

ASTON UNIVERSITY PROGRAMME SPECIFICATION

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 Programme	3 (Full-time) or 4 years (Sandwich)
Total Credits	360 full-time or 480 sandwich (for Placement)
Programme Accredited By	N/A
Dates Programme Specification Written and Revised	March 2006, revised September 2008, revised September 2009, September 2011

Education Aims of the Programme	<p>To prepare students for a career in academia or industry, primarily in mathematically interdisciplinary areas.</p> <p>To equip students with a wide range of analytical and computational tools which they can employ in a principled framework.</p> <p>To introduce students to the main streams of mathematics and to the use of computing as a means of deploying mathematical techniques.</p> <p>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.</p> <p>To offer students the opportunity to obtain relevant industrial experience by providing the option of a placement year.</p>
Relevant Subject Benchmark Statements and other External and Internal Reference Points used to inform programme outcomes	<ul style="list-style-type: none"> • UK Quality Code Part A.1 (2011) • 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/Option	Condonable	Prerequisites
Academic Writing and Study Skills	10	4	AM10AS	Core		
Calculus and Ordinary Differential Equations	20	4	AM10CO	Core		
Mathematical Algorithms	10	4	AM10CP	Core		
Introduction to Matlab	10	4	AM10IM	Core		
Transition Mathematics	20	4	AM10TM	Core		
Vector Algebra and Geometry	20	4	AM10VG	Core		
Java Programming Foundations (CB)	20	4	CS1020	Core		
Internet Computing	10	4	CS1240	Core		
TOTAL	120					

Programme Structures and Requirements: Levels, Modules and Credits						
Stage 2						
Module Title	Credits	Level	Module Code	Core/Option	Condonable	Prerequisites
Introduction to Analysis	10	4	AM10IA	Core		
Statistics and Probability	10	4	AM10SP	Core		
Numerical Methods II	10	5	AM20CP	Core		
Numerical Methods I	10	5	AM20IM	Core		
Investigative Skills	10	5	AM20IS	Core		
Linear Mathematics	10	5	AM20LM	Core		
Multivariate Calculus	10	5	AM20MC	Core		
Mathematical Methods	10	5	AM20MM	Core		
Real Analysis	10	5	AM20RA	Core		
Information Systems and Databases	20	4	CS1050	Core		
Java Program Construction	10	5	CS2300	Core		
TOTAL	120					

Programme Structures and Requirements: Levels, Modules and Credits						
Stage 3 P						
Module Title	Credits	Level	Module Code	Core/Option	Condonable	Prerequisites
Choose 120 credits from the following options						
EAS Study Placement Year	120	P	SEP001	Option		
EAS Industrial Placement Year	120	P	SEP002	Option		
TOTAL	120					

Programme Structures and Requirements: Levels, Modules and Credits						
Stage F						
Module Title	Credits	Level	Module Code	Core/Option	Condonable	Prerequisites
Complex Analysis	20	6	AM30CA	Core		
Partial Differential Equations	20	6	AM30PD	Core		
Choose 80 credits from the following options						
Statistical Pattern Analysis	10	5	AM20PA	Option		
Probability Distributions	10	5	AM20PD	Option		
Stochastic Processes	10	5	AM20SR	Option		
Vector Calculus	10	5	AM20VR	Option		
Approximation Theory and Methods	10	6	AM30AT	Option		
Chaos and Dynamical Systems	10	6	AM30CD	Option		
Financial Mathematics	10	6	AM30FT	Option		
Game Theory	10	6	AM30GT	Option		
Classical Mechanics	10	6	AM30ME	Option		
Mathematics Final Year Project	20	6	AM30MP	Option		
Mathematics Report	10	6	AM30MR	Option		
Option Theory	10	6	AM30OT	Option		
Probabilistic Modelling	10	6	AM30PM	Option		
Portfolio Analysis	10	6	AM30PT	Option		
Simulation Techniques	10	6	AM30ST	Option		
Modern Time Series	10	6	AM30TS	Option		
Enterprise Application Technology	10	6	CS3160	Option		
Information Security	10	6	CS3190	Option		
Geographic Information Systems	10	6	CS3210	Option		
Testing and Reliable Software Engineering	10	6	CS3270	Option		
Data Mining	10	6	CS3440	Option		
Enterprise Computing Strategies	10	6	CS3460	Option		
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.	<ul style="list-style-type: none"> • Lectures • Tutorials • Reading • Independent Study 	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • Lectures • Tutorials 	<ul style="list-style-type: none"> • 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				
		<table border="1"> <thead> <tr> <th>Learning and Teaching Methods</th> <th>Assessment Methods</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> • Lecture • Tutorials • Placement (if undertaken) </td> <td> <ul style="list-style-type: none"> • Examinations • Coursework • Presentation • Placement Reports (if Placement undertaken) </td> </tr> </tbody> </table>	Learning and Teaching Methods	Assessment Methods	<ul style="list-style-type: none"> • Lecture • Tutorials • Placement (if undertaken) 	<ul style="list-style-type: none"> • Examinations • Coursework • Presentation • Placement Reports (if Placement undertaken)
Learning and Teaching Methods	Assessment Methods					
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1	Demonstrate comprehension of the relevant modern industrial environment (if a Placement is 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				
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Learning and Teaching Methods	Assessment Methods					
<ul style="list-style-type: none"> • Lecture • Tutorials • Computer laboratory sessions • On the job (if placement undertaken) 	<ul style="list-style-type: none"> • Examinations • Coursework • Presentation • Placement Reports (if Placement undertaken) 					
1	Communication skills (oral and written)					
2	Presentational skills					
3	Analytical skills					
4	Ability to use appropriate mathematical software					
5	The ability to learn independently.					

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	<p>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.</p> <p>Industrial/Professional Placement For Sandwich students only, the third stage is either the module <i>SEP001 EAS Study Placement Year</i> or <i>SEP002 EAS Industrial Placement Year</i>, each of which carries 120 credits.</p>

General Regulations (<http://www1.aston.ac.uk/registry/for-staff/regsandpolicies/general-regulations/>) and the Regulations for the programme (above) take precedence over other information sources such as student handbooks if there is a conflict. If there is a conflict between General Regulations and Programme Regulations then General Regulations take precedence unless an exemption has been approved.

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.