

Course Title	Data Communications and Computer Networks				
Course Code	CSE300				
Course Type	Compulsory				
Level	Bachelor (1st Cycle)				
Year / Semester	3 <sup>rd</sup> Year / 5 <sup>th</sup> Semester				
Teacher's Name	TBA				
ECTS	6	Lectures / week	3 hours/ 14 weeks	Laboratories / week	N/A
Course Purpose and Objectives	To provide an overview of the broad and constantly emerging field of data communications and computer networks. Data communication is discussed as the necessary tool for understanding computer communication networks.				
Learning Outcomes	<p>Upon successful completion of the course, students will be able to:</p> <ul style="list-style-type: none"> <li>• State and identify concepts relating to data communications; communication protocols and layered protocol architectures</li> <li>• State and interpret protocol communication standards like OSI and TCP/IP as used in computer networking and internetworking.</li> <li>• Recognize and explain data transmission fundamentals and types of media (both wired and wireless)</li> <li>• Define and discuss data link control protocols and their functionality</li> <li>• Recall and explain multiplexing techniques and their applications</li> <li>• Define, explain and exemplify concepts related to Local Area Networks; their topologies and protocols; their types and transmission technologies</li> <li>• Describe the process of routing, appraise different control protocols,</li> <li>• Recognize congestion, examine congestion control methods, value different congestion control methods</li> <li>• Describe, explain and classify types of security attacks; types and algorithms of encryption; security functionality in IP versions 4 and 6</li> <li>• Compare different network designs, develop networks designs for given parameters</li> </ul>				
Prerequisites	ECE210	Co-requisites	None		
Course Content	Introduction/Revision:				

	<p>Communication systems, entities and components. Computer networks as communication system; their topologies and types. Communication protocols, layered communications and protocols architectures. The OSI and TCP/IP standards; Physical Layer</p> <p>Data communication systems; transmission, impairments and media; Data transmission basics; frequency concepts, bandwidth, spectrum; data rate and bandwidth. Analog and digital transmission; wired transmission impairments. Transmission media and impairments for both wired (UTP, STP, Coaxial, Fiber) and wireless (Microwave, Radio, Infrared). Signal encoding techniques; analog-to-digital (and visa-versa) data-to-signal conversion</p> <p>Communication techniques; Data Link Control; Multiplexing</p> <p>Synchronous &amp; asynchronous transmission, Error control: types, detection and correction. Flow control: Stop-and-wait, Sliding-window, Automatic Repeat Request. The High-level Data Link Control protocol: modes, frame types and operation. Frequency Division Multiplexing, Synchronous and Statistical Time Division Multiplexing, multiplexing applications (ADSL)</p> <p>Local area networks; wired and wireless</p> <p>LAN topologies, protocols and the IEEE 802 standards; LAN interconnection, bridges, hubs, switches. Ethernet versions. Cellular systems: frequency reuse, capacity increase, operation. Wireless LANs: applications/types and transmission technologies</p> <p>Introduction to network routing and congestion control</p> <p>Virtual circuit and datagram networks; Router structure. Routing algorithms; link-state; distance-vector and hierarchical routing. Routing in the Internet (Intra-AS routing and Inter-AS routing: BGP). Broadcast and multicast routing. IPv6. Principles of congestion control; causes and the costs of congestion; approaches to congestion control; TCP congestion control.</p> <p>Network security</p> <p>Requirements; types of attacks; symmetric and asymmetric encryption techniques and their algorithms; Secure Socket Layer; IPv4 and IPv6 security; wireless protected access</p>
Teaching Methodology	Face- to- face
Bibliography	W. Stallings, Computer Networking with Internet Protocols and Technology, Prentice Hall

	<p>J.F. Kurose and K.W. Ross, Computer Networking: A Top-Down Approach Featuring the Internet, Addison-Wesley</p> <p>Behrouz A. Forouzan Data Communications and Networking, 4/e, Mc Graw-Hill</p> <p>A S. Tanenbaum, Computer Networks, Prentice Hall</p>								
<p>Assessment</p>	<table border="1" data-bbox="550 539 1241 725"> <tr> <td data-bbox="550 539 1002 577">Examinations</td> <td data-bbox="1002 539 1241 577">75%</td> </tr> <tr> <td data-bbox="550 577 1002 616">Assignments/Lab</td> <td data-bbox="1002 577 1241 616">15%</td> </tr> <tr> <td data-bbox="550 616 1002 689">Class Participation and Attendance</td> <td data-bbox="1002 616 1241 689">10%</td> </tr> <tr> <td data-bbox="550 689 1002 725"></td> <td data-bbox="1002 689 1241 725">100%</td> </tr> </table>	Examinations	75%	Assignments/Lab	15%	Class Participation and Attendance	10%		100%
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<p>Language</p>	<p>English</p>								