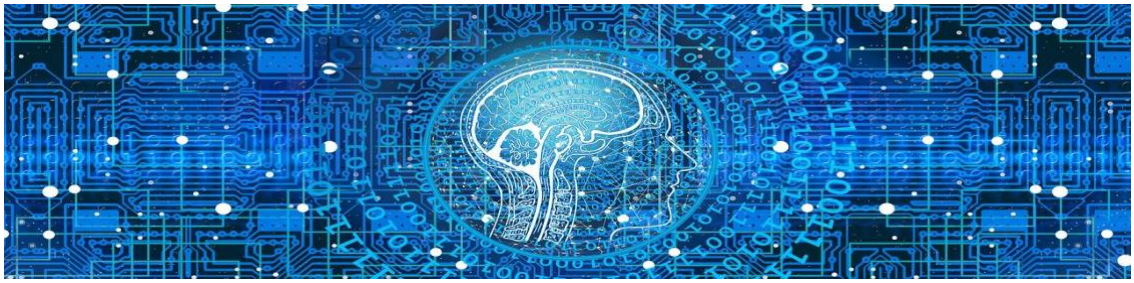
AMERICAN UNIVERSITY OF NIGERIA

MASTER OF INFORMATION COMMUNICATION SCIENCES (MICS)

PROGRAM PROSPECTUS



INTRODUCTION

Information and Communications Technology 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

Our philosophy is that with the right skillsets and professionals, IT offers a springboard for Nigeria and the Sub-Saharan African region to leapfrog the developments in this area and become competitive in the global economy. For this to happen, a stronger tie with industry is required. This program offers one opportunity to forge stronger ties with industry to that end.

AIMS / OBJECTIVES

The broad aim of our Master's Program in ICS 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 IT industry which has become all-pervasive across diverse organizations today.

Some objectives of the program include:

- Explain and apply appropriate information technologies and employ appropriate methodologies to help an individual or organization achieve its goals and objectives;
- Function as a user advocate;

- Manage the information technology resources of an individual or organization;
- Anticipate the changing direction of information technology and evaluate and communicate the likely utility of new technologies to an individual or organization;
- Understand and, in some cases, contribute to the scientific, mathematical and theoretical foundations on which information technologies are built;
- Live and work as a contributing, well-rounded member of society.

COURSE STRUCTURE

The Master of Information and Communication Science program requires a minimum of 36 credit units made up as follows:

▪ 10 core courses (3 credits each)	30 Credits units
▪ 2 Capstone Electives	6 Credits units
▪ Total	36 Credits units

CORE COURSES

	Credit Units
ICT 501 System Dynamics & Business/Data Analytics**	3
ICT 503 Data Science & Analytics**	3
ICT 505 Modern Operating system: Concepts, Principles & Practice (Linux!)**	3
ICT 507 TCP-IP and Networking **	3
ICT 509 IT Project Management	3
ICT 602 Web & Mobile Application Development **	3
ICT 604 Enterprise Database Management	3
ICT 606 IT Security and Computer Forensics	3
ICT 608 System Analysis & design with the UML	3
ICT 612 Emerging Technology (Cloud computing, Architecture)	3
ICT 690/691 Capstone Electives	6

COURSE DESCRIPTIONS

ICT 501 - System Dynamics & Business Analytics

The course is designed to develop skills in the creation and use of computer simulation models, firstly as an aid to gaining a more holistic view of complex business systems and their dynamics

and secondly as a tool for policy analysis and formulation of business strategy. A principal focus of the course is gaining understanding and appreciation for the significance of information feedback and circular causality in the behavior of complex sociotechnical systems. The increasing complexity of these socio-technical systems demands a new and complementary approach to the traditional scientific reductionist approach that has not done so well in the face of complex socio-technical issues. Systems dynamics represents a paradigm-shift from the scientific view of problems. The systems approach to problem-solving is holistic rather than reductionist in nature. It comes with a set of graphical modeling tools for discerning the underlying problem structure and a computer simulation methodology for building management flight simulators that permit to experiment with various policy choices to find leverage points that can affect the desired outcomes and become the basis for new policy decisions. A system study should precede and guide business analytics. Analytics has been defined as the extensive use of data, statistical and quantitative analysis, explanatory and predictive models, and fact-based management to drive decisions and actions. It is a process of transforming data into actions through analysis and insights in the context of organizational decision making and problem solving. Analytics includes a range of activities, including business intelligence, which is comprised of standard and ad hoc reports, queries and alerts; and quantitative methods, including statistical analysis, forecasting/extrapolation, predictive modeling (such as data mining), optimization and simulation. The Business analytics complement covers managerial statistical tools for descriptive and predictive analytics and data visualizations. Excel, Python and related tools/algorithms for data explorations, visualizations and analysis will be covered. [This course supports a certification component that is one of the Certification-to-Degree units]

ICT 503 – Data Science & Analytics

Data science is a fascinating, lucrative, and fast-growing field. Optimum use of Data Science in business has encouraged better customer service, inventory management, targeted advertising and many other profitable business decisions across industries. Data Science uses data to uncover patterns, relationships and behavior that may impact business decisions. Data scientists structure and analyze large volumes of data, uncover patterns, and make predictions. The Data Science syllabus consists of a considerable portion of *math*, *statistics*, *coding*, *domain expertise*, *Machine Learning algorithms and Data Analysis*. Having practical exposure is just as necessary to become a successful Data Scientist. Domain expertise translates to developing expertise in your area of work. Topics to be covered include *data collection*, *integration*, *management*, *modeling*, *analysis*, *visualization*, *prediction* and *informed decision making*, *as well as data security and data privacy*. This introductory course is integrative across the core disciplines of Data Science, including databases, data warehousing, statistics, data mining, data visualization, high performance computing, cloud computing, and business intelligence. Professional skills, such as communication, presentation, and storytelling with data, will be fostered. Students will acquire a working knowledge of data science through hands-on projects and case studies in a variety of business, engineering, social sciences, or life sciences domains. Issues of ethics, leadership, and teamwork are highlighted. Other areas to consider for completing a Data Science syllabus consist of Data Wrangling and Data Visualization. [This course supports a certification component that is one of the Certification-to-Degree units].

ICT 505 – Modern Operating Systems: Concepts, Principles & Practice (Linux)

The course will examine concepts, principles and the practice of modern operating systems with emphasis on the Linux Operating and its role in modern Cloud and Mobile applications. Treatment will go from important, high-level concepts all the way down to the command-line, scripting and some system level coding. Because operating systems concepts are among the most difficult in computer science, this top to bottom approach coupled with hands-on practice on the Ubuntu Linux systems should, we hope, help build skills and understanding better. We will cover core ideas in a modern operating system, such as; protection, concurrency, virtualization, containerization, resource allocation, and reliable storage. These are now widely applied throughout computer science. The dominance of Web, Cloud and mobile computing has given added importance to the Linux operating and the whole open source software movement. [This course supports a certification component that is one of the Certification-to-Degree units].

ICT 507 – TCP/IP & Networking **

The course covers the operational functions of Internet technologies (which include IPv4, IPv6, TCP, UDP, addressing, routing, domain names, etc.) and your PC, laptop or mobile's security and gateway Internet setup and basic principles. Topics include: Network basics, Network architectures (OSI Model), What are switches and routers? How is data forwarded through a network?, IP addresses, MAC Addresses, IP subnetting, Cabling and network topologies, TCP/UDP, DNS and DHCP, Routing, VLANs, Encryption, WireShark Basics and Data Hashing.

In addition, through some simple Wireshark lab experiments, you will see and learn about the TCP/IP packets and security systems in action that are serving your PC/laptop, that serve you. The dominance of Cloud and Mobile computing and the special role of virtualization in their set up has given added importance to networking and the TCP/IP stack in these distributed applications. [This course supports a certification component that is one of the Certification-to-Degree units].

ICT 509 - IT Project Management

This course will introduce modern project management. The course begins with an overview of the nuts and bolts of project management. From here it expands into Adaptive and Extreme project management. The focus of the course then shifts to the individual skills required to be an effective project manager, such as time management, leadership, and motivation. Once skills of the individual have been addressed, the course looks at social networks and how they could impact project management.

ICT 602 - Web & Mobile Application Development

The program is designed to prepare graduates with the knowledge they need to take advantage of electronic commerce opportunities in commercial and enterprise management in the new economy. Students will be able to understand management, public policy, and information

technology concepts, and effectively integrate these into developing electronic commerce solutions in a wide variety of specialized applications from electronic government, to electronic banking, to tele -health. More importantly, they will respond to the demand for professionals to work in a wide variety of capacities in digital age organizations in Nigeria and around the world.

ICT 604 - Enterprise Database Management

This course will reveal the fundamentals of database technology and database management systems. It will cover a wide range of topics including: uses of databases, database architectures, design, real world implementations, security topics, integrity issues, Structured Query Language (SQL), performance concepts, and storage issues. The emphasis of the course will be on practical applied database technology for enterprise systems. Course will cover logical and physical database design, query languages, and database programming, and will examine commercial systems. The course will also focus on technologies and industry standards for accessing and manipulating persistent data that are suitable for web enterprise application systems.

ICT606 – Cyber Security & Computer Forensics

This course will include the following topics: Network security, hacker attacks, virus attacks, web security, e-mail security, e-commerce security, systems and operation environment security, database security, algorithms for making data communications secure; encryption and coding techniques and IP security. Issues such as organizational security policy, legal and ethical issues in security, standards and methodologies for security evaluation will also be covered.

ICT 608 - System Analysis & Design with the UML

This course will focus on the application of the systems approach to the analysis and design of

information systems. Topics covered include object-oriented analysis models and tools; use cases, system modeling using UML; requirements specification development; other techniques for information requirement analysis, systems analysis issues, design theory, design techniques, system development life cycle and project management issues and a term project.

ICT 612 - Emerging Technology (Cloud computing, Architecture)

The course will present the state of the art in cloud computing technologies and applications. The course will explore potential research directions, as well as the technologies that will facilitate the creation of global marketplace for cloud computing services that support scientific, industrial, business, and consumer applications. Topics will include**:** telecommunications needs; architectural models for cloud computing; cloud computing platforms and services; security, privacy, and trust management; resource allocation and quality of service; cloud economics and business models; pricing and risk management; interoperability and internetworking; legal issues; and novel applications. Course projects will expose students to different tools and technologies used to build and utilize clouds and the related security, privacy and trust management issues.

ICT 610 - Technical Writing and Presentation

This course will explore and show students reasons for good technical writing matters. It will introduce the technical writing process and uses class group writing workshops to task/encourage students to prepare technical documents in selected topics of the ITC field. Writing workshops and assignments will cover the technical areas of Information Technology and Communications, IT Project Management, Systems Analysis, System Design and implementation documentations. Writing assignments are drawn. The course will use practical methods and workshops to improve students' presentation and public speaking skills. Students will be able to measure their improvements.

ICT 690/691 – Specialized Electives for Capstone Experience

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.