Introduction to Data Communications and Networking

Basic Course Information

Course Number	0305109	**Subject Category**	Compulsory (C)
Class Format	Lecture	**Credit Type and Number of Credits**	1
Department	Computer	**Student Category**	Year 3
Period of Study	Semester 2	**Classes per Week**	1
Required Materials			
Instructor	Krittanik Sitthansasarn	Shashi Shah	

Course Objective

To provide a conceptual understanding of the fundamentals of data communications and networking, such as: 1) to learn the basic concepts of data communications, information sharing, and networks, 2) to learn the layered architecture of communication protocols, 3) to learn digital signal transmission and encoding techniques, 4) to learn multiplexing techniques, and 5) to learn the protocols and standards in data communications and networking.

Evaluation(Rubric)	Ideal Level of Achievement (Very Good)	Standard Level of Achievement (Good)	Unacceptable Level of Achievement (Fail)
Understanding the basic concepts of data communications	Able to explain data communications concepts	Able to explain some data communications concepts	Unable to explain data communications concepts
Understanding layered architecture of communications protocols	Able to explain the functionality of different layered architecture of communications protocols	Able to explain some of the functionality of different layered architecture of communications protocols	Unable to explain the functionality of different layered architecture of communications protocols
Understanding idea of signals, transmission media, error detection in data communications and their correction	Able to explain the concepts of signals, transmission media, error detection in data communications and their correction	Able to explain some concepts of signals, transmission media, error detection in data communications and their correction	Unable to explain the concepts of signals, transmission media, error detection in data communications and their correction
Understanding the basic concepts of internetworking, addressing, and routing	Able to explain the basic concepts of internetworking, addressing, and routing	Able to explain some of the basic concepts of internetworking, addressing, and routing	Unable to explain the basic concepts of internetworking, addressing, and routing

Relationship with Learning Outcomes
C(1) Ability to operate and administer the computer software and hardware
C(4) Ability to understand the computer network system and security methods and to implement the safe system within networks, servers, computers, and connected devices.
Please change

Teaching Method

Outline:	Lecture and practice, group discussion
Class Format:	Lecture, practice, quiz, and reports
Please Note :	

Course Plan

Semester 2	**Contents and Method of Course**	**Goals**	**Related MOC**
week 1	Data Communications and Networking: Introduction	Understanding data communications components, data representation, and data flow, and networking: criteria, physical structure, types, and the Internet	V-D 6 75 V-D 6 77 V-D 6 78
week 2	Network Topologies	Understanding various network topologies: point-to-point topology, bus (point-to-multipoint) topology, ring topology, star topology, hybrid topology, mesh topology and tree topology	V-D 6 77
week 3	Network Models	Understanding protocol layering, TCP/IP protocol suite, and the OSI model	V-D 6 71 V-D 6 72 V-D 6 75
week 4	Data and Signals	Understanding theoretical basis for data communications: fourier analysis, bandwidth-limited signals, maximum data rate of a channel, analog and digital data, periodic analog signals, digital signals, and performance metrices. compression and decompression	V-D 6 78 V-D 8 107 V-D 8 109
week 5	No class due to public holiday (December 5)		
week 6	Digital Transmission and Analog Transmission	Understanding digital-to-digital conversion, analog-to-digital conversion, digital-to-analog conversion, analog-to-analog conversion, and transmission modes. transmission impairment	V-D 6 78 V-D 8 107 V-D 8 109
week 7	Bandwidth Utilization: Multiplexing and Spectrum Spreading	Understanding multiplexing: frequency-division multiplexing, wavelength-division multiplexing, time-division multiplexing, spread spectrum: frequency hopping and direct sequence. modulation	V-D 6 78 V-D 8 107 V-D 8 109
week 8	Transmission Media and Switching	Understanding guided media and unguided media of transmissions, modes of switching, circuit-switched networks, packet-switched networks, and their structures	V-D 6 73 V-D 6 78 V-D 6 79 V-D 6 81 V-D 8 109
week 9	No class due to public holiday (January 2)		
week 10	No class due to mid-term exam (January 9)		
week 11	Data-Link Layer, Error Detection and Correction	Understanding the basics of data-link layer, design issues, link-layer addressing, types of error, redundancy, detection versus correction, coding, error detection codes, and error correction codes	V-D 6 78 V-D 6 79 V-D 6 81 V-D 8 109
week 12	Data Link Control	Understanding data link control services and protocols	V-D 6 78 V-D 6 79 V-D 6 81 V-D 8 109
week 13	Media Access Control	Understanding channel access problem, and multiple access protocols	V-D 6 78 V-D 6 79 V-D 6 81 V-D 8 109
week 14	Network Layer	Understanding network layer services, design issues, and performances	V-D 6 78 V-D 6 79 V-D 6 81 V-D 8 109
week 15	IPV4 Addresses and Forwarding of IP Packets	Understanding address space, addressing, dynamic host configuration protocol (DHCP), network address resolution (NAT), and forwarding concepts	V-D 6 78 V-D 6 79 V-D 6 81 V-D 8 109
week 16	Network Layer Protocols	Understanding Internet protocol (IP), ICMPv4, and mobile IP	V-D 6 78 V-D 6 79 V-D 6 81 V-D 8 109
week 17	Routing and Congestion Control Algorithms	Understanding optamility principle, shortest path algorithm, flooding, approaches to congestion control, traffic-aware routing, admission control, traffic throttling, and load shedding	V-D 6 78 V-D 6 79 V-D 6 81 V-D 8 109
week 18	Unicast and Multicast Routing, and Next Generation IP	Understanding unicast routing protocols, intradomain multicast protocols, interdomain multicast protocols, IPv6 addressing, IPv6 protocol, and IPv6 transition	V-D 6 78 V-D 6 79 V-D 6 81 V-D 8 109
week 19	No class due to final exam (March 12)		
week 20			

Do not

	Midterm Examination	**Final Examination**	**Mutual Evaluations between students**	**Quiz**	**Report**	**Portfolio**
Basic Ability	25	25		25		
Technical Ability					25	
Interdisciplinary Ability						