AMERICAN UNIVERSITY OF NIGERIA

MASTER OF TELECOMMUNICATION AND WIRELESS TECHNOLOGIES (MTWT)

PROGRAM PROSPECTUS



INTRODUCTION

Telecommunications and ICT are the fastest growing sectors in developing nations especially within Sub-Saharan Africa. They remain major drivers for businesses in the world and together serve as major catalysts for development.

PHILOSOPHY

The Telecommunication and Wireless Technology program provides an ideal blend of technology and management courses that will propel the candidate into senior management position with the knowledge to help grow their company, effectively helping communication companies in Nigeria keep up with companies from the developed world, compete in an even playing field and support the growing demand for mobile communications.

AIMS / OBJECTIVES

The broad aim of our Master's Program in Telecommunication and Wireless Technology is to provide an opportunity to the large and growing pool of busy professionals in Nigeria to gain relevant knowledge and capabilities on the fast-changing Telecom & Mobile industry which has become all-pervasive across diverse organizations today.

Some objectives of the program include:

- Possess the ability to design computer networks and embedded systems that include both hardware and software to solve novel engineering problems, subject to trade-offs involving a set of competing goals and constraints. In this context, "design" refers to a level of ability beyond "assembling" or "configuring" systems.
- Have a breadth of knowledge in mathematics and engineering sciences, associated with the broader scope of telecommunications and beyond that are required for the field.
- Acquire project planning, organization & management.
- Acquire experience in methods and techniques for products and process improvement.
- Acquire commercial awareness.
- Develop personal qualities such as creativity, imagination, initiative & maturity.

COURSE STRUCTURE

The Master of Telecommunication and Wireless Technology program requires a minimum of 36 credit units made up as follows:

• 10 core courses (3 credits each)	30 Credit units
• Thesis (done over two semesters)	6 Credit units
• Total	36 Credit units

CORE COURSES

	Credit Units
ICT 517 Advanced Programming in C++ and Python etc.	3
TEL 501 Principles of data communications, Signaling, Transmission and Switching	3
TEL 503 Broadband and Access Technology	3
TEL 505 Voice Over IP and MPLS	3
TEL 507 Telecoms Policy, Licensing, Price Regulation and Regulatory Economics	3
TEL 602 Broadcast Networks	3
TEL 604 Real time DSP for Wireless communications	3
TEL 606 NGN and WiMAX	3
TEL 608 Advanced Mobile systems and Wireless	3
TEL 610 Telecom Markets, Business Cases, Strategy, Product, Marketing & Pricing	3
TEL 690/691 Capstone Electives	6

COURSE DESCRIPTIONS

ICT 517 - Advanced Programming in C++ and Python etc.
Basic Objects and Classes, Function and Operator Overloading, Inheritance and Polymorphism, Input and Output, Memory Management, Templates, Exception handling. The Standard API & Library. The ANSI/ISO Standard. Development Environments: Debuggers, Profilers, Browsers, Object Oriented Methodologies (one in detail e.g. OMT/UML). Reverse engineering, Case Study and Project in the area of Software Design for Advanced Communication Systems, Software Reuse.

TEL 501 - Telecommunications System Foundations; - Principles of data communications, Signaling, Transmission and Switching
The course provides a broad technical overview of telecommunication fundamentals, focusing on the principles of Data Communications, Signaling, Transmission and Switching. This course would allow participants to understand wired and wireless communications principles and standards. This is the fundamentals of Telecommunications systems which is necessary for understanding data communications, transmission and access systems.

TEL 503 - Broadband and Access Technology
The evolution of broadband and access technologies requires that managers and other staff members to be sufficiently aware of some of the pressing technical and business issues to be resolved. Understanding of fundamental technological developments, regulatory framework and commercial requirements are essential for the deployment of a successful broadband access strategy. The course will cover wide range of technological choices to provide comprehensive understanding of the key issues in broadband and access technologies.

TEL 505 - Voice Over IP and MPLS
The objective of this course is to provide delegates with a technical and practical overview of Voice over IP (VoIP) and MPLS. The course will introduce VOIP which lays the foundation for gaining skills and significant understanding of packet telephony by presenting the technologies that are common for both Enterprise and Service Provider delegates. The course will also provide an overview of basic MPLS, the component of an MPLS network and the Architecture.

TEL 507 - Telecommunications Policy, Licensing, Price Regulation and Regulatory Economics

On-going advances in telecommunications engineered by the convergence of traditional telecommunications systems, broadcasting, computing and networking and the emergence of smart-working have been imposing severe strains on many regulatory institutions, testing their core and delivery capabilities to the limit. The regulatory role is becoming increasingly challenging due to its unique and central position in the *two sided-market* surrounded by a complex mix of high-interest stakeholders all demanding higher and satisfying quality of service.

This course introduces the key principles and debates and also provides in-dept understanding of key interconnection and regulatory issues. The course is design around a blended learning approach involving lecturers, case studies and hands on application of key concepts to enhance the learning experience of delegates.

TEL 602 - Broadcast Networks

In 2006 countries in ITU region 1 committed to a transition to digital television by the year 2015. After this year, digital TV broadcasters have no obligation to protect continuing analogue broadcasts from interference. This course first explains the fundamentals of television broadcast systems and then explores the advantages of digital TV both for production and transmission. A substantial part of the course then explores in detail the four main digital TV standards highlighting in each case the technological and economic advantages. The course highlights the value of a national digital plan that has to involve all stakes holder in any successful transition from analogue to digital TV before going on to illustrate analogue to digital switch over with a couple of specific case studies. The course concludes with a review of second-generation digital TV standards exploring their advantages over the older first-generation standards.

TEL 604 - Real time DSP for Wireless communications

This module provides the students with the confidence and capability to successfully map DSP algorithms used in wireless communication systems to an advanced DSP system. Students will first learn the principle of real-time DSP especially the issues related to analogue signal sampling, digital representation, digitization effects on analogue signals and real-time processing constraints. Subsequently, students will learn the latest and advanced Texas Instrument (TI) TMS320C6000 DSP family, in particular, TMS320C6416T. Issues related to the processor architecture, its peripherals and operation, software development tools and real-time DSP programming will be covered. Students will be able to design real time embedded systems for wireless communications using different design methodologies and advanced arithmetic techniques suitable for DSP implementation. A range of DSP algorithms for wireless communication applications will be studied and analyzed for example, digital filter (FIR), adaptive filter, modulation techniques (PAM, PSK, QAM), phase-lock loop (costas-loop), FFT, CDMA, spectrum analysis etc.

TEL 608 - Advanced Mobile systems and Wireless

This module covers the fundamental principles of mobile communication systems and provides the knowledge and a practical understanding of the evolution and up-to-date technologies in mobile systems. It includes GSM/GPRS/UMTS/4G, multiple access technologies, cellular systems, multipath fading, QoS management and control, radio resource management and mobility and security management. Topics also includes Wireless access technologies, wireless LAN, mobile IP mobile transport layer and wireless multimedia applications

Tel 610 - Telecommunications Markets, Business Cases, Strategy, Product, Marketing and Pricing

The emergence of increasingly complex and intelligent next generation telecommunication networks (NGN) driven by customers' desire for ubiquitous and real time access to multi-media information has come with uphill challenges to regulators and other policymakers within the context of managing regulatory expectations in general, and, marketing in particular. It is therefore crucial that key players within the regulatory environment understand the shifting marketing dynamics within the industry whereby regulators are not only increasingly adopting entrepreneurial approaches to regulation but

also have the responsibility of understanding how NGN technologies can be marketed to meet the expectations of increasingly fragmented consumers. This course would allow participants to understand both traditional and emerging marketing concepts/frameworks applied to NGNs within the regulatory space.

TEL 690/691 – Capstone Electives

The student will be able to pick 2 electives out of an available set of electives in more specialized areas of interest to them for their career needs. Either or both of these requirement can also be met by completing set online industry certification programs.