Course Title	**Applied Data Communications**				
Course Code	**MIS310**				
Course Type	**Compulsory**				
Level	BSc/1st Cycle				
Year / Semester	3RD/6TH				
Teacher's Name	Giorgos Georgiou				
ECTS	7.5	Lectures / week	3 hours	Laboratories / week	-
Course Purpose and Objectives	The main objectives of the course are to: • Discuss the basic computer networking and existing connectivity technologies and the required infrastructure which comprises the key steps involved in the communication process. Basically to understand the LAN/WAN/MAN network architectures and the hybridized existing form in the business environment. • Explain the layered approach that makes design, implementation and operation of extensive networks possible. To learn the 7-layer OSI network model (each layer and its responsibilities) and understand the TCP/IP suite of protocols and the networked applications supported by it. • Discuss the basic protocols involved in wired/wireless communication process. These include the characteristics of the required infrastructure for Local Area Networks (MAC-CSMA-CD/Ethernet, Token Ring, FDDI, and others), and for Wide Area Networks using the TCP/IP (Visualizing TCP/IP mechanisms and variations), UDP/IP. Additionally to learn the VoIP technology in the business communication world. • Link different network performance concepts and traffic issues for Quality of Service (QoS) in broadband communication as well to link the above concepts with the network economics of the enterprise. • Discuss the basic design principles of broadband wired and wireless communication networks (802.11x) in the business environment. Moreover to gain the ability to design reliable wireless networks and model and analyze the structural performance for some commonly used in business network architectures.				
Learning Outcomes	After completion of the course students are expected to be able to: Explain the physical and logical as well as the electrical characteristics of digital signals and the basic methods of data transmission. • Acknowledge the importance of the ISO 7-layer reference model. • Discuss the concepts and requirements hosted in communication protocols and give				

	an overview of Data Communication Standards, how these standards were developed and under which assumptions were adopted. • Figure the area of computer networks in terms of connectivity, mobility and the role of metrics, with emphasis on the range of communication protocols utilized. • Identify the basic protocols involved in wired/wireless communication process. Local Area Networks (MAC-CSMA-CD/Ethernet, Token Ring, FDDI, and others), and for Wide Area Networks using the TCP/IP, UDP/IP. • Apply the basic design principles of wired and wireless communication networks. Moreover, to model and analyze the structural performance for some commonly used network architectures and discuss the functions and architectures of LAN and WAN. • Analyze and design LAN architecture and the design and deployment requirements. • Discuss the electrical interface and the basics of digital data transmission. • Appreciate the need for Data Communication standards and the underlying technology used in wired and wireless communication models. • Compare the protocols used in various types of computer networks. • Discuss the principles of Open Systems and the Transport/Applicationprotocols, which facilitate them. • Link different network performance concepts and traffic issues for Quality of Service (QoS) in broadband communication as well to link the above concepts with the network economics of the enterprise. • Gain the ability to design reliable wireless networks and to model and analyze the structural performance for some commonly used in business network architectures. • Explain fundamentals and technologies of physical, data-link and network layers.		
Prerequisites		Required	-
Course Content	1. Basic Concepts of connectivity and networking. Uses of Computer Networks, Network Architectures and topologies, Layering and Protocols, Metric Units, Basic Probability Theory. 2. Physical Layer. Theoretical basis for data communication. Guided Transmission Media. Wireless Transmission. Communication Satellites. 3. Data-Link Layer Encoding, Framing and Synchronization, Error Detection and Correction, Flow control and the sliding window algorithm. 4. Principles of Medium Access Control. Ethernet (802.3), Token Ring (802.5), FDDI, Wireless (802.11).		

	5. Network Layer, Switching and Routing. Packet vs Circuit switching, Protocols and Services, Internetworking protocols, IP, ICMP, ARP, DHCP, VPN. Routing principles, The Network Layer and its usage in the Internet. 6. Transport layer Services and Protocols. User Datagram Protocol (UDP), Transmission Control Protocol (TCP), TCP congestion control. 7. Applications. Networked applications (mail, file transfer, www), multimedia applications (RTP, H.323). 8. IP Layer Issues, Congestion Control Algorithms, Packet Switching/ Mobility issues, QoS, IP Layer & Internet. 9. Network performance concepts and traffic issues for Quality of Service (QoS) in broadband communication. Association of all the subsequent metrics with the network economics of an enterprise 10. Network Simulation tools and experimentation-Exercises on NetSim.
Teaching Methodology	Lectures, Lab Presentations, Lab Tutorials, Theoretical Exercises and Assignments.
Bibliography	**Essential Reading** William Stallings, (2005), *Business Data Communications 5/E*, Prentice Hall,ISBN : 0131442570 Allen Dooley, (2005), *Business Data Communications*, Prentice Hall, ISBN : 0131424297
Assessment	Tests/Quizes, Design project, Homework, Project, Mid-Term, Final Exam.
Language	English