



UNIVERSITY
of
TECHNOLOGY,
MAURITIUS

School of Innovative Technologies & Engineering

Department of Industrial Systems Engineering

MSc Mobile Communications and Computing

PROGRAMME DOCUMENT

Version 1.0
MMCC v1.0
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University of Technology, Mauritius

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MSc Mobile Communications and Computing

A. Programme Information

The current global and local state of affairs in the mobile communications area with the advent of a series of emerging technologies and paradigms shift have prompted the School of Innovative Technologies and Engineering to ponder and produce this programme in line with the demand from the industry and also in consultation with the authority. The paradigm in computing model between the machine and the human user has shifted from a one to many to a many to many model which is often referred to as pervasive and ubiquitous computing. The advancement in wireless and mobile communications has made this a reality today whereby services are available to anyone at anytime and anywhere. If we look at some facts and figures and major deployments in a very near future, we will have a better understanding for the “raison d’être” of this programme. These are as follows:

- Mobidensity in Mauritius has reached almost 84% and will probably rise
- Mobile subscribers to hit 5.9 billion worldwide in 2013
- Mobile communications contributes a substantial proportion in the 2 digits % (forecast for 2015) contribution of the ICT sector of the local GDP
- IPv6 (inclusive for mobile handsets) full deployment is planned for 2011, whereby thousands of IP addresses shall be available for the users and the business in huge amount
- Satellite domestic mobile services shall be made available to sub-Saharan (Les Mascareignes inclusive) region by 2012
- A National Broadband policy to be announced
- Deployment of LTE and 4G next generation networks
- New cost effective business model for Software delivery (SaaS) requiring remote services
- M2M, m-payments and m-banking are on exponential rise
- Market share of mobile apps on exponential rise

B. Programme Aims

To produce and manufacture future techno-preneurs with success stories in field of mobile communications and computing

Employment Prospects

A student holding the MSc. Mobile Communications and Computing should be able to but not limited to

- present and defend a business case for a mobile service operator or provider in the process of an application of a license vis à vis the authority
- integrate IPv6 in long term mobile communications strategy
- design and implement IPv6-ready applications and services for mobile communications
- work as satellite link designer and provider
- work as a revenue assurance officer
- develop new mobile products and services
- understand, implement and reinforce confidence (security) for mobile communications
- contribute in the development of strategic plans for mobile operators

C. Programme Objectives

Upon successful completion of this programme the students will be equipped with the necessary knowhow in the field of mobile communications from a technical and business perspective.

PART I – Regulations

D. General Entry Requirements

As per UTM'S Admission Regulations, and 'Admission to Programmes of Study at Master's Degree Level'

E. Programme Entry Requirements

A First Degree with substantial components in Networking /Mobile communications/Programming

F. Programme Mode and Duration

One Semester consists of 15 weeks (excluding examination period)

Full Time: 1 Year (2 semesters)

Part Time: 1½ Years (3 semesters)

G. Teaching and Learning Strategies

- Lectures, Tutorials and Practicals in Teaching Laboratories
- Tests and Assignments
- Access to telco operators labs
- Remote access to MIT labs
- Innovative development project or industrial project

H. Student Support and Guidance

Academic Tutoring: 3 hours per week per module

I. Attendance Requirements

As per UTM's Regulations and Policy

J. Credit System

1 module = 6 credits

Industrial Project or Innovative Development Project = 12 credits

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 and activities may include reading research papers, delivering presentations, taking part in quizzes, case-studying amongst others.

Each module carries 200 marks and unless otherwise specified, will be assessed as follows:

Written examination, inclusive of reading time, of duration of at least 3 hours and continuous assessment carrying up to 40% of total marks. Continuous assessment can be based on a combination of assignments, field study, workshops and class tests.

L. Evaluation and Performance

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

Maximum marks attainable: 1400

Module grading structure:

Grade	Marks x (%)
A	$70 \leq x$
B	$60 \leq x < 70$
C	$50 \leq x < 60$
D	$40 \leq x < 50$
F	$x < 40$
A-D	Pass
F	Fail

M. Award Classification

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

Minimum Credits Required for Award of:

Master's Degree:	42
Postgraduate Diploma:	30
Postgraduate Certificate:	18

N. Programme Organisation & Management

Programme Director and Coordinator: Dr. Nawaz Mohamudally

Contact Details:

- Telephone Number: 207 52 50
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Part II - Programme Structure

O. MSc Mobile Communications and Computing – Full Time (Version 1.0)

Semester 1				Semester 2			
Code	Modules	Hrs/Wk L + P	Credits	Code	Modules	Hrs/Wk L + P	Credits
MCT5105C	Mobile Networks & Communications	3+3	6	CAN5112C	High Performance Architecture	3+3	6
MCT5106C	Mobile Standards, Regulations & Economics	3+3	6	PROJ5105C	Innovative Product Development Project of Industrial Project		12
TELC5120C	Satellite Communications	3+3	6				
TELC5121C	IP Communications & Business Services	3+3	6				

P. MSc Mobile Communications and Computing – Part Time (Version 1.0)

Semester 1				Semester 2			
Code	Modules	Hrs/Wk L + P	Credits	Code	Modules	Hrs/Wk L + P	Credits
MCT5105C	Mobile Networks & Communications	3+3	6	TELC5121C	IP Communications & Business Services	3+3	6
MCT5106C	Mobile Standards, Regulations & Economics	3+3	6	CAN5112C	High Performance Architecture	3+3	6
TELC5120C	Satellite Communications	3+3	6				

Semester 3			
Code	Modules	Hrs/Wk L + P	Credits
PROJ5105C	Innovative Product Development Project of Industrial Project		12

Q. MODULE OUTLINE

MCT5105C: MOBILE NETWORKS & COMMUNICATIONS

- Wireless Transmission
- Frequencies for radio transmission, signals and antennas, signal propagation, multiplexing, modulation, spread spectrum, cellular networks
- Media Access, MAC schemes
- SDMA, FDMA, TDMA, CDMA, WCDMA
- Wireless Telecommunications Systems
- GSM, DECT, TETRA, UMTS
- Broadcast systems
- Multimedia Broadcast Multimedia Systems (MBMS)
- Interactive DBT
- Mobile IP
- Wireless Network protocols
- Wireless Transport protocols
- Mobile nodes & networks

MCT5106C: MOBILE STANDARDS, REGULATIONS & ECONOMICS

- ITU telecommunications standards
- 3GPP, 3GPP2, 3GPP Release 7, 8
- IMT-2000
- Licensing schemes
- Frequency Allocation and radio spectrum management
- Unbundling local loops
- Universal Service Fund
- Standardisation bodies Ex: IETF
- Mobile Telephony regulations
- ICANN regulations
- Competition in the mobile industry
- Evolution of national markets for mobile services
- Business Strategies and Models
- Pricing issues in mobile markets
- Evolution of Mobile Telecommunications revenues
- Access Gaps
- Interconnection pricing mechanisms
- Emergence of integrated operators
- ICTA Act 2001
- UK, Malaysia, Singapore Acts

TELC5120C: SATELLITE COMMUNICATIONS

- History of Satellite Communications
- Frequency allocation for satellite services
- Orbits and launching methods
- Radio wave propagation
- Polarisation and location
- Antennas
- The space segment
- The earth segment
- Analog and digital signals
- Error control coding
- The space link
- Interference
- Satellite Access Methods
- Satellite Services and the Internet

- Direct broadcast satellite services
- Satellite Services
- Link Design and budgeting
- Routing
- Handover
- Basic Elements of Remote Sensing
- CubeSat

TELC5121C: IP COMMUNICATIONS & BUSINESS SERVICES

- IPv4/IPv6 coexistence and transition mechanisms
- IPv6 Security Issues
- IPv6 monitoring tools
- Handing Over in heterogeneous networks
- Session Initiation Protocol (SIP)
- VoIP services
- IPTV
- VoD
- Naming and DNSSec
- IPv6 Applications
- IP on mobile handset
- Convergence principles of services
- Wireless Internet, Architecture and Applications
- IP & MPLS
- Connected TV
- Mobile Apps Development
- Cloud enabled mobile apps

CAN5112C: HIGH PERFORMANCE ARCHITECTURE

- Broadband definition and architecture
- Broadband wireless access
- WiFi Networks
- WiMax, IEEE802.16d and 802.16e
- Managing Mobile Backhaul
- Microwave Backhaul
- Next Generation Architecture
- 1Gbps networks
- LTE and LTE-Advanced
- 3G, 3.5G, 4G, 4.5G
- Radio Interface (Software Defined Radio – SDR)
- UMTS Evolution
- OFDM Modulation, OFDMA, C-OFDMA
- IMS architecture
- MIMO techniques
- V-BLAST, D-BLAST, H-BLAST
- UTRAN, EDGE, GPRS
- VHE, PoC, E-DCH
- HSDPA & HSUPA
- HSPA Broad band Case Studies
- TETRA network
- Business & Commercial deployments
- Value Added Services
- Mobile Broadband computing services
- Costs and Benefits of new technologies
- Services and revenues
- Cash Flow Scenarios
- I-Burst networks

- Software Defined Networks (SDN)

PROJ5105C: INNOVATIVE PRODUCT DEVELOPMENT OR INDUSTRIAL PROJECT

Priority shall be given to industrial project in order to empower the students on real life scenarios and render the students more employable. But in case students cannot spend much time in the industry, they may choose a product development project whereby emphasis will be laid on innovation and towards a finished product.