The Legal House – International Business College
School of Electrical and Computer Engineering

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Computer Communications
SECE 105

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Aim of Unit:

In this unit an overview of the field of data and computer communications is provided, with emphasizes on the basic principles of computer communications networks and telecommunications technology.

Unit Outline:

- Introduction to Computer Communications, Data Communications, Networks
- Basic Concepts, Line configuration, Topology, Transmission modes, Categories of Network, and Internetworks
- The OSI Model, Layered Architecture, Functions of the OSI layers
- Signals, Analog and Digital signals, Periodic and Aperiodic signals, Time and Frequency domain representation of signals, Composite signals
- Encoding and Modulation, Digital-to-Digital Conversion, Analog-to-Digital Conversion, Analog-to-Analog Conversions
- Transmission of Digital Data, Parallel and Serial Data Transmission, DTE-DCE Interface, Modems
- Transmission Media, Guided and Un-Guided Media, Transmission Impairments and Channel Capacity
- Multiplexing, Frequency-Division-Multiplexing (FDM), Time-Division-Multiplexing (TDM)
- Error Detection and Correction
- Data Link Control, Elements of a Protocol, Stop-and-Wait Protocol, Sliding-Window Protocol
- Networking and Internetworking Devices, Repeaters, Bridges, Routers and Gateways
- Introduction to TCP/IP Protocol Suite, Overview of TCP/IP, Internet Protocol, Addressing, Subnetting

Mode of Delivery:

Two hours lecture per week.
One hour tutorial per week.

Unit Assessment:

Attendance at Lectures and Tutorials	20 %
Assignments, Laboratories	40 %
Final Presentation	40 %

Assessment Requirements:

Students must receive 50% or more for each part of Unit Assessment in order to pass the subject.

Student Workload:

Students will have 3 hours per week face-to-face learning during semester. Students are expected to work at least 5 hours per week out of class.

Text Book:

1. Behrouz A. Forouzan, "Data Communications and Networking", 2nd edition, McGraw-Hill, 2001

Recommended References:

1. William Stallings, "Data and Computer Communications", 7th edition, Prentice-Hall Inc., 2003
2. Tanenbaum A. S., "Computer Networks", 4th edition, New Jersey, Prentice Hall, 2002
3. Comer E. C., "Computer Networks and Internets", 4th edition, New Jersey, Prentice Hall, 2004

Subject Schedule

Weeks	Lecture/Tutorial Topics	Assignments/ Laboratories	Reading from Text Book
1	Introduction, Basic Concepts, The OSI Model	Lab #1	Chapters 1, 2, 3
2	Signals, Encoding and Modulating	Lab #1	Chapters 4, 5
3	Transmission of Digital Data: Interfaces and Modems, Transmission Media(IP)	Assignment #1	Chapters 6, 7
4	Multiplexing, Error Detection and Correction	Lab #1, Assignment #1	Chapters 8, 9
5	Data Link Controls, Data Link Protocols	Lab #1, Assignment #1	Chapters 10, 11
6	Local Are Networks, Metropolitan Area Networks	Collect Lab #1	Chapters 12, 13
7	Switching, Point-to-Point Protocols	Collect Assignment #1	Chapters 14, 15
8	Integrated Services Digital Network(ISDN), X.25	Lab #2	Chapters 16, 17
9	Frame Relay, ATM	Assignment #2	Chapters 18, 19
10	SONET/SDH, Networking and Internetworking Devices	Lab #2, Assignment #2	Chapters 20, 21
11	Transport Layer, Upper OSI Layers	Collect Lab #2	Chapters 22, 23
12	TCP/IP Protocol Suite: Part 1, TCP/IP Protocol Suite: Part 2, Application Layer	Collect Assignment #2	Chapters 24, 25
13	Preparing for Final Presentation		
14	Final Presentation		

Subject Description

UNIT	SECE105 Computer Communications

FIELD	Analyse and Design

DESCRIPTION	This unit describes the competency required to ensure the client requirements are developed as a strategy to designing and understanding the computer communication systems.

RELATED COMPETENCY STANDARDS	The project lifecycle, Computer Systems and Telecommunications methodologies employed will determine which particular units of competency are relevant to this unit. Some include SECE101, SECE106, SECE108, SECE104.

	ELEMENT	PERFORMANCE CRITERIA
1	Overview of Data Communications and Networking	• Introduction Data Communications and Networking • Overview Network Models
2	Physical Layer	• Including Signals, Digital Transmission, Analog Transmission, Multiplexing • Determine Transmission Media, Circuit Switching and Telephone Network • Contain High-Speed Digital Access: DSL, Cable Modems, and SONET
3	Data Link Layer	• Figure out Error Detection and Correction, Data Link Control and Protocols • Deal with Point-to-Point Access: PPP, Multiple Access, Local Area Networks: Ethernet • Discussion of Wireless LANs, Connecting LANs, Backbone Networks, and Virtual LANs • Devoted to Cellular Telephone and Satellite Networks, Virtual Circuit Switching: Frame Relay and ATM
4	Network Layer	• Implementation of Host-to-Host Delivery: Internetworking, Addressing, and Routing • Include Network Layer Protocols: ARP, IPv4, ICMP, IPv6, and ICMPv6 • Contain Unicast and Multicast Routing: Routing Protocols
5	Transport Layer	• Detailed specifications of Process-to-Process Delivery: UDP and TCP • Devoted to Congestion Control and Quality of Service

6	Application Layer	• Full coverage of Client-Server Model: Socket Interface • Detailed specifications of Domain Name System (DNS), Electronic Mail (SMTP) and File Transfer (FTP) • Comprehensive treatment of HTTP, WWW and Multimedia
7	Security	• Figure out Cryptography, Message Security, User Authentication, and Key Management • Determine Security Protocols in the Internet