UNIVERSITY of TECHNOLOGY, MAURITIUS

School of Innovative Technologies and Engineering

Department of Applied Mathematical Sciences

MSc Computational Science and Engineering

PROGRAMME DOCUMENT

VERSION 5.0
MCSE v5.0
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University of Technology, Mauritius
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MSc COMPUTATIONAL SCIENCE AND ENGINEERING

A. Programme Information

Computational Science and Engineering is a broad multidisciplinary area which joins computer science and numerical mathematics for the advancement of practical scientific and engineering knowledge. Rather than performing costly and tedious experiments, computational engineers study complex systems and natural phenomena through numerical simulations. Practitioners of this field run computerised simulations of different scenarios for data analysis, in view of optimising production and efficiency.

In this programme emphasis is laid on computational modelling techniques and algorithms which are key for a wide range of established and emerging technologies. The programme provides a coverage of important topics in computer science, applied mathematics and scientific computing.

B. Programme Aims

The focus of the Computational Science and Engineering programme is on the development of the students' readiness in solving problems of complex nature in science and technology using computational modelling, analysis and simulations. They will furthermore be instructed to develop efficient, novel and robust computational procedures and problem-solving methodologies to be utilised in different settings.

The intended postgraduate student is a highly versatile person who can operate in multidisciplinary areas like weather prediction, traffic simulation, vehicles design, bioengineering, environmental modelling, web search engine and molecular biology amongst others.

Graduates will be also prepared for positions in scientific research, for MPhil/PhD programmes, and positions in business and industry.

C. Programme Objectives

Upon successful completion of the programme, students will be expected to

- demonstrate a sound understanding of computational methods for solving scientific and engineering problems
- be able to numerically simulate real world environments, and to understand the mathematics behind
- possess problem solving techniques strongly transferable for immediate use within industry
- be familiar with a variety of computerised and scientific tools for collecting and analysing data

PART I - Regulations

D. General Entry Requirements

As per UTM'S Admissions Regulations.

E. Programme Entry Requirements

A bachelor degree with significant content of Mathematics and/or Statistics.

For instance, a bachelor degree in Mathematics, Computer Science, Physics, Engineering, Statistics or a closely related field or other qualifications (academic or professional) acceptable to the University of Technology, Mauritius can be considered.

F. Programme Mode and Duration

Full Time: Minimum 1 Year, Maximum 3 Years (Minimum 2 Semesters, Maximum 6 Semesters)
Part Time: Minimum 1½ Years, Maximum 3½ Years (Minimum 3 Semesters, Maximum 7 Semesters)

G. Teaching and Learning Strategies

- Lectures (L), Tutorials (T), Practical (P) Sessions and Self-Development (SD) Activities
- Class Tests, Assignments and Dissertation/Projects;
- Self-Learning, Self-Study, Guest Lecture, Structured Discussions and Self-Directed Study;
- Workshops and Seminars;
- Case Study of real-world problems.

H. Student Support and Guidance

Each cohort of the programme is allocated a Programme Coordinator who acts as a liaison between the students and school management and provides support for academic management of the programme.

I. Attendance Requirements

As per UTM's Regulations and Policy

J. Credit System

This programme is aligned with the European Credit and Transfer System (ECTS).

Six-credit modules consist of 45 hours of delivery and 105 hours of self-learning, self-study, guest lecture, etc. The delivery could be any combination of face-to-face, blended, online, seminar, workshop or joint session.

For the award of

- a Postgraduate Certificate, a minimum of 30 credits are required;
- a Postgraduate Diploma, a minimum of 60 credits are required;
- a Master's Degree, 90 credits are required.

K. Student Progress and Assessment

The programme is delivered mainly through lectures, tutorials, and practical laboratory sessions. Students are expected to be as autonomous and research oriented as possible in their self-study and self-development activities, which may include reading, writing reports, delivering presentations, taking part in quizzes, and case-studying, amongst others. Each module carries 100 marks and unless otherwise specified, will be assessed as follows:

- written and/or practical examination, and coursework carrying 30% - 40% of total marks;
- coursework must consist of at least one class test and may also include assignments, field study, workshops and practical tests;
- modules '*Scientific and Statistical Programming*', '*Statistical Simulation*', '*Data Analysis and Statistical Models*' and '*Bioinformatics and Evolutionary Algorithms*' will be assessed by 100% coursework. The coursework must consist of at least one class test and at least one assignment.

Module grading structure:

Grade	**Marks x (%)**	**Remarks**
A	$70 \leq x \leq 100$	Excellent
B	$60 \leq x < 70$	Very Good
C	$50 \leq x < 60$	Good
D	$40 \leq x < 50$	Satisfactory
F	$x < 40$	Referred

L. Evaluation of Performance

The percentage mark contributes a 100% weighting towards the degree classification.

M. Award Classification

Overall weighted mark y (%)	**Classification**
$70 \leq y \leq 100$	MSc with Distinction
$60 \leq y < 70$	MSc with Merit
$40 \leq y < 60$	MSc
$y < 40$	No Award

N. Programme Organisation and Management

Programme Director: Dr Arshad Ahmud Iqbal PEER

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Part II - Programme Structure

O. MSc Computational Science and Engineering – Full Time (Version 5.0)

Semester 1				*Semester 2*			
Code	**Modules**	**Hrs/Wk L/T/P+SS**	**Credits**	**Code**	**Modules**	**Hrs/Wk L/T/P+SS**	**Credits**
COMP 5108C	*Scientific and Statistical Programming*	3+7	6	MATH 5340C	*Matrix Algorithms*	3+7	6
MATH 5338C	*Numerical Computation*	3+7	6	MATH 5314C	*Advanced Operational Research Methods*	3+7	6
MATH 5321C	*Methods for Operational Research*	3+7	6	MATH 5341C	*Numerical Differential Equations*	3+7	6
STAT 5353C	*Big Data Analysis Techniques*	3+7	6	STAT 5350C	*Data Analysis and Statistical Models*	3+7	6
COMP 5109C	*Network Analysis and Modelling*	3+7	6	COMP 5110C	*Bioinformatics and Evolutionary Algorithms*	3+7	6
STAT 5337C	*Statistical Simulation*	3+7	6	SCG 5109C	*Scientific Visualisation*	3+7	6
PROJ 5201C	*Master's Dissertation*						18

P. MSc Computational Science and Engineering – Part Time (Version 5.0)

Semester 1			
Code	**Modules**	**Hrs/Wk L/T/P+SS**	**Credits**
COMP 5108C	*Scientific and Statistical Programming*	3+7	6
MATH 5338C	*Numerical Computation*	3+7	6
MATH 5321C	*Methods for Operational Research*	3+7	6
STAT 5353C	*Big Data Analysis Techniques*	3+7	6

Semester 2				*Semester 3*			
Code	**Modules**	**Hrs/Wk L/T/P+SS**	**Credits**	**Code**	**Modules**	**Hrs/Wk L/T/P+SS**	**Credits**
COMP 5109C	*Network Analysis and Modelling*	3+7	6	MATH 5341C	*Numerical Differential Equations*	3+7	6
STAT 5337C	*Statistical Simulation*	3+7	6	STAT 5350C	*Data Analysis and Statistical Models*	3+7	6
MATH 5340C	*Matrix Algorithms*	3+7	6	COMP 5110C	*Bioinformatics and Evolutionary Algorithms*	3+7	6
MATH 5314C	*Advanced Operational Research Methods*	3+7	6	SCG 5109C	*Scientific Visualisation*	3+7	6
PROJ 5201C	*Master's Dissertation*						18