

COURSE SYLLABUS

CSC10008 – Computer Networking

1. GENERAL INFORMATION

Course name:	Computer Networking
Course name (in Vietnamese):	Mạng máy tính
Course ID:	CSC10008
Knowledge block:	Basic Professional Knowledge
Number of credits:	4
Credit hours for theory:	45
Credit hours for practice:	30
Credit hours for self-study:	90
Prerequisite:	No prerequisite
Prior-course:	Introduction to Computer Science, Introduction to Programming
Instructors:	Đỗ Hoàng Cường, Huỳnh Thụy Bảo Trân, Lê Ngọc Sơn, Lê Giang Thanh, Lê Hà Minh

2. COURSE DESCRIPTION

The course objectives include learning about computer network organization and implementation, obtaining a theoretical understanding of data communication and computer networks. This course consists of computer network architectures, protocol layers, network programming, transmission media, encoding systems, switching, network routing, congestion control, flow control, transport protocols, network security.

3. COURSE GOALS

At the end of the course, students are able to

ID	Description	Program LOs
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G1	Ability to work at the individual and team level to present problems in the Computer Networking.	2.1.1, 2.2.1, 2.2.2, 2.3.1
G2	Ability to understand and interpret English terminology in Computer Networking.	2.4.3, 2.4.5
G3	Ability to analyze and think at the system level.	4.1.3, 4.3.2
G4	Identify and classify the basics of the Computer Networking.	1.3.6, 1.4
G5	Understand and provide solutions to basic network problems. Use basic algorithms learned to solve real problems.	5.1.1, 5.1.3, 5.2.1, 5.2.2, 5.3.1, 6.1.1
G6	Design, deploy, and build a number of small computer networks.	5.1.3, 5.2.2, 5.3.2, 6.1.2

4. COURSE OUTCOMES

CO	Description	I/T/U
G1.1	Team formation, organization, operation, and management.	I, T
G1.2	Participate in group discussion and debate on subject matter.	U
G1.3	Analyze, synthesize, and document individual project reports or collaborate on a team.	I, T
G2.1	Know and understand specialized English terminology of the subject.	I
G2.2	Read and understand English materials related to lectures.	I
G3.1	Explain the basics of computer networks and how computer networks work: circuit switching networks, packet switching networks, TCP, UDP, DNS, DHCP, NAT, ...	I, T, U

G3.2	Know the roles, responsibilities and professional ethics while working.	I
G3.3	Know how to update new knowledge, self-study, self-develop and adapt.	I
G4.1	Distinguish the differences between the basic problems in the Computer Networking.	I, T
G5.1	Design and model a computer network.	I, T, U
G5.2	Use basic algorithms learned to solve real problems.	I, T, U
G5.3	Ability to program a number of network applications.	I, T, U
G6.1	Analyze the problem and model the problem.	I, T, U
G6.2	Design, build, deploy a number of small networks. Analyse, resolve network problems.	I, T, U

5. TEACHING PLAN

THEORY

ID	Topic	Course outcomes	Teaching/Learning Activities (samples)	Assessments
1	Introduction <ul style="list-style-type: none"> Basic concepts History of the Internet OSI Model TCP/IP Model 	G1.2, G2.1, G3.1, G3.2, G3.3	Lecturing Q&A, Group discussion	QZ1: Quiz 1 HW1: Homework 1

	<ul style="list-style-type: none"> IP address, subnetting 			
2	Application Layer <ul style="list-style-type: none"> DHCP, DNS, HTTP, FTP, SMTP, IMAP, POP Socket Programming 	G2.1, G2.2, G4.1, G5.1, G6.2	Lecturing Demonstration, Q&A	QZ2: Quiz 2 HW2: Homework 2 PR1: Project 1
3	Transport Layer <ul style="list-style-type: none"> UDP TCP 	G1.1, G1.3, G2.1, G3.2, G5.1, G5.3, G6.1	Lecturing Demonstration, discussion	QZ3: Quiz 3 HW2: Homework 3 PR1: Project 1 PR2: Project 2
4	Network Layer <ul style="list-style-type: none"> IP protocol Routing Router ICMP NAT 	G1.1, G1.3, G2.1, G3.2, G4.1, G5.1, G6.1, G6.2	Lecturing Demonstration, discussion	QZ3: Quiz 3 HW3: Homework 3 PR2: Project 2 PR3: Project 3
5	Data Link Layer <ul style="list-style-type: none"> Parity check, checksum, CRC TDM, FDM, CDMA, ALOHA, CSMA 	G1.2, G2.1, G4.1, G5.1, G6.1, G6.2	Lecturing Demonstration, discussion	QZ4: Quiz 4 HW4: Homework 4 PR2: Project 2 PR3: Project 3

	<ul style="list-style-type: none"> • ARP • Switch • Ethernet 			
6	Network Media <ul style="list-style-type: none"> • Wired networks • Wireless networks 	G2.1, G5.2, G6.1	Lecturing Question & answer Case study and discussion	HW5: Homework 5
7	Review	G2.1, G3.1, G3.2, G3.3, G3.4, G4.1, G5.1, G5.2, G5.3, G5.4	Lecturing Q&A, Discussion Projects submitted	A31

LABORATORY

ID	Topic	Course outcomes	Teaching/Learning Activities (samples)	Assessments
1	Socket Programming	G1.2, G2.1, G2.2, G3.1, G3.2, G3.3, G5.1, G5.2, G5.3, G6.1	Lecturing Demonstration, Q&A	A21
2	Capture and analyse packets with Wireshark	G2.1, G2.2, G3.1, G3.2, G3.3, G5.1, G5.2, G6.1, G6.2	Provide instructions Demonstration, discussion	A22
3	Design and configure networks with Packet Tracer	G1.2, G2.1, G2.2, G3.1, G3.2, G3.3	Provide instructions Demonstration, discussion	A23

		G5.1, G5.2, G6.1, G6.2		
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6. ASSESSMENTS

ID	Topic	Description	Course outcomes	Ratio (%)
A1	Assignments			20%
A11	Quizzes: QZ1 – QZ4	Small quizzes in class for each topic	G2.1, G2.2, G3.1, G4.1	10%
A12	Homeworks: HW1 – HW5	Reading comprehension and practicing based on knowledge taught in class	G2.1, G2.2, G3.1, G4.1, G5.1, G5.2, G6.1	10%
A2	Projects			30%
A21	Project: Socket programming	Create a network application using Socket.	G1.2, G2.1, G2.2, G3.1, G3.2, G3.3, G5.1, G5.2, G5.3, G6.1	10%
A22	Project: Capture and analyse packets with Wireshark	Understanding the TCP/IP model and protocols of each layer better using Wireshark tool	G2.1, G2.2, G3.1, G3.2, G3.3, G5.1, G5.2, G6.1, G6.2	10%

A23	Project: Design and configure networks with Packet Tracer	Design a network using the Cisco Packet Tracer tool, configure the network so that it can work properly	G1.2, G2.1, G2.2, G3.1, G3.2, G3.3, G5.1, G5.2, G6.1, G6.2	10%
A3	Exams			50%
A31	Final exam	Opened book exam. Describe the understanding of different topics, analyze & program to solve problems	G4.1, G5.1, G5.2, G6.1	50%

7. RESOURCES

Textbooks

- **Computer Networking** – by Mai Văn Cường - Trần Trung Dũng - Trần Hồng Ngọc - Lê Ngọc Sơn - Lê Giang Thanh - Trương Thị Mỹ Trang - Đào Anh Tuấn, 1st edition, 2015
- **Computer Networking: A Top-Down Approach** – by James F. Kurose, Keith W. Ross - Addison Wesley – 7th edition, 2017.

Other books

- **Computer Networks, Fourth Edition** – by Andrew S. Tanenbaum - Prentice Hall – 2003

Softwares

- VMware Workstation Pro/Player: <https://www.vmware.com/products/workstation-player/workstation-player-evaluation.html>
- Oracle VM VirtualBox: <https://www.virtualbox.org>
- Cisco Packet Tracer: <https://www.netacad.com/courses/packet-tracer>
- Wireshark: <https://www.wireshark.org>
- Microsoft Windows Server 2003/2008/2012/2016

- Ubuntu Linux: <https://ubuntu.com>

8. GENERAL REGULATIONS & POLICIES

- All students are responsible for reading and following strictly the regulations and policies of the school and university.
- Students who are absent for more than 3 theory sessions are not allowed to take the exams.
- For any kind of cheating and plagiarism, students will be graded 0 for the course. The incident is then submitted to the school and university for further review.
- Students are encouraged to form study groups to discuss on the topics. However, individual work must be done and submitted on your own.
- The number of assignments may vary depending on the class' situation.