Daffodil International University

Department of Computer Science and Engineering (CSE)

Course Outline

Course Code:	CSE 225/233
Course Title:	Data Communication
Program:	B.Sc. in Computer Science and Engineering
Faculty:	Faculty of Science and Information Technology (FSIT)

Semester:	Summer	**Year:**	2020
Credit:	3.0	**Contact Hour:**	3 Hrs/Week
Course Level:	L2-T3	**Prerequisite:**	CSE 212

Course Category:	Core Engineering
Instructor Name:	Narayan Ranjan Chakraborty
Designation:	Assistant Professor
Email:	narayan@daffodilvarsity.edu.bd
Office Address:	Room# 111, 1st Floor, Daffodil Tower

Class Hours:	Section	Class Day	Class Hours	Classroom

Google Classroom Code:	gx7x2a3

1. Course Rationale

To make an effective communication between the gadgets it is critical to play out every single essential apparatus and their fundamental design precisely. Therefore, to comprehend the system structure, segments and other applicable devices and procedure is an absolute necessity. This course will gives a prologue to the field data communications, Layered design of LAN, MAN and WAN, fundamentals of signalling, basic transmission concepts, error detection and correction etc.

1.1. Course Objective

To provide a solid conceptual understanding of the fundamentals of data communications. More specifically,

- To learn the basic concepts of data communications.
- To learn the layered architecture of communication protocols.
- To learn digital signal transmission and encoding techniques.
- To learn multiplexing techniques.
- To learn the concepts and techniques in error detection and correction.

- To learn LAN architectures and systems.
- To learn the fundamental issues driving network design

1.1. Course Outcomes (CO's)

At the end of this course, students will be able to…….

CO1	Interpret the components, tools and techniques of communication systems
CO2	Illustrate the TCP/IP and OSI Reference model and identify their differences in implementation within and across enterprises.
CO3	Explain how information can be sent via communication interfaces and links.
CO4	Determine the various modulation and error detection and correction techniques and their application in communication systems.

2. Strategies and approaches to learning

2.1. Teaching and Learning Activities (TLA)

TLA1	Lectures twice a week using white board/multimedia of different topics.
TLA2	Active discussion in class regarding efficient solving of the logical and mathematical problems of communication systems
TLA3	Assignment and Presentation of diverse problems based on the corresponding lectures.
TLA4	Evaluation of class performances to reach each student in a class for every topic.

3. Course Schedule and Structure

3.1. Textbook
- Data Communication and Networking by Behrouz A Frouzan, 5th Edition

3.2. Reference Books
- Data and Computer Communications- 8th Edition, William Stallings
- Computer Network, 4th Edition, Andrew S. Tanenbaum

3.3.Course Plan/Lesson Plan

Week	Lesson.	Topic	Teaching and Learning Activities (TLAi)	Textbook & Video Reference	Related CO's
1	Les. 1	Overview of Data Communication, Characteristics, Components of Data communication, Data representations, Data flow, Physical Structures of data communication,	TLA-1	Forouzan, Chapter-1 Page (4-12)	CO1
	Les. 2	Topologies, Categories of Network- LAN, MAN, WAN. Internet Protocols and Standards	TLA-1, TLA-2	Forouzan, Chapter-1 Page (13-28)	CO1
2	Les. 3	Layered Task, Internet Model: Peer-to-Peer Process, Organization of the layer, Layers in the OSI Model.	TLA-1, TLA-2 TLA-3	Forouzan, Chapter-2 Page (27-42) 4th Ed.	CO2
	Les. 4	TCP/IP protocol suite, ARP, RARP, ICMP, IGMP, Addressing.	TLA-1, TLA-2	Forouzan, Chapter-2 Page (42-54) 4th Ed.	CO2
3	\(Class Test – 1, Assignment – 1\)				
	Les. 5	Transmission Impairments: Attenuation, Distortion and Noise	TLA-1, TLA-4	Forouzan, Chapter-3 Page (76-83) Stallings Chap-4 Page (87-96)	CO3, CO1
	Les. 6	Performance Measure: Throughput, Bandwidth, latency	TLA-1, TLA-4	Forouzan, Chapter-3 Page (84-88)	CO3, CO1

Week	Lesson.	Topic	Teaching and Learning Activities (TLAi)	Textbook & Video Reference	Related CO's
4	Les. 7	Concept, Line coding, Unipolar, Polar, NRZ, RZ, Bipolar, Manchester, and Differential Manchester	TLA-1, TLA-2	Forouzan, Chapter-4 Page (96-104)	CO3, CO1
	Les. 8	Block coding, Scrambling, Pulse Code Modulation, Delta Modulation	TLA-1, TLA-2	Forouzan, Chapter-4 Page (104-124)	CO3, CO1
		(Class Test – 2)			
5	Les. 9	Transmission modes: Serial, Parallel, Synchronous, Asynchronous and Isochronous	TLA-1, TLA-2	Forouzan, Chapter-4 Page (125-129)	CO3, CO1
	Les. 10	Modulation of Digital Data, Bit Rate, Baud Rate, Amplitude Shift Keying, Frequency Shift Keying. Bandwidth, Phase Shift Keying,	TLA-1, TLA-4	Forouzan, Chapter-5 Page (136-143)	CO3, CO1
6	Les. 11	Quadrature Amplitude Modulation, Constellation diagram	TLA-1, TLA-2	Forouzan, Chapter-5 Page (143-147)	CO4, CO1
	Les. 12	Amplitude Modulation, Frequency Modulation, Phase Modulation	TLA-1, TLA-2	Forouzan, Chapter-5 Page (147-150)	CO4, CO1
		(MID–TERM EXAM)			
7	Les. 13	Concept, Frequency Division Multiplexing, Analog Hierarchy, Wave Division Multiplexing, Time Division Multiplexing	TLA-1, TLA-2, TLA-3	Forouzan, Chapter-6 Page (156-168)	CO3, CO4

Week	Lesson.	Topic	Teaching and Learning Activities (TLAi)	Textbook & Video Reference	Related CO's
	Les. 14	Analog and digital hierarchy, Data rate management	TLA-1, TLA-2, TLA-3	Forouzan, Chapter-6 Page (161, 168-172)	CO3, CO4
8	Les. 15	Types of Errors, Error Detection vs Error Correction, redundancy, Hamming distance	TLA-1, TLA-2	Forouzan, Chapter-10 Page (258-264)	CO4
	Les. 16	Cyclic redundancy check, polynomials. Checksum	TLA-1, TLA-2	Forouzan, Chapter-10 Page (264-282)	CO4
9	Les. 17	Taxonomy, Random access: Aloha, CSMA	TLA-1, TLA-2	Forouzan, Chapter-12 Page (325-334)	CO4
	Les. 18	CSMA/CD, CSMA/CA,	TLA-1, TLA-2	Forouzan, Chapter-12 Page (334-341	CO4
10		*(Class Test-3, Assignment – 2)*			
	Les. 19	Controlled Access: Reservation, polling, token ring.	TLA-1, TLA-2	Forouzan, Chapter-12 Page (341-344)	CO4
	Les. 20	Frequency Division Multiple Access, Time Division Multiple Access,	TLA-1, TLA-2	Forouzan, Chapter-12 Page (344-346)	CO4
11	Les. 21	Code Division Multiple Access.	TLA-1, TLA-2	Forouzan, Chapter-12 Page (347-352)	CO4
	Les. 22	Connecting Devices: Hub, Switch, Router	TLA-1, TLA-2	Forouzan, Chapter-17 Page (494-501)	CO1 CO3

Week	Lesson.	Topic	Teaching and Learning Activities (TLAi)	Textbook & Video Reference	Related CO's
12	Les. 23	*Review*	TLA-1, TLA-2	Full Syllabus	
	Les. 24	*Review*	TLA-1, TLA-2	Full Syllabus	
(FINAL EXAM)					

4. Assessment Methods

4.1. Grading System

Numerical Grade	Letter Grade	Grade Point
80-100	A+	4.00
75-79	A	3.75
70-74	A-	3.50
65-69	B+	3.25
60-64	B	3.00
55-59	B-	2.75
50-54	C+	2.50
45-49	C	2.25
40-44	D	2.00
Less than 40	F	0.00

5. Additional Support for Students

- Student Portal:
  http://studentportal.diu.edu.bd/
- Academic Guidelines
  https://daffodilvarsity.edu.bd/article/academic-guidelines
- Rules and Regulations of DIU
  https://daffodilvarsity.edu.bd/article/rules-and-regulation
- Career Development Center:

- For general queries:

Appendix-I

Program Outcomes and Assessment

Program Outcomes (POs) are narrower statements that describe what students are expected to know and be able to do by the time of graduation. These relate to the knowledge, skills and attitudes that students acquire while progressing through the program. The program must demonstrate that by the time of graduation, students have attained a certain set of knowledge, skills and behavioural traits to some acceptable minimum level. The BAETE specifically requires that students acquire the following graduate attributes.

PO-1- Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.

PO-2- Problem analysis: Identify, formulate, research the literature and analyse complex engineering problems and reach substantiated conclusions using first principles of mathematics, the natural sciences and the engineering sciences.

PO-3- Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety as well as cultural, societal and environmental concerns.

PO-4- Investigation: Conduct investigations of complex problems, considering design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions.

PO-5- Modern tool usage: Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO-6- The engineer and society: Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.

PO-7- Environment and sustainability: Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.

PO-8- Ethics: Apply ethical principles and commit to professional ethics, responsibilities and the norms of the engineering practice.

PO-9- **Individual work and teamwork:** Function effectively as an individual and as a member or leader of diverse teams as well as in multidisciplinary settings.

PO-10- Communication: Communicate effectively about complex engineering activities with the engineering community and with society at large. Be able to comprehend and write effective reports, design documentation, make effective presentations and give and receive clear instructions.

PO-11- Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work as a member or a leader of a team to manage projects in multidisciplinary environments.

PO-12- **Life-long learning:** Recognize the need for and have the preparation and ability to engage in independent, life-long learning in the broadest context of technological change.