Capital University of Economics and Business
Overseas Chinese College
Course Syllabus

Year and Semester	2019 Fall (September 2, 2019 - January 10, 2020)
Course Name	Computer Networking
Course Code	MIS351
Course Type	☐ General Education (Required) ☐ General Education (Elective) ☑ Professional Course (Required) ☐ Professional Course (Elective) ☐ Basic Disciplinary Course
Course Credits	3
Course Hours	54
Prerequisites	Fundamental of Computer Science
Instructor	Changjun Ru
Contact Information	Office: C217 Tele: (010)83951082 Email: ruchangjun@cueb.edu.cn
Office Hour	Mon & Tue: 08:00-10:00; Fri: 09:00-11:00;
Learning Centre	Wed & Thurs.: 10:00-12:00
Grade/Section	2017 Y01
Course Time/Place	Mon 10:00-12:00 & Thur. 8:00-8:50 (5#111)

Textbook

Kurose & Ross, *Computer Networking A top-down approach*, 7th edition*;* ISBN: 9780134312804

Course Description

This course is an introductory course on computer networks. Using the Internet as a vehicle, this course introduces the underlying concepts and principles of modern computer networks with emphasis on protocols, architectures, and implementation issues. The main goal of this course is to understand layering in computer networks, understand different protocol stacks (OSI and TCP/IP), understand functions and protocols within a layer, understand how layers fit together and finally understand how the Internet works. In addition, you will also experience with (i) writing simple network applications and (ii) learning exactly what is going on inside the Internet by looking at frames/packets/segments and identifying each bit.

Student Learning Objectives

After completing this course, students will be able to:

1. Understand the structure and organization of computer networks; including the division into network layers, role of each layer, and relationships between the layers.
2. Understand the basic concepts of application layer protocol design; including client/server models, peer to peer models, and network naming.
3. In depth understanding of transport layer concepts and protocol design; including connection oriented and connection-less models, techniques to provide reliable data delivery, and algorithms for congestion control and flow control.
4. In depth understanding of network layer concepts and protocol design; including virtual circuit and

datagram network designs, datagram forwarding, routing algorithms, and network interconnections.

5. Understand the basic concepts of link layer properties; including error-detection and correction techniques, multiple access protocols, point to pint protocols, and characteristics of link layer media (including wireless links).

6. Understand the basic concepts of network security concepts, including authentication, integrity, key distribution, and system security design challenges.

At the completion of this unit students will have knowledge and understanding of:

Teaching Methods

This course contains lectures, class discussions, homework, quizzes, presentation and exams. Textbook content will be introduced first. Then real case and practice questions will be delivered to students as a way to test their understanding of the knowledge. This will require individual or group assignment in class.

Grade Criterion

Component	Weight	Description
Final Exam	20%	A cumulative final examination will be given based on all of the contents of the class. The exam paper may be composed of multiple-choice questions, short answer questions, essay questions and practice problems. Students should rely primarily on homework assignments to give them a sense of what they may see for material on exams.
Mid-Term Test	20%	A cumulative midterm test will be given based on all of the contents that have been taught in class. The test paper may be mainly composed of multiple-choice questions and it should be completed within 60 minutes in class.
Homework	10%	Most of the assigned homework is taken from the Exercises in the textbook. Assignments will be collected at the clearly stated date. Late assignments will not be accepted. The graded assignments will be kept by the tutor for reference and won't be returned to students.
Quizzes	10%	There will be at least 2 quizzes during the semester. Quizzes may or may not be announced in advance. It may also be used as a way to check the attendance. Quizzes will test your knowledge of both concepts and the application of those concepts.
Presentation	20%	The students will be divided into several groups to prepare a presentation. Each student is required to be involved in the presentation. The topics can be selected from the textbook or lectures. Each group need to finish a PPT related to the topic which is given and hand in the related resources to the teacher before the presentation.
Participation	10%	Individuals will be asked to participate individually in a question and answer at least 5 times during the semester. The performances should be counted in their participation.
Attendance	10%	Refer to attendance policy listed below
Total	100%	

Detailed Grade Computation

	Before Midterm	After Midterm
Attendance	5%	5%
Participation	5%	5%
Homework	5%	5%
Quizzes	5%	5%
Presentation		20%
Midterm test	20% (5% of critical thinking)	
Final exam		20% (5% of critical thinking)
Total	40%	60%

Grading Policy

A+ 97-100	A 93-96	A- 90–92	B+ 87-89	B 83-86	B- 80–82
C+ 75-79	C 70-74	C- 67–69	D+ 63–66	D 62-60	F 0- 59

Exam Schedule

Midterm Test: November 4-8, 2019;
Final Exam: January 1–10, 2020.

Assessment of Student Performance

☞ ***Self-Study and Reading ability Practice***

Instructor will give out the chapters or the reference books to read and use class hours to have discussion; students should be able to show a proactive attitude and ability for self-study and reading. Knowledge and oral English will be elements of homework or presentation score.

☞ ***Homework***

Students should finish their homework by themselves. Copying from others will be treated as cheating and the homework scores will be lowered. Students should hand in all assignments on time. Late assignments will be accepted at the discretion of the instructor (i.e., when the student was ill or had an excused absence). Late assignments without reasonable proof will be reduced in score by 50%.

☞ ***Attendance***

Because the course covers a great deal of material, attending every class session is very important for performing well.

- Being late for 15 minutes or more is considered an absence.
- Five hours or above of unexcused absences will result in the lower level of the final grade by one grade band (e.g. from C – to D +). Any excused absence must be discussed directly with the teacher.
- Absence which is more than 1/3 of the total teaching hours will cause an F (a failing grade) directly. but students are welcome to continue attending classes.
- An incomplete grade (I) will be considered in case of medical or family emergencies.

☞ ***Participation***

- Students should participate in classes actively. Half of participation grade is determined by their presentation in class. They are encouraged to ask questions relevant to the subject and express their own opinions. Every student should respect the ideas, opinions, and questions of their classmates.

- Students should also use office hours to ask questions or talk with the instructor for good communication and effective learning.
- Frequent visiting the instructor and chatting in English during office hours is highly recommended.
- Any misbehavior and non-class related activities in class will result in the lower level of the participation grade, including ringing cell phones.
- All above behaviors will be solely evaluated by the instructor for scoring.

☞ Textbook

Students must bring the textbook to class.

Topical Course Outline

Week	Date	Topics	Homework
1	Sep. 2	● Course Introduction and Syllabus ● Introduce the textbook and how to read it ● Course Overview ● 1.1 What Is the Internet? ● 1.2 The Network Edge	- Read Chapter 1.1-1.3 Computer Networks and the Internet
	Sep. 5	● 1.3 The Network Core ✓ Packet-switching ✓ Store and forward ✓ Queueing delay, loss ✓ Network-core functions ✓ Circuit switching ✓ Network of networks	- Ake student to look for Network Core examples, and show up on paper - Comparison of Packet-switching and Circuit switching - Read Chapter 1.3
2	Sep. 9	● 1.4 Delay, Loss, and Throughput in Packet-Switched Networks ✓ Four sources of packet delay ✓ Packet loss ✓ Throughput ● Wireshark Lab: Getting Started	- Read Chapter 1.4 and Chapter 1.5 - Will cars arrive to 2nd booth before all cars serviced at first booth?
	Sep. 12	● 1.5 Protocol Layers and Their Service Models ✓ Why layering? ✓ Internet protocol stack ✓ ISO/OSI reference model ✓ Encapsulation	- Benefits of layers -Examples of each layers - Unit of each layer - Responsivity of each layer
3	Sep. 16	● Wireshark Lab: Getting Started	- List 3 different protocols that appear in the protocol column - What is time difference between HTTP GET, HTTP

			OK?
	Sep. 19	● 1.6 Networks Under Attack ✓ Virus, worm, spyware malware, botnet ✓ DDoS ● Summary of chapter1	- Chapter 1 test - Review Chapter 1 - Preview Chapter 2
4	Sep. 23	● 2.1 Principles of Network Applications ✓ Popular application-level protocols ✓ Some network apps ✓ CS, P2P architecture ✓ Sockets, Addressing processes ✓ App-layer protocol defines ✓ TCP, UDP ● 2.2 The Web and HTTP ✓ web page consists of objects ✓ request, response ✓ general format	- example port numbers - Is HTTP "stateless"
	Sep. 26	● 2.2 The Web and HTTP ✓ Cookie ✓ proxy server ● 2.3 File Transfer: FTP	- Benefits of cookie - proxy server - FTP port number -
5	Sep. 30	National Day Holiday	Preview Chapter 2.4-6
	Oct. 3	National Day Holiday	
6	Oct. 7	● 2.4 Electronic Mail in the Internet ✓ Three major components ✓ Sample SMTP interaction ✓ Mail access protocols ● Wireshark Labs: HTTP ✓ The Basic HTTP GET/response interaction ✓ The HTTP CONDITIONAL GET/response interaction	- Why not centralize DNS? - HTTP version - IF-MODIFIED-SINCE
	Oct. 10	● Wireshark Labs: HTTP ✓ Retrieving Long Documents ✓ HTML Documents with Embedded Objects ✓ HTTP Authentication	How many data-containing TCP segments were needed to carry the single HTTP response and the text of the Bill of Rights?
7	Oct. 14	● 2.5 DNS—The Internet's Directory Service ✓ DNS services ✓ DNS: a distributed, hierarchical database ✓ DNS name resolution example ✓ DNS record, protocol, messages ● Wireshark Labs: HTTP, DNS	- Revise the report
	Oct. 17	● 2.6 Peer-to-Peer Applications ✓ P2P architecture ✓ File distribution: client-server vs P2P	- examples of p2p - What if peer 13 wants to join?

		✓ Distributed Hash Table (DHT)	
8	Oct. 21	Chapter 3 Transport Layer ● 3.1 Introduction and Transport-Layer Services ✓ Transport vs. network layer ✓ Household analogy ● 3.2 Multiplexing and Demultiplexing ✓ How demultiplexing works	- Read Chapter 3 Transport Layer
	Oct. 24	● Quiz I	- Continue revising the report - Preview Chapter 3.3, 3.4
9	Oct. 28	● 3.3 Connectionless Transport: UDP ✓ UDP: segment header ✓ UDP checksum ✓ Internet checksum ● 3.5 Connection-Oriented Transport: TCP ✓ TCP segment structure ✓ EstimatedRTT ✓ TCP reliable data transfer ✓ Retransmission ✓ Flow control ✓ Connection Management	- Preview Chapter 4 The Network Layer
	Oct. 31	● 4.1 Introduction ✓ Two key network-layer functions ✓ Interplay between routing and forwarding ✓ Network service model ● 4.2 Virtual Circuit and Datagram Networks ✓ Datagram ✓ virtual-circuit ✓ VC implementation ✓ Datagram or VC network: why?	- three functions of network layer - routing vs forwarding
10	Nov. 4	● Mid-Term Test	
	Nov. 7	● Mid-Term Test	
11	Nov. 11	● Wireshark Labs: TCP ✓ Capturing a bulk TCP transfer from your computer to a remote server ✓ A first look at the captured trace ✓ TCP Basics	- What is the sequence number of the TCP SYN segment
	Nov. 14	✓ TCP congestion control in action	- What is the sequence number of the SYNACK segment
12	Nov. 18	● Wireshark Labs: UDP	- how many fields there are in the UDP header
	Nov. 21	● 4.3 What's Inside a Router?	- Preview Chap 4.4-7
13	Nov. 25	● 4.4 The Internet Protocol (IP): Forwarding and Addressing in the Internet ✓ IP addressing	IP addressing assigns an address to

		✓ Subnets ✓ CIDR	223.10.198.250/29, the network address
	Nov. 28	✓ ICMP ✓ IPv6	- IPv6 datagram format
14	Dec. 2	● 4.5 routing algorithms ✓ Dijkstra's algorithm	- use Dijstra's shortest path algorithm to compute the shortest path from A to all network nodes
	Dec. 5	● 4.6 Routing in the Internet ● 4.7 Broadcast and Multicast Routing	Self-study for chapter5
15	Dec. 9	Presentation	Grade for each group
	Dec. 12	Presentation	Grade for each group
16	Dec. 16	Presentation	Grade for each group
	Dec. 19	Presentation	Grade for each group
17	Dec. 23	Review	
	Dec. 26	Review	
18	Dec. 30	New Year's Day Holiday	
	Jan. 2	Review	
19	Jan. 6	Final Examination	
	Jan. 9	Final Examination	

Note: *Some chapters or sections may leave for self-study, this is the students' duty to learn and understand, they may also be included in the quizzes or exams. A review in Chinese may be held during L.C. and O.H. in the semester.*

Teacher's Office Hour

- The instructor's office hour is shown in the front of the office door.
- Students are suggested to use the instructor's office hour and learning center to ask questions or talk with the instructor once at least per week for good communication and effective learning, which is recorded in the students' participation.
- The time can be scheduled by instructors or students, or both.

Cheating and Plagiarism

Cheating is not tolerated. Any student caught cheating on a quiz; test or exam will be given a mark of zero (0) for the particular work. At the beginning of the semester the definition of plagiarism will be carefully explained, when any thoughts or writings of another person are used, they must be clearly identified (usually one uses quotation marks) and the source notes. **If any student is caught cheating on any homework assignment, the highest score the student can earn in that course is a "C".**

Important Dates

Fall Semester, 2019	September 2, 2019— January 10, 2020
Aug. 30	Registration
Sep.2	Classes Begin
Sep.7 - 20	Freshmen's Military Training

Sep.23	Classes Begin（Freshmen）
Sep.13	Mid-Autumn Festival (tentative)
Oct.1 - 7	National Day Holiday (tentative)
Nov. 4 - 8	Mid-term Test
Jan.1, 2020	New Year's Day Holiday (tentative)

Note: *This syllabus is tentative and may be changed or modified throughout the semester. All students will be notified and a new syllabus will be given.*

Instructor: Changjun Ru **Department Head: Jingning Li**