

Course Information	Course Title	Computer Networks			Course ID		
					(Course Type)		
	(Credit/ hours per week)	3/3	Version (date)	3.0 (2022.04)			
Instructor							
Course Learning Objective	Course Objectives					Relation with Program Outcomes	
	1	Learn fundamental aspects of modern network systems: design principles, control algorithms, and basic/advanced functionalities of computer networks				PO 1	
	2	Learn network architecture and layered functions on transport, routing, and medium access control				PO 1	
	3	Gain hands-on experiences on various network implementations through several term projects				PO 5	
Course Description	Analysis and design process of various communication protocols for computer communication network construction are presented with emphasis on automatic access and media access: media access protocol, network class as high level based on routing and internet protocol, various protocols and the functions for transfer class, application class.						
Course Outcomes	NO	De tai ls					
	1	an ability to describe computer networks and the Internet					
	2	an ability to explain application, transport, network, link layers of the Internet protocol stack					
	3	an ability to explain wireless and mobile networks					
	4	an ability to explain security issues and the corresponding solution of the Internet					
(Prerequisites)	[Mandatory] Probability and Statistics, Programming related courses						
(Recommended Courses after This Course)	Operating Systems, Micro-processor application						
Course Software or Tool	Windows, Linux, Python						
Textbook	Title	Authors	Publisher	Place	Year	ISBN	
	Computer Networking: A Top Down Approach	Jim Kurose, Keith Ross	Pearson		2016	9781292153599	
References	N/A						
Lecture type	Lecture and project						

(Notes)	This course is a lecture-based class. The instructor gives three-hour lectures about technical topics related to Internet protocol stack. Teaching materials include a detailed description of computer networks and Internet, application/transport/network/link layers, wireless and mobile networks, security in computer networks and multimedia networking. Based on this knowledge, students are asked to carry out some project related to TCP-based server-client communications based on python programming, packet analysis based on wireshark. * Attendance Policy All Regular students should attend all classes. Students who are absent without valid reason for ¼ or more than the assigned hours for the course will given a Grade “F”							
(Evaluation n Criteria)	(Attendance)	10%	(Mid-term exam)	30%	(Final exam)	30%	(Project)	30%
	(Total)						100 %	
(Methods of Evaluation)	There will be several projects, one mid-term exam and one final-exam.							

Computer Networks Syllabus

Weekly Topical Outline of Course		
(1st Week)	Topic	Computer networks and Internet (Chapters 1.1 ~ 1.3)
	Contents	What is the Internet?, Network edge, access networks, physical media, Network core, packet/circuit switching
	Assignment	Exercises and problems
(2nd Week)	Topic	Computer networks and Internet (Chapters 1.4 ~ 1.7)
	Contents	Performance metrics of packet switching network, delay, loss, throughput, Protocol layers and their service models, Networks under attack, History of computer networking and Internet
	Assignment	Exercises and problems
(3rd Week)	Topic	Application Layer (Chapters 2.1 ~ 2.3)
	Contents	Principle of network applications, Web and HTTP, Electronic mail in the Internet
	Lab	Install Python and environmental setting
(4th Week)	Topic	Application Layer (Chapters 2.4 ~ 2.7)
	Contents	Domain name service (DNS), Peer-to-peer applications, Video streaming and content distribution networks (CDN), Socket Programming
	Assignment	Exercises and problems
(5th Week)	Topic	Transport Layer (Chapters 3.1 ~ 3.3)
	Contents	Multiplexing, demultiplexing, Reliable data transfer, Connectionless transport (UDP)
	Lab	Making a server-client communication based on TCP
	Topic	Transport Layer (Chapters 3.4 ~ 3.7)
(6th Week)	Contents	Reliable data transfer (UDT), Connection-oriented transport (TCP),

		TCP congestion control,
	Assignment	Exercises and problems
(7th Week)	Topic	Network Layer: Data Plane (Chapters 4.1 ~ 4.4)
	Contents	Router, Internet protocol (IPv4, IPv6), Network address translation (NAT) Software defined network (SDN)
	Assignment	Exercises and problems
(8th Week)	Topic	MID-TERM EXAM
	Contents	MID-TERM EXAM
	Lab	N/A
(9th Week)	Topic	Network Layer: Control Plane (Chapters 5.1 ~ 5.6)
	Contents	Routing algorithm, link-state (LS) algorithm, distance-vector (DV) algorithm, Intra-AS routing algorithm (OSPF), Inter-AS routing algorithm (BGP), SDN control plane, ICMP
	Assignment	Exercises and problems
(10th Week)	Topic	Link layer and LANs (Chapters 6.1 ~ 6.3)
	Contents	Error detection and correction techniques, Multiple access links and protocols, Channel partitioning, random access, taking-turns protocols,
	Assignment	Exercises and problems
(11th Week)	Topic	Link layer and LANs (Chapters 6.4 ~ 6.6)
	Contents	Addressing, ARP, ethernet, switch, VLAN, Link virtualization, Datacenter networking
	Lab	Install Wireshark and environmental setting
(12th Week)	Topic	Wireless and Mobile Networks (Chapters 7.1 ~ 7.4)
	Contents	Wireless link and network characteristics, WiFi (IEEE 802.11) MAC protocol Cellular (3G, 4G, 5G) Internet access
	Lab	Packet analysis based on Wireshark (ARP, TCP, DHCP, HTTP, DNS, ICMP)
(13th Week)	Topic	Wireless and Mobile Networks (Chapters 7.5 ~ 7.7)
	Contents	Mobility management, Mobile IP, Managing mobility in cellular networks
	Assignment	Exercises and problems
(14th Week)	Topic	Security in computer networks (Chapters 8.1 ~ 8.6)
	Contents	Definition of network security, Principles of cryptography, symmetric key, asymmetric key, Authentication, secured socket layer
	Assignment	Exercises and problems
(15th Week)	Topic	Multimedia Networking (Chapter 9.1 ~9.4)
	Contents	Video and audio applications, UDP and HTTP streaming, Voice-over-IP, YouTube and Skype examples,
	Assignment	Exercises and problems
(16th Week)	Topic	FINAL EXAM
	Contents	FINAL EXAM
	Lab	N/A