



Course Specifications

Course Title:	Data Communication
Course Code:	323 CNET-3
Program:	Bachelor in Computer and Network Engineering
Department:	Computer and Network Engineering
College:	Computer Science & Information Technology
Institution:	Jazan University

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A. Course Identification

1. Credit hours: 3
2. Course type
a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered: Level 10/ 4
4. Pre-requisites for this course (if any): None
5. Co-requisites for this course (if any): None

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	52	100%
2	Blended	-	-
3	E-learning	-	-
4	Distance learning	-	-
5	Other	-	-

7. Contact Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	Lecture	22
2	Laboratory/Studio	22
3	Tutorial	-
4	Others (specify)	8
	Total	52

B. Course Objectives and Learning Outcomes

Course Description Course: The topics of this course include fundamentals of data communications. It introduces the essential elements and basic concepts of data communications. It covers the concept of analogue and digital signals, periodic and non-periodic signals, time and frequency domains concepts. Describes various error detection and correction techniques, CRC, Checksum and Hamming code techniques. It also covers topics related to networking and internetworking devices for communication.

2. Course Main Objective:

1. Explain the basic concept of Data Communication and its components.
2. Study all aspects of Communications Signals, Analog and Digital.
3. Describe the mechanism and techniques of encoding.
4. Explain various Multiplexing concepts, Time Division and Frequency Division Multiplexing.
5. Provide students with in-depth knowledge of data link layer fundamental, error detection.
6. Identify the different types of network devices and their functions within a network.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding:	
1.1	Explain the basic concepts of Data Communication.	K1
1.2	Describe all the aspects of Data Communications Signals, Analog and Digital.	K2
1.3	Explain digital transmission and its conversion techniques based on latest trends	K3
2	Skills :	
2.1	Apply various conversion techniques using ASK, FSK, PSK and QAM.	S2
2.2	Use various error detection and correction techniques used in data communication, their capabilities and limitations.	S2
2.3	Demonstrate various communication topologies using network simulator and programming languages.	S3
3	Values:	
3.1	Show the ability to work as a team member and take responsibilities for successful completion of mini projects and group assignments on recent trend.	V1

C. Course Content

No	List of Topics	Contact Hours
1	Chapter 1: Overview of Data Communications and Networking <ul style="list-style-type: none">• Introduction• Data Communications• Networks• The Internet• Protocols and Standards• Key Elements	4T + 4P
2	Chapter 2: Data and Signal <ul style="list-style-type: none">• Analog Data and Digital Data• Analog Signal and Digital Signal• Periodic and Analog Signals	4T + 4P

	<ul style="list-style-type: none"> • Signal and Communication • Frequency • Signals and Communication • Composite Signals and Periodicity • Digital Signal 	
3	Chapter 3; Digital Transmission <ul style="list-style-type: none"> • Digital to Digital Conversion • Line Coding • Data rate and Baud rate • Unpolar, Polar, Bipolar, Multilevel, Multitransition • Analog to Digital Conversion • Pulse Code Modulation • Sampling, Quantization, Binary encoding • Transmission Modes Parallel Serial 	4T + 4P
4	Chapter 4: Analog Transmission <ul style="list-style-type: none"> • Digital-to-Analog Conversion • Amplitude Shift Keying • Frequency Shift Keying • Phase Shift Keying • Quadrature Amplitude Modulation • MULTIPLEXING, • Frequency-Division Multiplexing, • Time-Division Multiplexing 	2T + 2P
5	Chapter 5: Error Detection and Correction <ul style="list-style-type: none"> • Types of Errors • Redundancy • Detection Versus Correction • Error Detection • Error Correction • Hamming Distance 	4T + 4P
6	Chapter 6: Connecting Devices <ul style="list-style-type: none"> • Connecting LANs • Backbone Networks • Satellite Network • Wireless WANs • Cellular Telephone • Satellite Networks 	4T + 4P
8	Final Exam+ Lab Exam	4T + 4P
Total		52

Online Study Topics

- Data Communications
- Analog Data and Digital Data
- Analog Signal and Digital Signal
- Digital to Digital Conversion
- Digital-to-Analog Conversion
- Error Detection, Correction

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge and Understanding		
1.1	Explain the basic concepts of Data Communication.	Visual & Verbal [Lectures/Presentations]	Assignment-1 Exam-1 Final Exam
1.2	Describe all the aspects of Data Communications Signals, Analog and Digital.	Visual & Verbal [Lectures/Presentations]	Assignment-1 Exam-1 Final Exam
1.3	Explain digital transmission and its conversion techniques based on latest trends	Visual & Verbal [Lectures/Presentations]	Assignment-1 Exam-1 Final Exam
2.0	Skills		
2.1	Apply various conversion techniques using ASK, FSK, PSK and QAM.	Visual & Verbal [Lectures/Presentations].	Assignment-2 Exam-2 Final Exam
2.2	Use various error detection and correction techniques used in data communication, their capabilities and limitations.	Visual & Verbal [Lectures/Presentations]	Assignment-2 Exam-2 Final Exam
2.3	Demonstrate various communication topologies using network simulator and programming languages.	Visual & Verbal [Lectures/Presentations]	Assignment-2 Final Exam
3.0	Values		
3.1	Show the ability to work as a team member and take responsibilities for successful completion of mini projects and group assignments on recent trend of subject idea.	Visual & Practical Lab Exercise/ Presentation	Lab Exam

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Assignments / Mini Project	4 th Week	20%
2	Midterm Exam	6 th Week	20%
3	Lab Exam	11 th Week	20%
4	Final Theory Exam	12 th Week	40%

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

Department have an arrangement for “Academic Counseling and Support” for each student by the department. The Department Coordinator nominates faculty members for “**Student Academic Advisory Committee**” every semester. These “**Academic Advisors**” are responsible for student counseling and advising to a group of fix number of students (around 10-15 students) and maintaining students’ files. At the beginning of semester and at time of course registration all students take counseling from Academic Advisor according to his previous grades and coverage of pre-requisite course and follow-up.

Also students with GPA below than 2.00 are remained under deep observation and continuous meetings with respective course teachers about their performance are arranged to help and support the students. The course teacher is to be associated with this course provide a proper guidance for students who are looking to focus on their future career based on their intellectual interests, identify better opportunities related to this course and connections in their academic fields.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	Data Communications and Networking with TCP/IP Protocol Suite 6th Edition, McGraw-Hill Education; 6th edition (January 6, 2021) ISBN-13 : 978-0078022098
Essential References Materials	1. Data and Computer Communications, 10th edition William Stallings ,Pearson+ subscription, ISBN-13: 9780137561704 10th edition Published by Pearson (July 14th 2021) 2. Computer Networks, 6th edition Andrew S. Tanenbaum David J.Wetherall Pearson+ subscription ISBN-13: 9780137523214 6th edition Published by Pearson (July 14th 2021) - Copyright 2021
Electronic Materials	www.ebook.com www.share4.com www.google.com
Other Learning Materials	Cisco Packet Tracer

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	1. A Lecture room appropriate for 30 students with a personal computer, a data show and a smart board. 2. Auditorium of a capacity of not less than 100 seats for large lectures format classes.
Technology Resources (AV, data show, Smart Board, software, etc.)	1. Data show and smart board in class rooms. 2. A Data Communication Lab with Communication devices.
Other Resources	Equipment and illustration tools relevant to the course material. Cisco Packet Tracer/ C/C++/ Network Devices/ Cables (Serial/ Parallel/ Cross and Straight).

Item	Resources
(Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Sufficiency of resources and facilities for students	Students	Course evaluation survey form
Effectiveness of teaching / learning process	Students	Course evaluation survey form
Effectiveness of teaching / learning process	CRC / QAU / HOD	Course reports / result analysis
Quality of learning Resources	Track leaders / CRC	Review meetings and star rating with suggestions for further modification and improvements
Verifying standards of student achievement / evaluation	HOD / committee nominated by HOD	Random re-checking of evaluated answer sheets
Achievement of course learning outcomes	Course Teachers / QAU	CLO assessment template that is further verified at course coordinator, Track leader and QAU level.

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	DEPARTMENT COUNCIL
Reference No.	
Date	