

General Information						
Course Code	ITEC-251	Level/Year	4 th /2 nd	Required (R) / Selected Elective (SE)		R
Credit Hours	Theory	2	Lab	1	Total	3
Prerequisites	Nil	Course Coordinator		Dr. Ali Tahir		
Corequisites	-	Track Leader		Dr. Ali Tahir		
Course Description						
<p>This is an entry-level course in data communication and networking. This course explains the students with the fundamentals of data communications and networking in detail. The topics include fundamentals of data communication: essential elements of data communications: simplex, half-duplex and full duplex transmission, basic concepts of networking: network criteria, network applications and benefits. Configurations, and categories of networks: line configuration, network topologies (mesh, star, tree, bus, ring, hybrid), internetwork or internet, types of network connection, intranet, and extranet. Introduction to OSI and TCP/IP network models: The OSI Model, The OSI layers, TCP/IP Protocol Suite in detail. Physical layer and media: analog and digital signals, periodic and non-periodic signals, signal parameters, time and frequency domains concepts, transmission impairment, transmission media: guided media, unguided media, circuit, and packet switching. Data link layer control: framing, error control and flow control, error detection and correction techniques: VRC, LRC, CRC, checksum, and Hamming code techniques. Wired LAN (Ethernet), IP addressing, subnetting, supernetting. networking and internetworking devices, and VLANs. Students will be trained in the existing components and products related to Cisco such as wireless networking, switches, routers, bridges, gateways, repeaters, hubs, cellular communication, and satellite communication.</p>						
Course Objectives : On completion of the course, the student will be able to:						
<ul style="list-style-type: none">Understand the fundamental concepts of data communication and networking.Outline the layering concepts, network models e.g., Open System Interconnect (OSI) and the Internet Model (TCP/IP).Study the concepts of analog and digital transmission, flow control, and error control, error detection and correction techniques in detail.Identify various types of transmission media, network devices, and performance assessment parameters for each guided and unguided media and connecting device. Also, discuss Ethernet and wireless networks.Apply the skills acquired concerning physical (MAC) and logical addressing (IP), subnetting and supernetting, network topologies, and VLANs.						
Course Contents						
List of Topics						Weeks
UNIT 1: Introduction to Data Communication & Computer Networks						1,2, 3
UNIT 2: Network Models & Networking Devices						4, 5, 6
UNIT 3: Signals, Multiplexing, and Switching						7, 8, 9
UNIT 4: Error Detection & Correction, Wired LAN, and IP Addressing						10, 11, 12

UNIT 5: Transmission Media, and VLANs						13, 14, 15
Textbook						
<ul style="list-style-type: none">Behrouz A Forouzan, Data Communications and Networking, 6th Edition, 2022, ISBN-13: 978-1-26-436335-3.						
Reference Materials						
<ul style="list-style-type: none">William Stallings,” Data and Computer Communication”, Pearson Education, 10th Edition, 2014, ISBN-13: 9781292014388.James Kurose, “Computer Networking: A Top-Down Approach”, Pearson, 8th Edition, 2021, ISBN-13: 9780136681557.Larry Peterson, “Computer Networks: A Systems Approach”, Morgan Kaufmann, 6th Edition, 2022, ISBN-13: 9780128182000 Andrew Tanenbaum, “Computer Networks”, 6th Edition, 2021, ISBN 13: 9781292374062.						
Course Learning Outcomes						
CLO	Description					Mapped PI
CLO#01	Define the fundamental concepts related to data communication, computer networks, and both guided and unguided transmission media.					PI 1.1
CLO#02	Explain the design principles of network topologies, layered architectures, the OSI and TCP/IP models, as well as analog and digital transmission.					PI 1.2
CLO#03	Identify the network devices and technologies, multiplexing methods, and switching techniques.					PI 1.3
CLO#04	Compare various error detection and correction methods, classful and classless IP addressing schemes, propagation methods, virtual local area networks, and the different generations of Ethernet technology.					PI 2.2
CLO#05	Implement and evaluate network topologies, subnets, supernets, VLANs, and configure network devices such as switches, and routers to fulfill an organization's networking needs.					PI 2.3 PI 2.4
CLO#06	Identify the emerging trends e.g., SDN, and related ethical issues.					PI 4.1 PI 4.4
CLO-PI-SO Mapping						
	SO-1	SO-2	SO-3	SO-4	SO-5	SO-6
CLO#01	PI 1.1	-	-	-	-	-
CLO#02	PI 1.2	-	-	-	-	-
CLO#03	PI 1.3	-	-	-	-	-
CLO#04	-	PI 2.2	-	-	-	-
CLO#05	-	PI 2.3 PI 2.4	-	-	-	-
CLO#06	-		-	PI 4.1 PI 4.4	-	-