Syllabus

ICT 206 – **Data Communications and Networks** (Credit Units: 3)

Department of Information and Communication Technology
Faculty of Computing
University of Delta, Agbor, Nigeria

Lecturer: Dr. Richard Omoefe Oveh
Office Location: FOC Room 2
Email:
Phone: +234 07036142579
Office Hours: Monday, Tuesday, Wednesday, Thursday & Friday 8:00 am - 4:00 pm
I can be reached using any of the following medium: in the office, by email, text message, WhatsApp or phone call.

Meeting Time and Place: Thursday, 10:00am to 12:00pm, FOC LH 2

Attendance

You are expected to attend every class. If you must miss a class, it is your responsibility to make up for the work that you missed. If you are going to be absent from any class, you must please notify the instructor in advance.

Methods of Instruction

This syllabus contains an overview of what will be covered in class; for specific information, students are referred to the class web page maintained on the University website. Assignments will be posted on University of Delta LMS or given in the class and should be submitted through University of Delta LMS. Class attendance, doing all your practical and homework will help the borderline cases.

Overview

Data Communications and Networks involve the transmission of information between devices. Key concepts include data transmission, network components, communication protocols (e.g., OSI, TCP/IP), LANs, WANs, internet and intranet, network security, wireless communication (Wi-Fi, mobile), emerging technologies (5G, IoT), network management, and cloud computing. Understanding these concepts is essential for efficient and secure communication in the modern world.

Objectives

The objectives of this course are to:

1. Facilitate Communication: Enable efficient and reliable exchange of data between devices and systems.
2. Understand Protocols: Comprehend communication protocols like OSI and TCP/IP for standardized and interoperable networking.
3. Manage Networks: Learn network management techniques to monitor, troubleshoot, and optimize network performance.
4. Adapt to Technologies: Stay current with emerging technologies like 5G and IoT to meet evolving communication needs.
5. Support Connectivity: Establish and maintain various types of networks, including LANs, WANs, and wireless networks, to support connectivity across different environments.
6. Enhance Network Efficiency: Optimize data flow, reduce latency, and ensure reliable communication within and between networks.

Learning outcomes

Upon completion of this course, should be able to:

1. Demonstrate Understanding: Exhibit a comprehensive understanding of fundamental concepts in data communication and networking, including protocols, topologies, and network components.
2. Apply Protocols: Apply knowledge of communication protocols like OSI and TCP/IP to design and troubleshoot networks effectively.
3. Configure Networks: Set up and configure various types of networks, including LANs, WANs, and wireless networks, to support diverse communication needs.
4. Optimize Network Performance: Utilize network management techniques to monitor, analyze, and optimize network performance for efficiency and reliability.
5. Troubleshoot Issues: Identify and troubleshoot common network issues to ensure uninterrupted communication and minimize downtime.
6. Promote Information Security Awareness: Promote a heightened awareness of information security principles and best practices to prevent and address potential vulnerabilities and threats in a networked environment.

Course Contents

Introduction to Data communications: the Development of Data Communications; types and sources of data, simple communications network, transmission definitions, one way transmission, half duplex transmission, transmission codes, transmission modes, parallel transmission, serial transmission, bit synchronization, character synchronization, character synchronization, synchronous transmission, asynchronous transmission, efficiency of transmission, error detection methods and data compression. Protocols: Introduction to network protocol. Seven Layer ISO- OSI standard protocols and network architecture. Transport protocols, session services protocols, and other protocols. Institute of Electrical and Electronics Engineering 802 standards. Error control and Data Compression: Forward Error Control; error detection methods; parity checking; linear block codes, cyclic redundancy checking; feedback error control, data compression, Huffman coding and dynamic Huffman coding. Local Area Networks: medium access control techniques – Ethernet, token bus and token ring; LAN standards; fibre distributed data interface, metropolitan area network. Peer-to-peer, Client Server. Client-Server Requirements: GUI design standards, interface independence, platform independence, transaction processing, connectivity, reliability, backup and recovery mechanisms. Information Network Software; Features and benefits of major recovery mechanisms. Information Network Software: features and benefits of major Network Operating Systems. Network OS: (e.g. Novell NetWare, UNIX/LINUX, OS/2 & Windows NT). TCP/IP and Network OS. INTERNET: Definition, architecture, services, Internet addressing. Internet protocol, IPv4, IPv6. Internet programming, Intranet. System administration and security issues.

Lecture Schedules

Week	Content	Lecture notes/slides
1.	Introduction to Data communications	
2.	Protocols 1	
3.	Protocols 2	
4.	Error control and Data Compression 1	
5.	Error control and Data Compression 2	
6.	Networks types 1	
7.	Mid-semester break	
8.	Networks types 2	
9.	Test	
10.	Client-Server Requirements	
11.	Information Network Software	
12.	Network OS	
13.	INTERNET	
14.	Revisions	
15.	Final Exam	

Examination schedule

- Attendance
- Homework
- Class Test
- Practical exercises
- End of Semester Exam

Grading

- Homework: 10% of grade
- Practical: 10% of grade
- Midterm Exam: 10% of grade
- Final Exam: 70% of grade

Text & References

1. Data Communications and Networking 5th Edition by Behrouz A. Forouzan
2. Fundamentals of Data Communication Networks by Oliver C. Ibe

Student Conduct

All students enrolled at the University shall follow the tenets of common decency and acceptable behaviour conducive to a positive learning environment. The code of student conduct is described in detail in the student handbook or University website.

Academic Honesty

"All students enrolled at the University shall follow the tenets of common decency and acceptable behaviour conducive to a positive learning environment." It is the policy of the University, that no form of plagiarism or cheating will be tolerated. Plagiarism is defined as the deliberate use of another's work and claiming it as one's own. This means ideas as well as text or code, whether paraphrased or presented verbatim (word-for-word). Cheating is defined as obtaining unauthorised assistance on any assignment. Proper citation of sources must always be utilised thoroughly and accurately. If you are caught sharing or using other people's work in this class, you will receive a 0 grade and a warning on the first instance. A subsequent instance will result in receiving an F grade for the course, and possible disciplinary proceedings. If you are unclear about what constitutes academic dishonesty, ask.