Addis Ababa University **College of Natural and Computational Science** **School of Information Science**				
Course Title	**Introduction to Networks and Systems**			
Module Title	**Computer Networks, Administration and Security**			
Module Code	INSY-M3071	**Course Code**: INSY3071		
CP/ECTS	**5**			
Study Hours	Lecture: **48**	Laboratory: **16**	Tutorial: **0**	Home Study: **71**
Instructor's Information	**Name**: *Tsegaye Berhanu*			
	Mobile:			
	Email: tsegaye.berhanu@aau.edu.et			
	Office Location: Eshetu Chole Building, 3rd Floor, Room #319			
	Consultation Hours: Anytime			
Course Information	Academic Year: 2021/2022			
	Semester: I			
	Course Schedule:			
	Class Room:			
	Prerequisite(s): None			
	Mode of Delivery: **Block**			
Course Description	The course aims at exploring the various types of data communication systems, networks and their applications. The content includes: computer networks, seven-layer architecture, OSI & TCP/IP suite of protocols, network hardware, network software, standardization, guided transmission media, wireless transmission, data link layer, Ethernet and IP addressing. It involves practical session on Cabling and crimping, Configuring TCP/IP, Peer to Peer Networking, Sharing Files, Sharing Printers, Client-server Networking, Steps for Creating a home or small office Network, experiencing collaboration tools, installing & Configuring Network Operating System, Exploring Server Roles, setting up a DNS Server, setting up a DHCP server, Domain controller and IP Addressing.			
Learning Outcomes	Up on the successful completion of the course, students will be able to: • Describe the basics of data communications and network • Explain the benefits and the need for network • Understand data transmission and transmission media • Understand Protocols and various networking components • Understand TCP/IP & OSI Reference Model • Demonstrate cable crimping, establishing, setup and troubleshooting Networks • Demonstrate network addressing • Understanding network Equipment • Understand network security and data integrity			

Course Content		
Topic	**Duration (Week)**	**Reading List**
Chapter 1: Introduction 1.1. History & overview of Networks 1.2. The impact of Networks on daily life 1.3. The network as a platform 1.4. Network Role & Elements 1.5. Network Architecture Characteristics 1.6. Computer Networks Versus Human Network	**1**	✓**Lecture Notes** ✓**Textbooks** ✓**Internet**
Chapter 2: Data Communications 2.1. What is communication? 2.2. The platform for communication 2.2.1. Communicating the Message 2.3. Data transmission 2.3.1. Concepts and Terminology 2.3.2. Analog and Digital Data Transmission 2.3.3. Transmission Impairments 2.4. Components of the network 2.4.1. End Devices & their role 2.4.2. Intermediary Devices & their role 2.4.3. Network Media	**2**	✓**Lecture Notes** ✓ **Textbooks** ✓ **Internet**
Chapter 3: Network Types 3.1. LANs, MAN, WANs and Internetworks 3.2. Peer to peer versus Server based Networks 3.3. Network Topologies 3.3.1. Overview of network topologies	**3**	✓**Lecture Notes** ✓**Textbooks** ✓**Internet**
Chapter 4: Protocols and OSI Reference Model 4.1. Rules & Network Protocols 4.2. Protocol suites & Industry Standards 4.3. Layered Models 4.3.1. The TCP/IP Model 4.3.2. The OSI Model 4.3.3. Comparing OSI Model with TCP/IP Model 4.3.4. Overview of familiar Protocols 4.4. Overview & functions of each layer 4.4.1. Bits, Frame, Packet & Datagram 4.4.2. Physical Signaling & Encoding	**4**	✓**Lecture Notes** ✓**Textbooks** ✓**Internet**
Chapter 5: Switching & Network Devices 6.1. Switching Concept and Types 6.1.1. Packet-switched and Circuit switched networks 6.2. Multiplexing Concepts and Types 6.3. Introduction to Ethernet & Wireless Networks 6.3.1. Ethernet and Fast Ethernet 6.3.2. Introduction to Wireless Network 6.4. Network Devices	**6**	✓**Lecture Notes** ✓**Textbooks** ✓**Internet**
Chapter 6: Introduction to IP Addressing and Subnetting 7.1. Classful & Classless Addressing 7.2. Subnetting 7.3. Variable Length Subnet Masking (VLSM)	**7**	✓**Lecture Notes** ✓**Textbooks** ✓**Internet**

<table>
<tr><td>Chapter 7: Network Security
7.1. Fundamentals of secure networks; cryptography
7.2. Encryption and privacy
7.3. Authentication protocols
7.4. Firewalls
7.5. Virtual private networks
7.6. Transport layer security</td><td>8</td><td>✓Lecture Notes
✓Textbooks
✓Internet</td></tr>
<tr><td>Teaching Strategy</td><td colspan="2">The course will be delivered in the form of lectures, demonstration, student presentations, group discussions, and individual and group project works.</td></tr>
<tr><td>Assessment Criteria</td><td colspan="2">The evaluation shall be based on both formative and summative assessment which include:
<table><tr><th>Assessment Forms</th><th>% of credit allotted</th></tr><tr><td colspan="2">Lecture and Practice (100%)</td></tr><tr><td>• Participation and Attendance
• Quizzes and Assignments
• Test(s)
• Final Examination</td><td>5
25
30
40</td></tr><tr><td colspan="2">Practice (100%)</td></tr><tr><td>• Participation and Attendance
• Laboratory Exercise
• Laboratory Exam
• Project</td><td>10
20
40
30</td></tr></table></td></tr>
<tr><td>Role of Instructor(s)</td><td colspan="2">Delivers lectures, prepares reading assignments and topics for group discussion, prepares lab exercise by discussion with student, gives consultation and advises students on individual and group assignments, prepares and evaluates quiz, assignment, tests and final examination.</td></tr>
<tr><td>Role of Students</td><td colspan="2">Attend lectures, laboratory session and presentation, work in team on group work, participate in group discussion, discusses with the instructor on topics of interest for group work, delivers and presents individual and group work, attend quiz, midterm and final examination.</td></tr>
<tr><td>Required software and/or hardware</td><td colspan="2">Hardware: Computers, printer, UTP cable, network toolkit, hub/switch, RJ-45 connectors.
Software: Network Operating systems, Simulators</td></tr>
<tr><td>Reference</td><td colspan="2">Textbook:
• Data Communications and Networking, 4th Ed., Behrouz A. Forouzan
Reference:
• A S Tannenbaum " Computer Networks" Prentice Hall of India Publication, 2002
• Data and Computer Communications, 8th ed. William Stallings
• Computer Networking. Kurose & Ross. Addison Wesley
• Fred Halshall "Data Communication, Computer Networks & Open systems" Publication Pearson Education
• Any Cisco Material (CCNA Module1) will be helpful</td></tr>
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