

UNIVERSITY OF DELTA, AGBOR, NIGERIA
COMPUTING
COMPUTER SCIENCE
B.Sc. Information and Communication Technology

UNIDEL-ICT 104: Data Communications and Computer Networks (3 Units; Compulsory: LH=30; PH=45)

Senate-approved Relevance

The training of high-skilled graduates who are understand the technical underpinning of data communication using computer networks as well as use them for better ICT experiences both in government and other industries which will ultimately lead to good performance and throughput by these organizations in Delta State and Nigeria is in tandem with the vision and mission of the University of Delta, Agbor. This ensures that Information and Communication Technology graduates with demonstrable potentials and necessary skill-set to attend to trending issues in data communications and computer networking. The relevance of this is seeing and producing ICT graduates of the University of Delta, Agbor being versed in using data communication and able to share information using computer networks to generate good communication which could help business owners and managers in making higher profitability and better business management in Nigeria.

Overview

The term telecommunication means communication at a distance. The word data refers to information presented in whatever form is presented in whatever form is agreed upon by parties creating and using the data. Data communication is the exchange of data between two devices via some forms of transmission medium such as a wire cable. Computer network was developed for the purpose of defense. To have a secured communication network that can even withstand a nuclear attack after a decade or so, companies in various fields started using computer networks for tracking of inventories, monitor productivity, communication between different ranch offices located at two different locations

This course covers fundamental topics like data, information to the definition of communication and computer networks. The main objective of data communication and networking is to enable seamless exchange of data between any two points in the world. This exchange of data takes place over a computer network.

Objectives

The objectives of this course are to: (i) Define the basic terminology of computer networks (ii) Recognize the individual components of the big picture of computer networks (iii) Outline the basic network configurations (iv) Cite the reasons for using a network model and how those reasons apply to current network systems (v) List the layers of the OSI model and describe the duties of each layer (vi)List the layers of the Internet model and describe the duties of each layer (vii) Compare the OSI and Internet models and list their differences and similarities

Learning Outcomes

Upon completion of this course, students should be able to: (i) Understand the basic concepts of data communications and networking (ii) Explain and discuss the purpose of network layered models, the Open System Interconnect (OSI) and the Internet Model using TCP/IP protocols. (iii) Explain and discuss noise, attenuation, and distortion affect signal transport, encoding methods of analog and digital data digital transmission. Flow and Congestion control. (iv) Understand the use of LAN components like Bridges, Switches, Routers etc. and the backbone networks. (iv) Understand IP addressing, sub-netting and super-netting

Course Content

Introduction to computer network, Data Communication requirements and evolution of computer networks, Network Topologies (LAN, WAN, MAN). AN Architectures Star. Bus/Tree topology. Ring topology. Ethernet CSMA/CD/CA. IBM Token Ring, Network Protocols. OSI Model TCP/IP model. Data Communication. Transmission mode. Simplex, Half-duplex. Full-duplex. Bluetooth. WiFi, WiMax. Serial and parallel transmission. Synchronous transmission vs Asynchronous transmission. Transmission Media and Transmission Technologies, Metallic media . Optical fiber media. Wireless media (line-of-sight media). Wireless media (Baseband and broadband transmission. Transmission bandwidth (link capacity). Modulation and demodulation. modems and modem standards. Transmission impairments (distortion/noise limitations on system performance). Data Encoding Techniques. Unipolar, Polar. Bipolar. PAM. PCM. Multiplexing FDM, TDM, DWDM etc. Frequency Division Multiplexing. Synchronous Time Division Multiplexing. Digital Carrier Systems. Network structure: Routing in switched networks. LAN overview. Circuit Switching Concepts. Packet Switching Concepts. Cables. Modems. Routers. Hubs. Switches. Access Points Internet Protocols architecture. OSI Model. TCP/IP Protocol Architecture. IP Addressing, OSI vs TCP/IP - TCP/IP vs UDP - IP V4 Classful addressing - Designing Subnets - Introduction to IPv6 - Subnetting - Classless Addressing CIDR, Data Link Control Protocols. Stop and Wait Flow Control, Sliding Window Flow Control, Stop and Wait ARQ. Go Back N ARQ. Selective Reject ARQ. HDLC Network Security. Confidentiality with Conventional Encryption, Message Authentication and Hash Functions. Public-Key Encryption and Digital Signatures

Minimum Academic Standard:

NUC minimum academic standard requirements for facilities.