UNIVERSITY of TECHNOLOGY, MAURITIUS

School of Innovative Technologies and Engineering

Department of Industrial Systems Engineering

BSc (Hons) Computer Science with Network Security

PROGRAMME DOCUMENT

VERSION 6.0

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BSC (HONS) COMPUTER SCIENCE WITH NETWORK SECURITY

A. PROGRAMME INFORMATION

In this era of rapid evolution in science, engineering, and business, Computer Science is radically changing the world today. Computer science is, *de facto*, an essential component of the Information Communications Technology (ICT) sector. The Bachelor of Computer Science with Network Security aims at producing graduates with skills to contribute to this exciting and rapidly evolving field. Furthermore, with its strong focus on solving real-world problems through problem-solving-based learning and cutting-edge content, this undergraduate programme delivers world-class, industry-relevant teaching. Students will not only gain knowledge and practical know-how but also a strong foundation in the underlying principles of the subject. It is this combination of skills that will enable our graduates to keep pace and adapt to this rapidly changing area and secure rewarding careers that can be pursued almost anywhere in the world.

Since most information system nowadays is growing more and more complex and networked, the risk of security attacks on such networks is becoming significant as most businesses rely on the computer system for storage and processing of critical and sensitive information. The BSc (Hons) Computer Science with Network Security is thus designed to produce graduates with a sound knowledge of today's networked infrastructure and security skills to be able to properly design, implement and secure such complex and distributed systems.

The programme adopts the **European Credit Transfer System (ECTS)** which promotes a unified procedure for academic recognition of study periods performed. The system introduces standards for assessment and comparison of study levels in various academic institutions and enables to recognize degrees at the European job market. ECTS credits are assigned to each module in the programme amounting to 60 credits per year.

B. PROGRAMME AIMS

This programme is a three-year program of study that equips students with skills that are in high demand from industry. It emphasizes the mathematical and theoretical foundations of computing such as programming, networks, database systems, cybersecurity, agile software design, mathematics, probability and statistics which cover the essential material required of all computer scientists, as well as a number of modules related to emerging technologies such as cloud computing, Internet of Things, Blockchain, Artificial Intelligence and Machine Learning. Moreover, the programme also equips students with soft skill such as communication, collaboration and teamwork, time-management, self-discipline and leadership that are essential for readiness for a professional career as well as overall growth and development. These "softer" skills enable a graduate to adapt and succeed in the workplace. The programme also involves a substantial individual supervised capstone computer science project and work placement (internship) to allow students to put learning into practice and depict their potential. The curriculum provides a balanced and intellectually stimulating programme of theoretical and practical work.

Employment Prospects

Computer technologies are integral to modern life and workplace, and thus computer science skills are in high demand across many different industries. These include software development, networking, telecommunications, financial, management and consultancy, and data management, multinational companies, governmental agencies, educational and healthcare institutions. Career opportunities exist in Mauritius, in other neighboring islands in the Indian Ocean and African countries and as well as in other parts of the world.

Typical job prospects include

- Applications developer
- Web Designer and developer
- IT consultant
- Information systems manager
- Software developer
- System Administrator
- Security Administrator

- Cyber security analyst
- Forensic computer analyst
- Data analyst
- Database administrator
- Mobile App developer
- Network Administrator
- IT sales professional
- ICT trainer/teacher

Further Study Opportunities
Successful graduates of this programme can also embark on further taught and/or research studies such as a master's degree (MSc) and/or a doctoral study leading to a PhD.

C. PROGRAMME OBJECTIVES

After successful completion of the BSc (Hons) Computer Science with Network Security programme, the graduates should/ will be able to:

- Build and maintain reliable software to address the sophisticated demands of today's market
- Develop innovative and creative approaches to problem-solving
- Work independently with confidence
- Design and develop network-based solutions
- Design a secured network using different available technologies such as cryptography, firewalls and intrusion, detection systems
- Have excellent communication skills
- Compete for roles at the cutting-edge of the tech sector, including application programmer, mobile app developer, web developer, network administration, security consultant

REGULATIONS

D. GENERAL ENTRY REQUIREMENTS

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

E. PROGRAMME ENTRY REQUIREMENTS

At least an 'A' Level (Advanced/Advanced Subsidiary) in Mathematics OR any one science subject (e.g. Physics, Chemistry, Biology, Computer Science, Design and Technology) OR any other science or Technology related subject.

F. PROGRAMME MODE AND DURATION

Full-Time: Minimum 3 years (6 semesters) and Maximum 6 years (12 semesters)
Part-Time: Minimum 4.5 years (9 semesters) and Maximum 7.5 years (15 semesters)

G. TEACHING AND LEARNING STRATEGIES

In general, for this programme, modules will be conducted via face-to-face mode. However, to cater for the impact of the COVID-19 pandemic and other similar situations, and matters connected, consequential, or related, the course may be run online or on a blended mode. The programme will be delivered in a diverse and inclusive learning environment.

The course contains strong practical elements in several modules; development of experiential learning through engagement with industrial mentors during the work placement at the end of year 2; and a year-long individual project in year 3. Each year aims to progressively build the students' skills, knowledge, and confidence in practical computer science.

The timetabled study is a mix of practical, tutorials and theoretical sessions. In the third year, more emphasis will be placed on independent study and this reflects the student's ability to apply knowledge and skills in substantial assignments and project. Students will be supported by an academic staff through all of the independent studies. This transition where students explore their own ideas through project work is an important attribute of a graduate.

Teaching, Learning and assessment will be carried out using a variety of methods, including

- Lectures (L), Tutorials (T) and Practical (P) sessions
- Workshops / Seminars / Group activities
- Structured Discussions & Self Development Study (SD)
- Case Study materials & scenarios centered on real-world problems
- Class Tests, Quiz assignments
- Assignments and/or presentations
- Practical exercises and demonstrations
- Work Placement
- Written and/or online examinations

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 for students as well as the following.

- Academic tutoring: Individual/group tutoring sessions can be arranged for students.
- Supervision for the Capstone Computer Science Project.
- Student counseling via the UTM Wellness Centre.

I. ATTENDANCE REQUIREMENTS

As per UTM's Regulations and Policy.

J. CREDIT SYSTEM

As stated in Section A, this programme is aligned with the European Credit and Transfer System (ECTS). The programme promotes a unified procedure for academic recognition of study periods performed. The system introduces standards for assessment and comparison of study levels in various academic institutions and enables recognition of diplomas/degrees at the European job market. ECTS credits are assigned to each module in the programme amounting to 60 credits for each level.

For each level, on average there will be 1500 hours of learning. One module is worth 6 credits and will carry 150 hours of learning to comprise 45 hours of delivery which could be any combination of face-to-face, blended, online, seminar, workshop, or joint session. The remaining 105 hours will cover self-learning, self-study, guest lecture, etc. The Capstone Computer Science Project is assigned 12 credits.

K. STUDENT PROGRESS AND ASSESSMENT

For the award of the degree, all modules must be passed overall with passes in the examinations, coursework, and other forms of assessment. All modules will carry 100 marks and will be assessed as follows (unless otherwise specified):

(i) Written examinations inclusive of reading time shall be of duration of up to 3 hours and will carry a weightage of 60% unless otherwise specified.
(ii) Continuous assessment will normally carry a weightage of 40% unless otherwise specified.
(iii) Continuous assessment for the following specific modules (Programming Techniques 1, Professional Communications, Programming for Machine Learning, Programming Techniques 2, Server-side Web Programming, Research and Innovation, Cross-Platform Mobile Applications, Web Service development) shall be 100% of the total marks. Continuous assessment can be based on a combination of assignments, case studies, workshops, and class tests.
(iv) The overall pass mark for a module is 40%.

Grading:

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

L. EVALUATION OF PERFORMANCE

(i) The % mark at Level 1 contributes a 20% weighting towards the BSc degree classification.
(ii) The % mark at Level 2 contributes a 30% weighting towards the BSc degree classification.
(iii) The % mark at Level 3 contributes a 50% weighting towards the BSc degree classification.

M. AWARD CLASSIFICATION

Overall weighted mark y (%)	**Classification**
$y \geq 70$	1st Class Honours
$60 \leq y < 70$	2nd Class 1st Division Honours
$50 \leq y < 60$	2nd Class 2nd Division Honours
$45 \leq y < 50$	3rd Class Honours
$40 \leq y < 45$	Pass Degree
$y < 40$	No Award

For the award of an Honours Degree, a minimum of 180 credits is required.

Students who fail to qualify for the award of the degree may be awarded as follows:

1. Certificate in Information Technology: at least 60 credits
2. Diploma in Information Technology: at least 120 credits

N. PROGRAMME ORGANISATION AND MANAGEMENT

Programme Director/Coordinator: Dr. Sandhya ARMOOGUM

Contact Details: Tel: 207-5250 Fax: 234-1767

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Programme Design Committee:
Dr Sandhya Armoogum (UTM), Dr Nawaz Mohamudally (UTM), Dr Vinaye Armoogum (UTM), Mr Rishi Heerasing (UTM), Mr Ravi Foogooa (UTM), Dr Geerish Suddul (UTM), Mr Pillay Kanaksabee (UTM), Dr Arshad Peer (UTM), Dr Aslam Saib (UTM).

PROGRAMME STRUCTURE

O. BSc (Hons) Network and Telecommunication Technologies Programme Structure

Level 1					
Code	**Modules**	**Hrs/Wk** L/T/P+SD	**Total Hrs/ Semester**	**ECTS Credits**	**Prerequisites (if any)**
BCNS1101C	Maths for Computer Science	3+7	150	6	
BCNS1102C	Programming Techniques 1	3+7	150	6	
BCNS1103C	Database Design	3+7	150	6	
WAT11XXC	Web Design & Development	3+7	150	6	
BCNS1105C	Professional Communications	3+7	150	6	
BCNS1206C	Probability & Statistical Techniques	3+7	150	6	
BCNS1207C	Networks	3+7	150	6	
BCNS1208C	Computer Architecture and Operating Systems	3+7	150	6	
BCNS1209C	Programming for Machine Learning	3+7	150	6	
BCNS1210C	Cyber crime and security fundamentals	3+7	150	6	
	Total Hours (Level 1)		**1500**	**60 credits**	

Level 2					
Code	**Modules**	**Hrs/Wk** L/T/P+SD	**Hrs/ Semester**	**ECTS Credits**	**Prerequisites (if any)**
BCNS2101C	Programming Techniques 2	3+7	150	6	
BCNS2102C	Switching and Routing Techniques	3+7	150	6	
BCNS2103C	Server-Side Web Programming	3+7	150	6	
BCNS2104C	Project Management and Entrepreneurship	3+7	150	6	
BCNS2105C	Data Security & Cryptography	3+7	150	6	
BCNS2206C	Agile Software Engineering	3+7	150	6	
BCNS2207C	Research and Innovation	3+7	150	6	
BCNS2208C	Operating System Administration	3+7	150	6	
BCNS2209C	Cross-Platform Mobile Applications	3+7	150	6	
WAT2140C	Web Service Development	3+7	150	6	
	Total Hours (Level 2)		**1500**	**60 credits**	

PRE-LEVEL 3 ACTIVITY			
Code	**Activity**	**Duration**	**Credits**
BCNS3101C	Work Placement	Two-month training in an ICT industry or at UTM which will start immediately after the 15th week of the 4th Semester of the programme of study on Full-Time mode.	6 credit, Compulsory Submission of a Portfolio upon completion

Level 3					
Code	**Modules**	**Hrs/Wk** L/T/P+SD	**Hrs/ Semester**	**ECTS Credits**	**Prerequisites (if any)**
BCNS3102C	IoT Networks and Applications	3+7	150	6	
BCNS3103C	Machine Learning	3+7	150	6	
BCNS3104C	Network security	3+7	150	6	
BCNS3105C	Network Design and Management	3+7	150	6	
BCNS3207C	Digital Forensics	3+7	150	6	
BCNS3208C	Cloud computing	3+7	150	6	
BCNS3209C	Cryptocurrency & Blockchain	3+7	150	6	
BCNS3006C	Capstone Computer Science Project	-		12	
	Total Hours (Level 3)		**1080 (excluding Capstone project)**	**60 credits**	

Total Number of ECTS Credits = 180.

Total Number of ECTS Hours = 4050 (excluding the number of hours spent to complete the Capstone project).

Version 6.0 was approved in September 2021.