



East West University
Department of Computer Science and Engineering
Course Outline
Spring 2023 Semester

Course Information

Course: CSE405 Computer Networks (Section: 1, 2 and 3)

Teaching Scheme:

	Theory	Laboratory	Total
Credits	3	1	4
Contact Hours	3 Hrs/Week for 13 Weeks	2 Hrs/Week for 13 Weeks	5 Hrs/Week for 13 Weeks

Prerequisite: CSE245, CSE350

Instructor Information

Instructor: **Dr. Anisur Rahman**
Associate Prof, Department of Computer Science and Engineering
Office: Room # 629
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TA: TBA

Class Routine and Office Hour

	8:30 – 10:00	10:10 – 11:40	11:50 – 1:20	01:30 – 03:00	03:10 – 04:40
Sunday	CSE 405 (2) Room # 630	<i>Office Hour</i>			
Monday	CSE 405 (1) Room # 108	<i>Office Hour</i>	CSE 405 (3) Room # 110		
Tuesday	CSE 405 (2) Room # 108	<i>Office Hour</i>	<i>Office Hour</i>		
Wednesday	CSE 405 (1) Room # 108	<i>Office Hour</i>	CSE 405 (3) Room # 110	CSE 405 (3) Room # 630	
Thursday	CSE 405 (2) Room # 108	<i>Office Hour</i>			

Course Objective

This course explores the field of computer networking and communication, emphasizing network architecture and software issues. Students will learn the basic performance and engineering trade-offs in the design and implementation of computer networks. Knowledge of this course will be needed as prerequisite knowledge for future courses such as CSE406 Internet of Things, CSE453 Wireless Networks, and CSE457 Cellular Networks.

Knowledge Profile

K4: Forefront engineering specialist knowledge for practice, K5: Engineering design
K6: Engineering practice (technology)

Learning Domains

Cognitive - C2: Understanding, C3: Applying, C4: Analyzing, C6: Creating
Psychomotor - P2: Manipulation, P3: Precision
Affective - A2: Responding

Program Outcomes (POs)

PO2: Problem Analysis, PO3: Design/Development of Solutions
PO5: Modern Tool Usage, PO12: Project Management

Complex Engineering Problem Solution

EP1: Depth of knowledge required, EP2: Range of conflicting requirements
EP3: Depth of analysis required, EP4: Familiarity of issues

Complex Engineering Activities

None

Course Outcomes (COs) with Mappings

After completion of this course students will be able to:

CO	CO Description	PO	Learning Domains	Knowledge Profile	Complex Engineering Problem Solving/ Engineering Activities
CO1	Identify, use and justify algorithms, protocols and phenomena of different computer network layers for analyzing and designing functional networks	PO2	C2, C3	K4	EP1, EP3
CO2	Analyze, develop and justify networking algorithms and protocol for effective design of computer networks	PO3	C2, C3	K4	EP1, EP2
CO3	Apply appropriate tools to build and simulate computer networks and analyze packet transmission	PO5	C3	K4, K5	EP1, EP2

CO4	Identify and use appropriate computer network solutions; and construct a complete computer network for coping with the evolving and changing technologies	PO12	C3, C6 P2, P3 A2	K4, K5, K6	EP1, EP2, EP4
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Course Topics, Teaching-Learning Method, and Assessment Scheme

Course Topic	Teaching-Learning Method	CO	EP/EA	CO Marks				Exam (Mark)
				C2	C3	C6		
Introduction to computer networks, layers, transmission media. Data link layer: introduction, design issues, framing. Protocol verification: finite state machine & petri net models	Lecture, Class Discussion, Discussion Outside Class with Instructor/ Teaching Assistant	CO1	EP1, EP3	6	6		30	Midterm Exam I (20%)
MAC, Channel allocation problem, CSMA/CD, Contention period, BEB CSMA	Do			6	6			
Collision-free protocols: bit-map, binary countdown, limited contention					6			
Network layer: Introduction, Static and dynamic routing algorithm, Distance vector routing, count-to-infinity problem, Link state routing	Do	CO1	EP1, EP2	6	6		30	Midterm Exam II (20%)
Internet Protocol (IP), IPv4 header, NAT		CO2		6	12			
IP addresses and subnets								
Congestion and congestion control algorithms in network layer	Do	CO1	EP1, EP3	6	6		30	Final Exam (20%)
QoS, leaky bucket algorithm, Jitter, Internetworking, tunneling, fragmentation								
Transport layer: Introduction, transport services, connection establishment, data transfer & connection release, TCP segment header, Congestion control in Transport layer				6	6			
Application layer: Introduction, DNS, Web server, Optimization of Web server. Server farm					6			

Laboratory Experiments and Assessment Scheme

Experiment	Teaching-Learning Method	CO	Mark of Cognitive Learning Levels				Mark of Psychomotor Learning Levels	Mark of Affective Learning Levels	CO Mark
			C2	C3	C4	C6			
Familiarization with transmission media and orientation of CAT5	Lab Experiment, Result analysis and report	CO3							
Creating straight through and cross over cable and data transmission between hosts	Do	CO3							
The basic of Linux networking commands, administrative commands and analyzing parameters	Do	CO3							
Creating networks with Linux	Do	CO3							
Analyzing packets with Wireshark I		CO3							
Creating network (LAN) with Packet tracer (Simulator)	Do	CO3							
Creating networks with LAN segments and networks with servers (client-server)	Do	CO3							
Creating multiple networks, configuring and implementing routing protocols	Do	CO3							
Lab Exercise Total		CO2	8		8			8	3%
		CO3		8		8	16		5%
Lab Exam	Lab Exam	CO2	2	2.5				2.5	2%
		CO3				4	2		5%
Total									15%

Mini Project Assessment Scheme

Mini Project	Teaching-Learning Method	CO	EP/EA	Mark of Cognitive Learning Level			Mark of Psychomotor Learning Levels		Mark of Affective Learning Level		CO Mark
				C2	C3	C4	P3	P5	A4	A5	
Lab-based Mini Project including Report and Presentation	Group-based moderately complex network design project with report writing and oral/poster presentation	CO2	EP1	1	1	1			1	1	5
		CO4	EP2				2	4	2	2	10

Overall Assessment Scheme

Assessment Area	CO				Other	PO Marks			
	CO1	CO2	CO3	CO4		PO2	PO3	PO5	PO12
Class Participation					5				
Class Test/Quiz					5				
Midterm-I Exam	20	0	0	0		20	0	0	0
Midterm-II Exam	8	12	0	0		8	12	0	0
Final Exam	20	0	0	0		20	0	0	0
Laboratory Performance and Lab Exam	0	5	10	0		0	5	5	0
Mini Project	0	5	0	10		0	5	5	10
Total	48	22	10	10	10	48	22	10	10

Teaching Materials/Equipment

Text book:

- Computer Networks, Forth /Fifth edition, Andrew S. Tanenbaum, Prentice Hall

References:

- Computer Networking: A Top-Down Approach Featuring the Internet by James Kurose and Keith Ross, Addison Wesley
- Data and Computer Communications by William Stalling

Teaching-Learning Method: Lecture Notes and extensive interactive sessions

Grading System

Marks (%)	Letter Grade	Grade Point	Marks (%)	Letter Grade	Grade Point
97-100	A+	4.00	73-76	C+	2.30
90-96	A	4.00	70-72	C	2.00
87-89	A-	3.70	67-69	C-	1.70
83-86	B+	3.30	63-66	D+	1.30
80-82	B	3.00	60-62	D	1.00
77-79	B-	2.70	Below 60	F	0.00

Exam Dates

Section	Midterm I	Midterm II	Final
1	06.03.2023 (Monday)	05.04.2023 (Wednesday)	17.05.2023 (Wednesday)
2	07.03.2023 (Tuesday)	11.04.2023 (Tuesday)	16.05.2023 (Tuesday)
3	06.03.2023 (Monday)	05.04.2023 (Wednesday)	17.05.2023 (Wednesday)

Academic Code of Conduct

Academic Integrity:

Any form of cheating, plagiarism, personification, falsification of a document as well as any other form of dishonest behavior related to obtaining academic gain or the avoidance of evaluative exercises committed by a student is an academic offence under the Academic Code of Conduct and **may lead to severe penalties as decided by the Disciplinary Committee of the university.**

Special Instructions:

- For plagiarism, the grade will automatically become zero for that exam/assignment.
- Normally there will be **NO make-up exam**. However, in case of **severe illness, death of any family member, any family emergency, or any humanitarian ground**, if a student miss any exam, the student **MUST** get approval of makeup exam by written application to the Chairperson through the Course Instructor **within 48 hours** of the exam time. Proper supporting documents in favor of the reason of missing the exam have to be presented with the application.

- For **final exam**, there will be NO makeup exam. However, in case of **severe illness, death of any family member, any family emergency, or any humanitarian ground**, if a student misses the final exam, the student **MUST** get approval of **Incomplete Grade** by written application to the Chairperson through the Course Instructor **within 48 hours** of the final exam time. Proper supporting documents in favor of the reason of missing the final exam have to be presented with the application. **It is the responsibility of the student to arrange an Incomplete Exam within the deadline mentioned in the Academic Calendar in consultation with the Course Instructor.**
- There is **zero tolerance for cheating** in exam. Students caught with cheat sheets in their possession, whether used or not; writing on the palm of hand, back of calculators, chairs or nearby walls; copying from cheat sheets or other cheat sources; copying from other examinee, etc. would be treated as cheating in the exam hall. The only penalty for cheating is **expulsion for several semesters as decided by the Disciplinary Committee of the university.**