Aston University

PROGRAMME SPECIFICATION
(2012-13)

Programme Title	Mathematics with Computing
UCAS/JACS Code	G190
School/Subject Area	School of Engineering and Applied Science Mathematics
Final Award	BSc
Interim Awards	Certificate of Higher Education/Diploma of Higher Education
Mode(s) of Study	Full-time or Sandwich
Normal Length of Program	3 (Full-time) or 4 years (Sandwich)
Total Credits	360 full-time or 480 sandwich (for Placement)
Programme Accredited By	N/A
Dates Program Specification Written and Revised	March 2006, revised September 2008, revised September 2009, September 2011

Education Aims of the Programme	To prepare students for a career in academia or industry, primarily in mathematically interdisciplinary areas. To equip students with a wide range of analytical and computational tools which they can employ in a principled framework. To introduce students to the main streams of mathematics and to the use of computing as a means of deploying mathematical techniques. To provide a stimulating and challenging learning experience that will enable students to develop their analytical and computational skills, preparing them for the dynamic and ever changing environment of the information age. To offer students the opportunity to obtain relevant industrial experience by providing the option of a placement year.
Relevent Subject Benchmark Statements and other External and Internal Reference Points used to inform programme outcomes	• Framework for Higher Education Qualifications • QAA benchmark standard for Mathematics, Statistics and Operational Research • Expertise of members of staff • Industry • School Strategic Plan

Programme Structures and Requirements: Levels, Modules and Credits Stage 1				
Module Title	**Credits**	**Level**	**Module Code**	**Core**
Academic Writing and Study Skills	10	4	AM10AS	YES
Calculus and Ordinary Differential Equations	20	4	AM10CO	YES
Computational Mathematics	10	4	AM10CP	YES
Introduction to Matlab	10	4	AM10IM	YES
Transition Mathematics	20	4	AM10TM	YES
Vector Algebra and Geometry	20	4	AM10VG	YES
Java Programming Foundations (CB)	20	4	CS1020	YES
Internet Computing	10	4	CS1240	YES
TOTAL	120			

Programme Structures and Requirements: Levels, Modules and Credits Stage 2				
Module Title	**Credits**	**Level**	**Module Code**	**Core**
Introduction to Numerical Methods	10	5	AM20IM	YES
Investigative Skills	10	5	AM20IS	YES
Linear Mathematics	10	5	AM20LM	YES
Multivariate Calculus	10	5	AM20MC	YES
Mathematical Methods	10	5	AM20MM	YES
Probability Distributions	10	5	AM20PD	YES
Real Analysis	10	5	AM20RA	YES
Vector Calculus	10	5	AM20VR	YES
Information Systems and Databases	20	4	CS1050	YES
Computer Graphics	10	5	CS2150	YES
Java Program Construction	10	5	CS2300	YES
TOTAL	120			

Programme Structures and Requirements: Levels, Modules and Credits Stage P				
Module Title	**Credits**	**Level**	**Module Code**	**Core**
Industrial Placement	120	P	AMP001	NO
TOTAL	120			

Programme Structures and Requirements: Levels, Modules and Credits **Stage F**				
Module Title	**Credits**	**Level**	**Module Code**	**Core**
Statistical Pattern Analysis	10	5	AM20PA	NO
Stochastic Processes	10	5	AM20SR	NO
Approximation Theory and Methods	10	6	AM30AT	NO
Complex Analysis	20	6	AM30CA	YES
Chaos and Dynamical Systems	10	6	AM30CD	NO
Financial Mathematics	10	6	AM30FT	NO
Game Theory	10	6	AM30GT	NO
Classical Mechanics	10	6	AM30ME	NO
Mathematics Final Year Project	20	6	AM30MP	NO
Mathematics Report	10	6	AM30MR	NO
Option Theory	10	6	AM30OT	NO
Partial Differential Equations	20	6	AM30PD	YES
Probabilistic Modelling	10	6	AM30PM	NO
Portfolio Analysis	10	6	AM30PT	NO
Simulation Techniques	10	6	AM30ST	NO
Modern Time Series	10	6	AM30TS	NO
Enterprise Application Technology	10	6	CS3160	NO
Information Security	10	6	CS3190	NO
Geographic Information Systems	10	6	CS3210	NO
Testing and Reliable Software Engineering	10	6	CS3270	NO
Data Mining	10	6	CS3440	NO
Enterprise Computing Strategies	10	6	CS3460	NO
TOTAL	120			

Programme Outcomes, Learning and Teaching and Assessment Strategies			
Knowledge and Understanding			
	On successful completion of their programme students, are expected to have knowledge and understanding of:	**Learning, Teaching and Assessment Strategies to enable outcomes to be achieved and demonstrated**	
		Learning and Teaching Methods	**Assessment Methods**
1	The mathematics of information handling and analysis.	• Lectures • Tutorials • Reading • Independent Study	• Lectures • Tutorials • Reading • Independent Study
2	The role of IT in commerce and industry, with a particular focus on large databases and distributed applications.		
3	The principled approach to data analysis and modelling.		
4	A range of numerical\computational methods, balancing the practical applications with appropriate underpinning.		
5	A range of mathematical skills and techniques for problem formulation and solution.		

Intellectual Skills			
	On successful completion of their programme students, are expected to have knowledge and understanding of:	**Learning, Teaching and Assessment Strategies to enable outcomes to be achieved and demonstrated**	
		Learning and Teaching Methods	**Assessment Methods**
1	Use a principled approach to data analysis and modelling.	• Lectures • Tutorials	• Examinations • Coursework • Presentations
2	Design and build informatics applications.		
3	Critically appraise different methods and techniques of problem-solving, assessing their effectiveness and applicability.		
4	Work independently by taking responsibility for the management of their own study and learning.		

Professional Skills			
	On successful completion of their programme students, are expected to have knowledge and understanding of:	**Learning, Teaching and Assessment Strategies to enable outcomes to be achieved and demonstrated**	
		Learning and Teaching Methods	**Assessment Methods**
1	Demonstrate comprehension of the relevant modern industrial environment (if a Placement is undertaken).	• Lecture • Tutorials • Placement (if undertaken)	• Examinations • Coursework • Presentation • Placement Reports (if Placement undertaken)
2	Assimilate and use up to date information from a variety of sources.		
3	To implement, test and evaluate a given technique on real data, using a computer if necessary		
4	Apply numerical algorithms to real-world applications		

Transferable Skills			
	On successful completion of their programme students, are expected to have knowledge and understanding of:	**Learning, Teaching and Assessment Strategies to enable outcomes to be achieved and demonstrated**	
		Learning and Teaching Methods	**Assessment Methods**
1	Communication skills (oral and written)	• Lecture • Tutorials • Computer laboratory sessions • On the job (if placement undertaken)	• Examinations • Coursework • Presentation • Placement Reports (if Placement undertaken)
2	Presentational skills		
3	Analytical skills		
4	Ability to use appropriate mathematical software		

Entry Requirements	In addition to satisfying the general entry requirements, 320 points in 3 A-level subjects to include at least a grade A or B in Mathematics, or equivalent qualifications.
Programme Regulations	**Attendance requirements** Full-Time students are normally required to attend the University for nine terms over a period of three consecutive academic years. Sandwich students are normally required to attend the University for nine terms over a period of four consecutive academic years. **Industrial/Professional Placement** 1. Sandwich students will be required to undertake an integrated programme of professional training of at least 40 weeks duration, not including any periods of vacation, shall be undertaken at times approved by the Associate Dean Undergraduate Programmes. 2. For sandwich students the placement mark will contribute 10% to the final degree classification. Stage 2 will contribute 15% and the final stage will contribute 75% to the final degree classification. For Sandwich students only, the third stage is the module *AMP001 Professional Placement*, which carries 120 credits. **Specific assessment requirements for modules (if any, e.g. modules which may not be condoned)** 1. Module *AM10TM Transition Mathematics* is fundamental to the entireprogramme of study and shall not be passed by condonement. 2. Final year students only permitted to take an optional module if the appropriate pre-requisite module has been taken (and passed); students allowed to take a pre-requisite module from lower level in order to meet this requirement. **Requirements for the Ordinary Degree** The second and final stage comprises the modules that are designated as required for the Ordinary Degree, which total 100 credits at each stage.

This specification provides a concise summary of the main features of the programme and the threshold learning outcomes that a student might normally be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. **The individual modules included in the programme may differ from those included in this programme specification as our programmes are subject to continuous review**. Information on admissions requirements and career opportunities is available in the relevant prospectus. More detailed information on the learning outcomes, content and teaching, learning and assessment methods of each module can be found in the appropriate module guides and programme handbook(s) which are available to students on enrolment.