Quantitative Finance, B.Sc. Management Science (single Honours).			
Pre-requisite(s):	MT1002			
Required for:	MT3606, MT3706, MT3833, MT4527, MT4530, MT4607, MT4608, MT4613			
Learning and teaching methods and delivery:	**Weekly contact**: 5 lectures, 1 tutorial and 1 practical.			
	Scheduled learning: 70 hours		**Guided independent study:** 230 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 75%, Practical Examinations = 0%, Coursework = 25%			
	As used by St Andrews: Written Examination = 75% (3-hour final exam = 70%, class test = 5%), Coursework = 25%			
Module Co-ordinator:	Prof S T Buckland			
Lecturer(s)/Tutor(s):	Prof S T Buckland, Dr R King, Dr M Papathomas			

MT2005 Discrete Mathematics: Algorithms and Applications

SCOTCAT Credits:	30	SCQF Level 8	**Semester:**	2
Academic year:	2013/4			
Planned timetable:	11.00 am			
In recent years mathematics of discrete (finite) structures has greatly gained importance, especially with the development and expansion of computer technology. This module covers a selection of topics from discrete mathematics. The emphasis is on methods (algorithms) for manipulating finite mathematical objects (such as graphs, codes, abstract machines, etc.), solving problems using these algorithms, as well as on 'real life' applications of these methods to problems in operational research. The module also gives a mathematical treatment of computational machines (automata and Turing machines) and safe transfer of information (coding and encryption).				
Programme module type:	Optional for all programmes in the School			
Pre-requisite(s):	MT1002 or MT1008			
Learning and teaching methods and delivery:	**Weekly contact**: 5 lectures, 1 tutorial, 1 examples class and 1 practical.			
	Scheduled learning: 80 hours		**Guided independent study:** 220 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 80%, Practical Examinations = 0%, Coursework = 20%			
	As used by St Andrews: Written Examination = 80% (3-hour final exam = 70%, class test = 10%), Coursework = 20%			
Module Co-ordinator:	Dr C M Roney-Dougal			
Lecturer(s)/Tutor(s):	Dr C M Roney-Dougal, Dr S Huczynska, Dr D L Borchers			