CMPE 344/CMSE 346 Computer Networks

Department: Computer Engineering

Instructor Information:
Name: Assoc. Prof. Dr. Muhammed Salamah
E-mail: muhammed.salamah@emu.edu.tr
Office: CMPE 114
Office Tel: 1149

Assistant Information:
Mostafa Mobarhan

Meeting Times and Places:
Monday 08:30-10:20, Room CMPE 129
Thursday 12:30-14:20, Room CMPE 129
Monday 14:30-16:30, Lab CMPE 135

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

Course Code: CMPE 344/CMSE 346	**Credits:** 4	**Year/Semester:** 2020-2021 Fall

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

Prerequisite(s):
CMPE 242 Operating Systems
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, 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, cellular networks. TCP/IP protocol family. Network applications. New trends in computer-communication networks.

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

Textbook(s):
L. L. Peterson and B. S. Davie, *Computer Networks: A Systems Approach*, 5th ed., Morgan Kaufmann, 2012.

Supplemental Texts:
J. F. Kurose and K. W. Ross, *Computer Networking: A Top-Down Approach*, 7th ed., Pearson, 2017.
B. A. Forouzan, *Data Communications and Networking*, 5th ed., McGraw-Hill, 2012.

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

Week 1	*Foundations (Ch. 1)*
Week 2	*Network performance, importance of statistical multiplexing (Ch. 1)*
Week 3	*Link layer services, effect of errors on communication (Ch. 2)*
Weeks 4-5	*Ethernet: physical properties, multiple access (Ch. 2)*
Week 6	*Wireless technologies: Bluetooth, Wi-Fi, cellular (Ch. 2)*
Week 7	*Packet switching concepts, bridges and LAN switches (Ch. 3)*
Weeks 8-9	*MIDTERMS*
Weeks 10-11	*Internetworking with IP (Ch. 3)*
Week 12	*Address translation, host configuration, VPNs, IPv6 (Ch. 3, 4)*
Week 13	*End-to-end protocols: UDP and TCP (Ch. 5)*
Weeks 14-15	*A brief overview of the application layer (Ch. 9)*

Lab Schedule:
There are no exemptions from labs. Consult the course Web site for details of lab assignments and other lab policies.
Tentative labs:
- Lab 1 Protocol layers
- Lab 2 Ethernet
- Lab 3 Wireless
- Lab 4 IP
- Lab 5 ARP
- Lab 6 UDP/TCP
- Lab 7 DNS

Course Learning Outcomes:
Upon successful completion of the course, students are expected to have the following competencies:
(1) use tools for evaluation of real-world network systems using Socket programming.
(2) describe factors affecting network performance (bandwidth, latency, delay-bandwidth product);
(3) describe large scale network issues;
(4) explain fundamental principles of layered network protocol architectures;
(5) describe functions of layers in OSI and TCP/IP protocol stacks;
(6) explain key networking concepts such as multiplexing, multiple access, switching, bridging, and addressing;
(7) classify automatic repeat request (ARQ) protocols (stop-and-wait and sliding window);
(8) describe protocols for wired/wireless medium access (CSMA/CD and CSMA/CA);
(9) explain issues related to virtual circuit switching and packet switching;
(10) classify addressing in IP networks, subnets, classless routing and longest prefix match;
(11) classify connection-oriented and connectionless services provided by TCP/IP;
(12) describe application layer protocols and domain name system (DNS)

Assessment	Method	No	Percentage
	Midterm Exam	1	40%
	Final Exam	1	50%
	Labs	5-7	10%

Attendance and Participation: Attendance to every lecture is mandatory.

NG Policy: NG grade will be given in the following cases:
Lab attendance < 50% or
Missing both Midterm and Final Exams.

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.**

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.

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
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions

Prepared by: Assoc. Prof. Dr. Muhammed Salamah	Date Prepared: 19 October 2020