CPE 314 – Computer Networks (2/61)

General Information

Instructors	Assoc.Prof. Peerapon Siripongwutikorn, Ph.D. (Before midterm) Email: `peerapon.sir@mail.kmutt.ac.th` Office hours: Wed. 9.00-12.00 or by appointment Assoc.Prof. Thamrongrat Amornraksa, Ph.D. (After midterm) Email: `t_amornraksa@cpe.kmutt.ac.th` Office hours: Wed. 9.00-12.00 or by appointment
TAs	Mr. Kriangsak Palapunyakul (Indy) Ms. Natchaya Chungsawat (Jong) Mr. Arnan Mindang (Toomtam) Office hours: Mon. 13.00-15.00 or by appointment
Class meeting	Sections AB (Lecture) on Thu. 8.30-10.20, Room 1121 Section A (Lab) on Thu.10.30-12.20, Room 1120 Section B (Lab) on Thu.16.30-18.20, Room 1120 Sections CD (Lecture) on Wed. 13.30-15.20, Room 1121 Section C (Lab) on Wed.15.30-17.20, Room 1120 Section D (Lab) on Wed.17.30-19.20, Room 1120
Credit hours	3 (2-2-6)
Prerequisite	None

This course is required for all 3rd-year Computer Engineering students.

Course Description

This course introduces fundamental concepts, protocols, and technologies in TCP/IP networks. Topics covered include network architectures, socket programming, application layer protocols, TCP, UDP, routing algorithms and protocols, TCP/IP protocol suite, data link control, multiple access, Ethernet, virtual LAN, wireless LAN, and multimedia networking.

Materials

Main Text	B.A. Forouzan and F. Mosharraf, *Computer Networks: A Top Down Approach*, McGraw-Hill, 2012
Supplemental Texts	J.F. Kurose and K.W. Ross, *Computer Networking, A Top-Down Approach*, 6th Edition, Addison-Wesley, 2012. D. Peterson and B. Davie, *Computer Networks, A systems approach*, 5th Edition, 2011. W. Stallings, *Data and Computer Communications*, 10th Edition, Pearson Education, 2013.

Handouts, slides, and assignments are posted at http://myle.kmutt.ac.th.
Regularly check for updates.

Learning Outcomes

On completion of the subject, students should be able to:

- ▷ Explain functions and rationales of key network protocols in TCP/IP networks.
- ▷ Design and implement a nontrivial networked application.
- ▷ Design a simple small-scale network based on engineering justifications on the choices of network devices, topology, and related protocols.
- ▷ Configure network service components for an operational network from a given requirement.

Evaluation

Assignments and Projects 30%
Midterm exam 35%
Final exam 35%

The instructors reserve any right to change the grading policy as deemed appropriate.

Policies

Unless mentioned otherwise, the following policies are applied in the course by default:

Assignment is due in one week. A homework submission must be clear and legible to receive full credits. Letter grades A to F may be given, where $A = 10$ and $F = 0$.

Late submission is only accepted under reasonable excuses and explicit permission from the instructors, or it will be deducted one grade off each day. No submission is accepted after the solution has been posted.

Academic integrity is strictly enforced. Submissions with copied contents get at least two grades off.

Course Schedule

The following schedule may slightly change, depending on our progress in the course. The detailed and up-to-date course schedule is available at the class web page.

Week	Lecture	Lab
1	Basic concepts; Network architectures; Addressing, Protocol layering	Using Wireshark to capture packets
2	Socket programming	Python network programming
3	Application layer protocols – HTTP, DNS, SMTP, Websocket, MQTT	Setting up DNS server; Resource records and name resolution.
4	Transport layer protocols – UDP and TCP TCP flow and congestion control	UDP/TCP data transmission, TCP connection management
5	Packet switching networks and performance measures	Address resolution in a single-segment network.
6	Internet layer (1) – Internet protocol, IP addressing and forwarding	Setting up a static-routed network. Exploring network performance
7	Internet layer (2) – DHCP, ICMP, and NAT	Setting up DHCP server and relay agent. DHCP operations
	— Midterm exam —	
8	Distance vector, link-state, and path-vector routing	Setting up NAT gateway and SOHO network
9	RIP and OSPF protocols Link layer – Framing, Error detection and correction	RIP operations and routing convergence
10	Multiple access protocols – Random Access, Controlled Access, Channelization; Fast, 1G, and 10G Ethernet;	OSPF operations and routing convergence
11	LAN interconnection and Spanning tree protocol; Virtual LAN, trunking and link aggregation	Learning bridge and forwarding loop. Preventing loops with Spanning tree protocol
12	IEEE 802.11 Wireless LANs, Bluetooth	Separating broadcast domains with VLANs, Routing across VLANs, Aggregating links.
13	Physical signal transmission and standards, Multiplexing, Transmission media, and Transmission network technologies	Exploring physical media channel capacity and characteristics
14	Real-time interactive protocols: SIP, H.323, RTP, RTCP, SIP, SCTP; Quality of Services	Measuring voice and video quality of services
	— Final exam —	