Year and Semester : 4, Fall
Credit Hour : (4,1) 4
Pre/Co-requisite(s) : EEE/EENG 212 (Algo. & Data Structures)
Academic Term : Fall

Catalog Description:
Principles of data communications; information transfer, computer networks and their applications. Network structures, architectures and protocols. Open systems and the OSI reference model; services and network standardization. Communication systems: transmission media, analog and digital transmission. PSTN, modems, PCM, encoding and digital interface. Transmission and switching: FDM, TDM, modulation, circuit, packet and message switching. The store and forward concept. Networking characteristics. Storage, delay, multiplexing, bandwidth sharing and dynamic bandwidth management, QoS. Channel organization, framing, channel access control. PSPDN and integrated digital network concept: ISDN. LANs, MANs and WANs. ATM and gigabit networking. Communication models. De-facto standards. The Internet open architecture and the protocol suite. Modern applications of networking. (Prerequisite: EEE/EENG212 or equivalent)

Prerequisite by Topic:
Algorithm design and representation. Developing and running computer programs. Student must have taken and passed the EEE/EENG212 Algorithms and Data Structures course.

Instructor:
Dervis Z. Deniz
Office Hours: Monday 14:30 - 15:30 Wednesday: 13:30 – 14:30
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Tel: x1301

Lab Assistant:
Nasser Sabah (e-mail: nasser.sabah@cc.emu.edu.tr Tel: x 2775 ).

Course Web Page: http://faraday.ee.emu.edu.tr/EENG412

Textbook:

References:

Course Objectives:
A student who successfully fulfills the course requirements will have demonstrated:

i. an understanding of data communication concepts and principles,
ii. an understanding of the layered architecture and protocols,
iii. an understanding of the interaction between hardware and software elements,
iv. an understanding of the relationship and migration between communications and computers,
v. an understanding of the use of switching systems and their development,
vi. an understanding of different network types including the Internet,
vii. an understanding of integration of services and quality of service concepts.

### COURSE OUTLINE and Organization

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<thead>
<tr>
<th>WK #</th>
<th>DATES</th>
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<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>0</td>
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<td>Registration Days</td>
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<tr>
<td>5-6</td>
<td>4</td>
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<td>3. The Data Link Layer: (1 weeks) DLL design issues. Framing, error and flow control. Error detection and correction. Basic data link protocols. Simplex protocol. Sliding window protocols. Selective repeat. Protocol specification and verification; FSM, Petri Net. Example data link protocols; HDLC, SLIP, PPP.</td>
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<td>1. MIDTERM EXAMS</td>
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<td>10</td>
<td>4</td>
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<td>Religious Holiday (30/11/09)</td>
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<td>5. The Network Layer and the IP: (1 week) NL in the Internet; IP and Mobile IP. Internetworking.</td>
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<td>6. The Transport Layer: (1 week). The transport service; QoS and primitives. Addressing and connection management. Flow control, buffering and multiplexing. TL in the Internet; TCP and UDP.</td>
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<td>7. The Application Layer: (1 week) DNS, SNMP, ASN.1, SMI, MIB. E-mail; RFC822, MIME, SMTP, PEM, Usenet. NTTP, <a href="http://WWW">WWW</a>. Multimedia. Privacy and network security.</td>
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<td>8. Case studies on the term projects: (1/2 week) Equivalent of 1 week of discussions on case studies of term projects.</td>
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<td>FINAL EXAMS</td>
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**Design Component:**
Engineering Science Credit: 2  
Engineering Design Credit: 2

**Computer Usage:**
Students have access to computer facilities in two ways: during laboratory hours and free-times. Every two students will have a separate computer and hence are expected to work as teams on computer networking problems. These will include running ready-made programs, testing, and results collection. Further they may need to develop their own programs as part of the term project. Students are encouraged to use the internet to search for various topics, including contents of similar courses offered elsewhere. Students can reach teaching/learning material, solved problems, data sheets etc. on the allocated Web sites. Students are encouraged to submit homework and lab-work using the computer network.

**Teaching Techniques:** Power point presentation/over-head projector and/or whiteboard are used in the class-rooms. Remote access to network and facilities are also desirable. Tutorials are organized to establish a closer contact with students.

**Laboratory:** Laboratory sessions are organized in parallel with theoretical study given in classrooms. Students have to complete all laboratory study/exercises and submit homework and attend quizzes.

**GRADING POLICY**
Midterm 1: 25-30%  
CW(s) + Lab + (Proj.): 30-35%  
Final: 40%

N.B.: This is a “practical” course aiming for a significant amount of programming expertise to be developed during the course. Students are expected to become fluent with computer program development which includes source code development, compilation, testing, running the programming problems. A term project may be assigned to students based on the number of students in the class. In addition, programming/networking exercises, homework and short projects will be assigned to be implemented during laboratory sessions as well as outside laboratory hours. Students are required to follow the attendance guidelines throughout the semester. NG grade will be given to students with bad exam and other evaluation results as well as low class/laboratory attendances ( < 70% attendance ).