CMPE/CMSE 344 Computer Networks

Department: Computer Engineering

Instructor Information:
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Assistant Information:
TBA

Meeting Times and Places:
Gr01: Lectures: Mon 14:30-16:30, Tue 10:30-12:30 Lab: Thu 12:30-14:30
Gr02: Lectures: Tue 14:30-16:30, Thu 12:30-14:30 Lab: Mon 14:30-16:30

Program Name: Computer/Software Engineering	**Program Code:** 25/29

Course Code:	**Credits:**	**Year/Semester:**
CMPE/CMSE 344	4	2025-2026 Spring

☒ Required Course ☐ Elective Course (click on and check the appropriate box)

Prerequisite(s):
CMPE 242 Operating Systems and MATH 322 Probability and Statistical Methods

Catalog Description:
Introduction to fundamental concepts of computer networks. Basic performance and engineering trade-offs in the design and implementation of computer networks. Network hardware/software (sockets), protocols and layers, OSI and TCP/IP reference models. Data link layer design issues including encoding, framing, error detection, reliable delivery, and multiple access. Multiplexing, switching, and routing. LANs, wireless LANs, fiber optics, and cellular networks. TCP/IP protocol family. Best-effort design principle of IP. End-to-end protocols including UDP, TCP, RTP, SCTP, and QUIC. Network applications including real-time multimedia communications, streaming, and content distribution. New trends in computer-communication networks.

Course Web Page:
https://staff.emu.edu.tr/doguarifler/en/teaching/cmpe344

Textbook(s):
L. L. Peterson and B. S. Davie, *Computer Networks: A Systems Approach*, 6th ed., Morgan Kaufmann, 2021.

Supplemental Text:
J. F. Kurose and K. W. Ross, *Computer Networking: A Top-Down Approach*, 9th ed., Pearson, 2025.
A. Tanenbaum, N. Feamster, and D. Wetherall, *Computer Networks*, 6th ed., Pearson, 2021

Topics Covered and Tentative Class Schedule:
(4 hours of lectures per week)

Week 1	*Foundations: Layering and protocols, multiplexing (Ch. 1: Read 1.1-1.5)*
Week 2	*Network performance, statistical multiplexing (Ch. 1 continued)*
Week 3	*Link layer services, effect of errors on communication (Ch. 2: Read 2.1, 2.5-2.8. For Sections 2.2-2.4, only essential concepts available in lecture notes)*
Weeks 4-5	*Ethernet: physical properties, multiple access (Ch. 2 continued)*
Week 6	*Wireless technologies: Bluetooth, Wi-Fi, cellular; Fiber optics: Passive Optical Networks (Ch. 2 continued)*
Week 7	*Packet switching concepts, bridges, and LAN switches (Ch. 3: Read 3.1-3.2)*
Weeks 8-9	*MIDTERMS (10-25 April 2026)*
Week 10	*Internetworking with IP (Ch. 3: Read 3.3, 3.5. For Section 3.4, only essential concepts available in lecture notes)*
Week 11	*Address translation, host configuration, VPNs, IPv6 (Ch. 3 continued, Ch. 4: Read 4.1-4.2)*
Week 12	*End-to-end protocols: UDP, TCP, SCTP, QUIC, and RTP (Ch. 5: Read 5.1, 5.2.1, 5.2.2, 5.2.10, 5.4)*
Weeks 13-15	*A brief overview of the application layer, real-time multimedia communications, streaming, and content distribution networks (Ch. 9: Read 9.1-9.4)*

Lab Schedule:
There are no exemptions from labs. Consult the course Web site for details of lab assignments and other lab policies. (Read Textbook Chapter 1.5 for background information on socket programming.)

- Lab 1: Socket programming, Echo client/server (Week 3: 9-13 March 2026)
- Lab 2: Concurrent Echo client/server (Week 4: 16-20 March 2026)
- Lab 3: Simplex Talk program over TCP and UDP (Week 6: 30 March-3 April 2026)
- Lab 4: Ping client/server (Week 7: 6-10 April 2026)
- Lab 5: Tiny Web server (Week 11: 4-8 May 2026)
- Lab 6: Tiny Web server with dynamic content generation (Week 12: 11-15 May 2026)

Course Learning Outcomes:
Upon successful completion of the course, students are expected to have the following competencies:

(1) use socket API for programming simple network applications;
(2) describe factors affecting network performance (bandwidth, latency, delay-bandwidth product);
(3) explain fundamental principles of layered network protocol architectures;
(4) explain key networking concepts such as multiplexing, multiple access, switching, routing;
(5) describe protocols for wired/wireless medium access control (CSMA/CD and CSMA/CA) and understand key issues related to cellular wireless networks;
(6) understand addressing in IP networks, subnets, classless routing (CIDR) and longest prefix match;
(7) identify uses of different transport protocols: UDP, TCP, SCTP, QUIC, and RTP
(8) describe application layer protocols, domain name system (DNS), real-time multimedia communications, streaming, and content distribution networks.

	Method	**No**	**Percentage**
Assessment	Midterm Exam	1	40%
	Final Exam	1	50%
	Labs	6	10%

Attendance and Participation: Attendance to every lecture is mandatory.

NG Policy: Receiving zero from or missing any of the components (midterm, final, lab) used in determination of the letter grade or attending <50% of the lectures may result in an NG if the accumulated total mark in the course is <50%.

Make-Up Policy: Only one **comprehensive** make-up examination will be given for a missed midterm or final **only under exceptional/extenuating circumstances** (e.g., hospitalization, loss of a close relative, etc.). In these cases, students must submit a petition with related official reports to me within the next three working days following the missed exam. Note that minor ailments are not considered as exceptional/extenuating circumstances. Eligibility to take the make-up exam **will be subject to my final approval.**

Resit Exam: The resit exam is given according to EMU's by-laws. However, since only a subset of students will take this exam, evaluation and mapping of numeric grades to letter grades may follow a different scheme.

Academic Dishonesty: Any conduct that attempts to gain unfair academic advantage is considered academic dishonesty. Copying labs and assignments, cheating during exams, substituting for another person are some examples of academic dishonesty. Cases of academic dishonesty will not be tolerated and will be punished according to EMU's disciplinary policies. Also, on the grounds of **reasonable doubt**, the instructor reserves the right to invite students to an **oral examination** for further verification of knowledge, and this may be used as a basis for assigning a grade.

Relationship of the course to Student Outcomes
The course has been designed to contribute to the following student outcomes:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

Prepared by: Prof. Dr. Dogu Arifler	**Date Prepared:** 22 February 2026