



UNIVERSITY
of
TECHNOLOGY,
MAURITIUS

School of Innovative Technologies and Engineering

Department of Industrial Systems Engineering

BSc (Hons) Network and Telecommunication Technologies

PROGRAMME DOCUMENT

VERSION 1.0
BNETVI.0
September 2021

BSC (HONS) NETWORK AND TELECOMMUNICATION TECHNOLOGIES

A. PROGRAMME INFORMATION

Networks and Telecommunications are a vital part of systems infrastructure, and fundamental to businesses, society, and industry. They have become part of everyday lives and form the backbone of modern information systems. During the last decade, the network/telecom industry has seen massive growth and is now preparing for a drastic change with the evolution of the fifth industrial revolution.

Currently, the only issue that has more pressure on the global telecommunications infrastructure is the Covid-19 pandemic. Governments, companies, universities and educational institutions, schools, and households around the world transitioned to remote working, learning, and socializing. All these require online access and increased use of audio & video communications and bandwidth. According to Forbes (2021), this transition almost instantly has pushed up Internet usage by 70% and has tasked networks that, prior to this point, were working fairly efficiently. This has opened the doors of various opportunities for the network and telecommunication professionals. This programme is a broad-based course that provides the students with the technical expertise and skills required to plan, design, construct and maintain telecommunications networks, equipment and facilities.

This BSc (Hons) Network and Telecommunication Technologies programme is designed so that graduates can take up demanding, responsible and exciting positions in the rapidly expanding telecommunication and network industry. The programme has been developed in consultation with leading companies in Mauritius and is tailored to the current needs of the industry. It emphasizes an in-depth understanding of the technologies that underpin the Internet, local and global broadband digital networking, and mobile communication systems that are required for tomorrow's broadband-interactive information highways. It also focuses on the application of technology solutions to business problems in the telecom sector. The programme addresses several emerging technologies such as mobile technologies, cloud deployments, 5G, Internet of Things (IoT), Software-Defined Networks, Internet Protocol version 6 (IPv6), amongst others, and safety of businesses in line with the rapid evolution of global information structures and Technology 4.0 and 5.0. Finally, this programme emphasizes the technical aspects of network design, network installation, configuration, systems administration, maintenance, and management, as applied to the emerging technologies. Students will hence gain practical experience in developing systems using the latest technologies and techniques, as well as exposure to the latest trends that will shape their future.

At the first level, the programme covers a broad range of fundamental concepts in network Technologies, telecommunication fundamentals, operating system & installation, cabling work, database technology, programming using the latest platform recommended by the industry. The first level also covers key areas in mathematics and physics, basically, the electrical circuit theory to ensure that the students have sufficient knowledge and aptitude to cope with the more advanced modules that necessitate these academic backgrounds. Hence, this level lays the theoretical and practical foundations for study at a more advanced level. The students will undergo in-house training under the assistance of a technical team to demonstrate their practical and professional skills in the design and installation of a simple system. In the second and third levels, the modules are built to give the students an understanding of how to apply network principles to more complex problems and helping them to develop sophisticated analysis methods and design. The specialized modules will address areas such as network operating system, network design, configuration to implementation and testing of networks, emerging technologies such as software-defined networks, cloud computing, virtualization, development and usage of IoT applications in a network and telecom system, mobile systems (up to 5G), network advanced programming, infrastructure management, acquisition and procurement methods, agile approach for planning and design and installation of a network system and appropriate topics in security to defense systems against any attacks and threats. During the semester break, the students will follow a professional work placement programme in a company to develop their technical skills and build their experience. The students will complete a final year project to be qualified for the Bachelor programme.

B. PROGRAMME AIMS

The BSc (Hons) Network and Telecommunication Technologies programme aims to provide a foundation upon which students can build a successful career. This programme has been created to provide the students with the skills and abilities required by networking companies. The programme deals with network engineering as well as network design and administration.

Employment Prospects

Network and Telecommunication jobs entail designing, installing, and testing/fixing network and telecommunications systems and equipment. A career in these fields is a promising one since communication options are constantly changing and growing. In this diverse field career options are available in Transmission and switching systems, performance and optimization, network policy, network operations, server management, system programming, wireless systems, and the development of innovative applications and software.

There are many and varied career opportunities for highly qualified network specialists and administrators in the networking industries. These industries are large and strong in Mauritius and the region. Also, due to the global nature of this area, there are also career opportunities in other parts of the World. Possible jobs include Telecom Project Manager, Network Manager, Telecom or Network Engineer, Network Administrator, System Administrator, system programmer, Cloud-based jobs (e.g. cloud engineer or anything job dealing with the planning, design, deployment, maintenance, and support), Mobile Network Field Engineer, Penetration Tester, Network Support staff, System Support Analyst, Network Security Analyst, System Architects, Network Systems Consultant, Product Support Engineer, IT Support Engineer, etc.

Further Study Opportunities

Graduates of this BSc (Hons) Network and Telecommunication Technologies may undergo further study at a range of levels, including, master's degrees and doctoral study leading to a PhD.

C. PROGRAMME OBJECTIVES

After successful completion of the BSc (Hons) Network and Telecommunication Technologies programme, the graduates will acquire the following:

- knowledge of the physical and logical principles that determine how data networks and various telecommunications systems work
- Describe the integration of multiple technologies in addressing organizational solutions
- Demonstrate an understanding of industry-standard best practices in working with telecommunications technologies
- Technical skill to design and install to meet a specification and manage a networked system
- Display an appreciation of network-based application development
- Select and configure appropriate hardware and software to implement a networked system design
- Identify and solve problems in the operation of networked systems
- Capacity to pursue an independent investigation using learning resources and practical evaluation
- Demonstrate critical thinking and communication skills required in a technical environment
- Communicate effectively verbally and in writing
- Finally, demonstrate sufficient background knowledge to serve as a foundation for continued studies.

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 a credit in Mathematics or in one Science or Technology subject at Ordinary level of the School Certificate or an alternative qualification acceptable to the APL/APEL committee.

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 either via online or blended learning modes. The student would be expected to perform a substantial amount of self-learning both for the theoretical and practical parts of the modules and adopt a research-oriented approach, as far as possible.

To summarise, teaching and learning activities may include

- Lectures (L), Tutorials (T) and Practical (P) sessions
- Class Tests and Assignments
- Participating in quiz-based exercises
- Professional Work Placement (in-house training and outside the University)
- Workshops / Seminars / Lab Sessions
- Industry visits so that students may observe company cultures and may network with industry professionals
- Structured Discussions & Self Development Study (SD)
- Case Study materials & scenarios centred on real-world network and telecom-related scenarios and problems.

H. STUDENT SUPPORT AND GUIDANCE

- Academic tutoring and Counseling: Group tutorials or individual tutorials are arranged for students upon request.
- Supervision of mini-projects, placement, in-house training and final year capstone projects.

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). 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 to recognition of diplomas 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 Project is assigned 12 credits.

K. STUDENT PROGRESS AND ASSESSMENT

The programme is delivered through lectures and seminars, and practical sessions in computer, network and electronic labs. Self-study or self-development is also important and will include reading, designing and preparing presentations, academic tutoring, writing reports and theses, and investigating problems. The importance of IT/simulation tools in modern network practice is emphasized, and students will make use of the latest software to solve problems and to develop network solutions.

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 and/or practical examinations will normally 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 (Python Programming Methodology 1 & 2, Structured & Coaxial Cabling and Optical Fibre, Business English and French Communication Skills, Life skills and Good Practices, Python Network Programming, Research and Project Development Process, Pervasive Internet of Things Systems) shall be 100% of the total marks. Continuous assessment can be based on a combination of assignments, field 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 | Referred |

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 (%)

| |
|------------------|
| $y \geq 70$ |
| $60 \leq y < 70$ |
| $50 \leq y < 60$ |
| $45 \leq y < 50$ |
| $40 \leq y < 45$ |
| $y < 40$ |

Classification

| |
|--|
| 1st Class Honours |
| 2 nd Class 1st Division Honours |
| 2 nd Class 2 nd Division Honours |
| 3rd Class Honours |
| Pass Degree |
| No Award |

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

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

1. Certificate in Network Technology: a minimum of 60 credits
2. Diploma in Network Technology: a minimum of 120 credits.

N. PROGRAMME ORGANISATION AND MANAGEMENT

Programme Director/Coordinator: Dr. Vinaye ARMOOGUM

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Programme Design Committee:

Dr Vinaye Armoogum, Dr Nawaz Mohamudally, Dr (Mrs) Sandhya Armoogum, Mr Rishi Heerasing, Mr J. Narsoo, Mr Dudley Tse, Dr Sameer Sunhaloo, Dr Geerish Suddhul, Mr Ravi Foogooa, Ms Vanessa Seebaluck and Prof KMS Soyjaudah.

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) |
| BNET1101C | Mathematical Techniques | 3+7 | 150 | 6 | |
| BNET1102C | Python Programming Methodology 1 | 3+7 | 150 | 6 | |
| BNET1103C | Structured & Coaxial Cabling and Optical Fibre | 3+7 | 150 | 6 | |
| BNET1104C | Telecommunication Systems and protocols fundamentals | 3+7 | 150 | 6 | |
| BNET1105C | Electrical circuits and theory | 3+7 | 150 | 6 | |
| BNET1206C | Database Theory and Applications | 3+7 | 150 | 6 | |
| BNET1207C | Python Programming Methodology 2 | 3+7 | 150 | 6 | BNET1102C |
| BNET1208C | Business English and French Communication Skills | 3+7 | 150 | 6 | |
| BNET1209C | Operating Systems and Troubleshooting | 3+7 | 150 | 6 | |
| BNET1210C | Network Technologies and Design 1 | 3+7 | 150 | 6 | BNET1104C |
| Total Hours (Level 1) | | | 1500 | 60 credits | |

| INTER-LEVEL ACTIVITY | | | |
|----------------------|--|--|--|
| Code | Activity | Duration | Credits |
| BNET1211C | Professional Studies 1: Hardware Assembling and OS administration, Server Installation and Troubleshooting | 30 hours (training workshop during vacation at the end of Level 1) | No credit. Compulsory Submission of a Report upon completion |

| Level 2 | | | | | |
|------------------------------|---|--------------------|------------------|-------------------|---------------------------|
| Code | Modules | Hrs/Wk L/T/P+SD | Hrs/ Semester | ECTS Credits | Prerequisites (if any) |
| BNET2101C | Electronic Circuits and practice | 3+7 | 150 | 6 | BNET1103C BNET1105C |
| UTM2101C | Life skills and Good Practices | 3+7 | 150 | 6 | |
| BNET2102C | Linux OS, Architecture & Programming | 3+7 | 150 | 6 | BNET1210C |
| BNET2103C | Cloud Computing and Virtualization | 3+7 | 150 | 6 | |
| BNET2104C | Network Technologies and Design 2: LAN Switching and Wireless LAN | 3+7 | 150 | 6 | BNET1210C |
| BNET2205C | Social & Legal issues and Professional Ethics | 3+7 | 150 | 6 | |
| BNET2206C | Server Administration & Management | 3+7 | 150 | 6 | BNET1210C BNET2104C |
| BNET2207C | Python Network Programming | 3+7 | 150 | 6 | BNET1207C |
| BNET2208C | Network Technologies and Design 3: WAN Technologies | 3+7 | 150 | 6 | BNET2104C |
| BNET2209C | Infrastructure Management and Acquisition | 3+7 | 150 | 6 | BNET1104C |
| Total Hours (Level 2) | | | 1500 | 60 credits | |

| PRE-LEVEL 3 ACTIVITY | | | |
|----------------------|--|---|---|
| Code | Activity | Duration | Credits |
| BNET3101C | Professional Studies 2: Professional Placement | Two-month training in a network/telecom industry or at UTM which will start during vacation at the end of Level 2 | 6 credits, Compulsory Submission of a Portfolio upon completion |

| Level 3 | | | | | |
|-----------|--|--------------------|--|-----------------------|---------------------------|
| Code | Modules | Hrs/Wk L/T/P+SD | Hrs/ Semester | ECTS Credits | Prerequisites (if any) |
| BNET3102C | Research and Project Development Process | 3+7 | 150 | 6 | |
| BNET3103C | Agile Professional & Project Management | 3+7 | 150 | 6 | |
| BNET3104C | Network Technologies and Design 4: Routing Techniques | 3+7 | 150 | 6 | BNET2208C |
| BNET3105C | Pervasive Internet of Things Systems | 3+7 | 150 | 6 | BNET2207C |
| BNET3208C | Network Technologies and Design 5: Secure Telecommunication & networks Solutions | 3+7 | 150 | 6 | BNET3104C |
| BNET3209C | Network Technologies and Design 6: Integration and Enabling Technologies | 3+7 | 150 | 6 | BNET3104C |
| BNET3106C | Mobile Systems and Technologies | 3+7 | 150 | 6 | |
| BNET3007C | Network Capstone Project | - | | 12 | |
| | Total Hours (Level 3) | | 1080 (excluding Capstone project and placement) | 60 credits | |

Total Number of ECTS Credits = 180.

Total Number of ECTS Hours = 4080 (excluding the number of hours spent to complete the Professional Studies 2 (Professional Placement) and the Capstone project).

Version 1.0 was approved in September 2021.