

SCE 321/BSc (Hons) MATHEMATICS WITH COMPUTER SCIENCE/ FULL TIME-(UNDER REVIEW)

1. CONTEXT AND OBJECTIVES

The BSc (Hons) Mathematics with Computer Science course is an innovative programme of study which has been redesigned for students who wish to acquire knowledge in both Mathematics and Computer Science. With increasing dependence on computations in the scientific and business worlds, this course provides the skills required for undertaking careers in Mathematics, business analytics and software development.

It is indeed a programme of study that provides the students with a firm and comprehensive knowledge in computer and mathematical sciences for them to be able to work as mathematicians in professions requiring the application of mathematical tools in modern science, engineering and finance. Various sectors of industry face increasingly large-scale problems that can be solved only through specialised knowledge and skills in applied mathematics together with the knowledge of computer science.

The objectives are:

- to help students build, develop and apply mathematical models using advanced IT tools so as to solve theoretical and practical mathematical problems in industry.
- to deepen their knowledge of current research in mathematics and informatics so as to enable them to continue their education at a postgraduate level.
- to prepare graduates for employment in application areas that require substantial input from both disciplines.

2. LEARNING OUTCOMES

(a) Subject knowledge

- A thorough understanding of core mathematical principles
- Well-developed problem solving and analytical skills
- A grounding in statistical reasoning
- An ability to use computers, both for scientific computation and for general applications
- An appreciation of the ways in which mathematical thinking can be utilised in the real world
- Acquisition of specialist knowledge and understanding, especially towards the later stages of the programme
- A sound theoretical and practical understanding of computing science coupled with a wider competence in information technology

(b) Cognitive/analytical

- Analyse and solve mathematical problems proficiently
- Appreciate ways in which mathematical thinking can be utilised in the real world
- Work under supervision on a placement that requires mathematical skills

(c) Professional/Practical skills

- Use computers and IT for data analysis and presentation, scientific computation and general purpose applications

(d) Transferable skills

- Information literacy skills, including the ability to research, summarise and understand mathematical topics and to reference it in an academically rigorous way

3. TEACHING AND LEARNING METHODS

Modules shall be taught over 10 weeks and shall include 3 hours of contact per week, involve 6 hours of self-study per week and 9 hours of other learning activities per week for each semester. The 30 hours of contact shall include class hours, tutorials and practicals.

4. ENTRY REQUIREMENTS

• *General Requirements*

General: As per General Entry Requirements for admission to the University for undergraduate degrees.

• *Programme (Specific) Requirements*

Programme (Specific): Minimum Grade ‘C’ in Mathematics at GCE ‘A’ level.

5. PROGRAMME DURATION

	Normal	Maximum
Degree	3 years	5 years

6. MINIMUM LCCS CREDITS REQUIRED

- For Degree Award: 200

Breakdown as follows:

	LCCS credits from		
Degree	Core Taught Modules	Project	Electives
BSc (Hons) Mathematics with Computer Science	156	14	30 ^{ab}

^a at least 12 LCCS credits from level/year 2.

^b at least 18 LCCS credits from level/year 3.

LCCS credits per Semester

Minimum: 18 LCCS credits; Maximum (including retake modules): 48 LCCS credits

7. ASSESSMENT AND DEADLINES

Each module will be assessed over 100 marks, which includes a written examination of one and a half hour duration for modules carrying six LCCS credits, unless specified otherwise, and a 3- hour paper for modules carrying twelve LCCS credits, and continuous assessment done during the semester or year.

Written examinations accounting for 60%, will be carried out at the end of the semester in which they are taught.

The continuous assessment will count for 40% of the overall percentage mark of the module(s), except for a module where the structure makes for other specific provision(s). Continuous assessment may be based on practical work, presentations, seminars and/or assignments and class test.

An overall total of 40% is required for a candidate to pass a module.

Projects/Dissertations will carry 14 LCCS credits for degree award.

The following list of modules will be assessed solely by continuous assessment:

MA1117(1)

MA1214(1)

MA3010(5)

Deadlines are as per UoM regulations.

8. LIST OF MODULES

A. Core Modules (156 + 14 LCCS credits)

Code	Module Name	Contact Hrs/wk L+P	Self- Study/wk	Other Learning hrs /wk	LCCS Credits
MA1111(1)	Mathematical Techniques I	3+0	6	9	6
MA1112(1)	Mathematical Analysis I	3+0	6	9	6
MA1113(1)	Applied Mathematics I	3+0	6	9	6
MA1115(1)	Probability & Statistics	3+0	6	9	6
MA1117(1)	Excel Modelling	2+2	6	9	6
CSE1031Y(1)	Database Systems & Administration	2+2	6	9	12
CSE1038Y(1)	Programming and Data Structures	2+2	6	9	12
MA1211(1)	Mathematical Techniques II	3+0	6	9	6
MA1212(1)	Mathematical Analysis II	3+0	6	9	6
MA1205(1)	Algebra for Computer Science	3+0	6	9	6
MA2111(3)	Numerical Analysis I	3+0	6	9	6
MA2112(3)	Mathematical Methods I	3+0	6	9	6
MA2113(3)	Mathematical Statistics	3+0	6	9	6
MA2104(3)	Complex Analysis	3+0	6	9	6
MA2118(3)	Linear Algebra	3+0	6	9	6
CSE2019Y(3)	Algorithms and Complexities	2+2	6	9	12
MA2212(3)	Linear Programming	3+0	6	9	6
MA2204(3)	Numerical Analysis II	3+0	6	9	6
MA2208(3)	Metric Spaces	3+0	6	9	6
MA3000Y(5)	Project	-			14
MA3101(5)	Measure & Integral	3+0	6	9	6
CSE3053Y(5)	Computer Networks and System Administration	2+2	6	9	12
CSE3096Y(5)	Cloud Computing and Big Data	2+2	6	9	12
MA3201(5)	Applied Probability	3+0	6	9	6

B. Electives (Not all modules may be on offer)

Code	Module Name	Contact hrs/wk L+P	Self- Study/wk	Other Learning hrs /wk	LCCS Credits
MA1204(1)	Advanced Excel Modelling	2+2	6	9	6
CSE1016Y(1)	Communications and Business Skills for IT	3+0	6	9	12
CSE1032Y(1)	Web Design And Development	2+2	6	9	12
MA2002(3)	Discrete Mathematics	3+0	6	9	6
MA2003(3)	Vector & Tensor Analysis	3+0	6	9	6
CSE2035Y(3)	Software Modelling and Design	2+2	6	9	12
MA2203(3)	Linear Regression Analysis	3+0	6	9	6
MA2205(3)	Numerical Linear Algebra	3+0	6	9	6
MA2010(3)	Data Science and Data Analytics	3+0	6	9	6
MA3003(5)	Numerical Solution of PDE's	3+0	6	9	6
MA3004(5)	Optimisation	3+0	6	9	6
MA3010(5)	Mathematical Modelling	3+0	6	9	6
MA3011(5)	Time Series Analysis I	3+0	6	9	6
MA3102(5)	Fluid Dynamics I	3+0	6	9	6
CSE3123Y(5)	Mobile Computing and Wireless Technologies	2+2	6	9	12
MA3202(5)	Functional Analysis	3+0	6	9	6
MA3203(5)	Multivariate Analysis	3+0	6	9	6

Note: Contact Hours: L= Lectures, T = Tutorials, P = Practicals

9. PROGRAMME PLAN

YEAR 1							
Semester 1 Code	Module Name	Hrs/wk L+P	LCCS Credits	Semester 2 Code	Module Name	Hrs/wk L+P	LCCS Credits
CORE				CORE			
MA1111(1)	Mathematical Techniques I	3+0	6	MA1211(1)	Mathematical Techniques II	3+0	6
MA1112(1)	Mathematical Analysis I	3+0	6	MA1212(1)	Mathematical Analysis II	3+0	6
MA1113(1)	Applied Mathematics I	3+0	6	MA1205(1)	Algebra for Computer Science	3+0	6
MA1115(1)	Probability & Statistics	3+0	6				
MA1117(1)	Excel Modelling	2+2	6				
CSE1031Y(1)	Database Systems and Administration	2+2	12				
CSE1038Y(1)	Programming and Data Structures	2+2	12				
ELECTIVES:							
CSE1016Y(1)	Communications and Business Skills for IT	3+0	12	MA1204(1)	Advanced Excel Modelling	2+2	6
CSE1032Y(1)	Web Design and Development	2+2	12				
				Subtotal			72

YEAR 2							
Semester 1 Code	Module Name	Hrs/wk L+P	LCCS Credits	Semester 2 Code	Module Name	Hrs/wk L+P	LCCS Credits
CORE				CORE			
MA2111(3)	Numerical Analysis I	3+0	6	MA2212(3)	Linear Programming	3+0	6
MA2112(3)	Mathematical Methods I	3+0	6	MA2204(3)	Numerical Analysis II	3+0	6
MA2113(3)	Mathematical Statistics	3+0	6	MA2208(3)	Metric Spaces	3+0	6
MA2104(3)	Complex Analysis	3+0	6				
MA2118(3)	Linear Algebra	3+0	6				
CSE2019Y(3)	Algorithms & Complexities	2+2	12				

NOTE: AT LEAST 12 LCCS CREDITS FROM THE FOLLOWING ELECTIVES:

CSE2035Y(3)	Software Modelling and Design	2+2	12	MA2203(3)	Linear Regression Analysis	3+0	6
MA2002(3)	Discrete Mathematics	3+0	6	MA2205(3)	Numerical Linear Algebra	3+0	6
MA2003(3)	Vector & Tensor Analysis	3+0	6	MA2010(3)	Data Science and Data Analytics	3+0	6
				Subtotal			72

YEAR 3

Semester 1 Code	Module Name	Hrs/ Wk L+P	LCCS Credits	Semester 2 Code	Module Name	Hrs/ Wk L+P	LCCS Credits
CORE				CORE			
MA3000Y(5)	Project	-	14	MA3201(5)	Applied Probability	3+0	6
MA3101(5)	Measure & Integral	3+0	6				
Either							
CSE3053Y(5)	Computer Networks and System Administration	2+2	12				
Or							
CSE3096Y(5)	Cloud Computing and Big Data	2+2	12				

NOTE: AT LEAST 18 LCCS CREDITS FROM THE FOLLOWING ELECTIVES:

CSE3123Y(5)	Mobile Computing & Wireless Technologies	2+2	12	MA3202(5)	Functional Analysis	3+0	6
MA3003(5)	Numerical Solution of PDE's	3+0	6	MA3203(5)	Multivariate Analysis	3+0	6
MA3004(5)	Optimisation	3+0	6				
MA3010(5)	Mathematical Modelling	3+0	6				
MA3011(5)	Time Series Analysis I	3+0	6				
MA3102(5)	Fluid Dynamics I	3+0	6				

Subtotal **56**

Grand Total **200**