MSc Mathematical and Scientific Computing (Part time) - SC504

1. CONTEXT AND OBJECTIVES

The MSc Mathematical and Scientific Computing programme is an innovative postgraduate programme of study that has been designed for undergraduate degree holders having a background in a quantitative discipline and intending to gather the required knowledge and skills for undertaking careers in the fields of Mathematical and Scientific Computations, and Data Analytics. The course contains the necessary mathematical content that is the primary prerequisite for Data Analytics and Data Science, thus helping to develop an in depth understanding of New Technologies in the Modern world.

Objectives

The objectives are to:

- build, develop and apply mathematical knowledge using advanced computing tools so as to tackle the challenges in industry.
- gain practical, hands-on experience with programming languages and tools.
- enhance the knowledge and skills related to practice problem analysis and decision-making.

Competencies

After successful completion of this programme, graduates should be equipped with competencies to pursue careers in the fields of Mathematical and Scientific Computations, and Data Analytics and those that require critical thinking and problem solving skills, such as, Finance, banking, insurance, and IT sectors.

2. LEARNING OUTCOMES

Knowledge & Understanding

- Demonstrate a thorough understanding of core mathematical principles and appreciate the importance of mathematical logic in scientific computations.
- Demonstrate an understanding of the fundamental concepts and techniques of mathematics, programming and data analysis.
- Ability to apply this understanding within a range of more specialist optional topics with an emphasis on scientific computations, programming and data analytics problems.
- Use the fundamental mathematical concepts and techniques in areas such as simulation and statistical modelling, algorithmic and data intelligence, numerical computations and risk modelling.

Cognitive Skills

- Apply mathematical knowledge logically and accurately in the solution of examples and real life problems.
- Conduct a mathematical investigation using appropriate scientific computations techniques.
- Analyse problems and situations in mathematical terms, and identify the appropriate mathematical tools and techniques for their solution.
- Organise their work in a structured manner.

Transferable Skills

- Ability to research, summarise and understand mathematical topics and to reference it in an academically rigorous way.
- Manage time and oversee projects, both individual and team-oriented.
- Use computer technology efficiently for a variety of purposes.
- Communicate mathematical ideas and concepts and present findings through oral and written means to a range of audience.
- Adopt an analytic and scientific approach to problem solving.

Professional/Practical Skills

- Demonstrate understanding of logical mathematical arguments and reasoning and apply these arguments appropriately.
- Use a range of mathematical software and programming languages for the solution of mathematical, scientific computations and data analytics problems.
- Use computers and IT for data analysis and presentation, new technologies and general purpose applications.

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/or practicals.

Other learning activities may comprise of the following:

- Working on tutorials and assignments;
- Sitting for class test and preparation time for same;
- Sitting for examination and preparation time for same;
- Group work;
- Attending Workshops/Conferences recommended by the Department / Faculty;
- Report writing and oral presentations;
- Additional tutorials and practicals;
- Presentation among Peers;
- Experimental Learning;
- Guest Lectures.

4. PROGRAMME REQUIREMENTS

General Requirements

Successful completion of an undergraduate degree with

- at least a Second Class or 50%, whichever is applicable or
- a GPA not less than 2.5 out of 4 or equivalent, from a recognised higher education institution.

OR alternative qualifications acceptable to the University of Mauritius.

Programme Requirements

Students must hold at least a Second Class BSc (Hons) Degree in Mathematics or any Mathematics related field, Statistics, Computer Science, Physics, Engineering, Economics, Finance, Actuarial Science or any other qualifications (academic or professional) acceptable to the University of Mauritius.

5. PROGRAMME DURATION

	Normal	**Maximum**
Master's Degree:	4 Semesters (2 years)	8 Semesters (4 years)
Postgraduate Diploma:	4 Semesters (2 years)	8 Semesters (4 years)

6. MINIMUM LCCS CREDITS REQUIRED

(i) Master's Degree

Modules	**LCCS Credits**
Minimum LCCS Credits for Core modules	42
Minimum LCCS Credits for Elective modules	18
Final Year Project	12
TOTAL	72

(ii) Postgraduate Diploma

The Postgraduate Diploma is provided as a possible exit point in the programme whereby a student must have attained at least 48 LCCS credits to be eligible for an award. The breakdown is as follows:

Core modules (which may include Project):	36 LCCS credits
+ 2 Electives:	12 LCCS credits

7. ASSESSMENT AND DEADLINES

All modules carry equal weighting.

Projects/Dissertations will carry 12 LCCS credits for degree award.

Each module will carry 100 marks and will be assessed as follows (unless otherwise specified):

Assessment will be based on a written examination of 2-hour duration and continuous assessment carrying at least 50% of total marks. Continuous assessment is based on test(s), group projects and/or assignment(s) and should include at least 1 class test.

An overall total of 50% for combined continuous assessment and written examination components would be required to pass a module, without minimum thresholds within the individual continuous assessment and written examination.

8. LIST OF MODULES

A. Core Modules (42 + 12 LCCS credits)

Code	Module Name	Contact hrs (L+P)	Self-Study hrs	Other Learning Activities/ hrs	LCCS Credits
MATHS 5000(1)	Project				12
MATHS 5101(1)	Algorithmic Intelligence	30+0	60	90	6
MATHS 5102(1)	Simulation & Modelling	30+0	60	90	6
MATHS 5103(1)	Numerical Computations	30+0	60	90	6
MATHS 5104(1)	Statistical Modelling	30+0	60	90	6
MATHS 5201(1)	Valuation & Risk Models	30+0	60	90	6
MATHS 5202(1)	Data Intelligence for Business Analytics	30+0	60	90	6
MATHS 5203(1)	Scientific Visualisation & Data Analytics	30+0	60	90	6

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

Code	Module Name	Contact hrs (L+P)	Self-Study hrs	Other Learning Activities /hrs	LCCS Credits
MATHS 5001(1)	Applied Time Series Analysis and Forecasting	30+0	60	90	6
MATHS 5002(1)	Financial Modelling & Computations	30+0	60	90	6
MATHS 5003(1)	Mathematical Finance	30+0	60	90	6
MATHS 5004(1)	Optimisation	30+0	60	90	6
MATHS 5005(1)	Mathematical Modelling	30+0	60	90	6

9. PROGRAMME PLAN

YEAR 1

Semester 1

Code	Module Name	Hrs/Wk L+P	LCCS Credits
CORE			
MATHS 5101(1)	Algorithmic Intelligence	3+0	6
MATHS 5102(1)	Simulation and Modelling	3+0	6
MATHS 5103(1)	Numerical Computations	3+0	6

SubTotal = 36

Semester 2

Code	Module Name	Hrs/Wk L+P	LCCS Credits
CORE			
MATHS 5201(1)	Valuation & Risk Models	3+0	6
MATHS 5202(1)	Data Intelligence for Business Analytics	3+0	6
MATHS 5203(1)	Scientific Visualisation & Data Analytics	3+0	6

YEAR 2

Semester 1

Code	Module Name	Hrs/Wk L+P	LCCS Credits
CORE			
MATHS 5104(3)	Statistical Modelling	3+0	6
ELECTIVES			
NOTE: AT LEAST 18 LCCS CREDITS FROM THE FOLLOWING ELECTIVES			
MATHS 5001(1)	Applied Time Series Analysis & Forecasting	3+0	6
MATHS 5002(1)	Financial Modelling & Computations	3+0	6
MATHS 5003(1)	Mathematical Finance	3+0	6

SubTotal = 36

Semester 2

Code	Module Name	Hrs/Wk L+P	LCCS Credits
CORE			
MATHS 5000(1)	Project		12
ELECTIVES			
NOTE: AT LEAST 18 LCCS CREDITS FROM THE FOLLOWING ELECTIVES			
MATHS 5004(1)	Optimisation	3+0	6
MATHS 5005(1)	Mathematical Modelling	3+0	6

Total = 72

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