EE-4272
Communications Networks

Curricular Designation:  EE: elective  CpE: elective

EE 4272 – Communications Networks  Focuses on the fundamental network architecture concepts and their core principles and issues in the emerging Communication/Data Networks.

Credits: 3.0 Lec-Rec-Lab: (0-3-0)  Semesters Offered: Fall  Prerequisites: EE 2150 and (MA 3710 or MA 3720).  Restrictions: Must be enrolled in one of the following Class(es):  Junior/Senior

Textbooks(s) and/or Other Required Materials:

Prerequisites by Topic:
1. Introduction to elementary probability, communication theory
2. Familiarity with high-level-language computer programming, including Java/C/C++

Course Objectives:
1. Introduction to the design issues and principles of the computer and data networks.
2. Familiarity with various network architectures and key protocols.
3. Exposure to network design alternatives.
4. Introduction to the challenging issues in the growing Internet.
5. Gain hands-on experience with programming and simulation techniques for network protocols and performance issues

Topics Covered:
1. Introduction: Requirements of Building a Network; Network Architectures; Implementing Network Software.
2. Direct Link Networks: Fundamental of Digital Transmission, Encoding, Framing, Error Detection, Reliable Transmission, Ethernet, Token Ring, SONET.
4. Circuit Switching: Space-Division Switching, Time-Division Switching, Routing in Circuit Switch Networks, Control Signaling.
5. Packet Switching: Switching/Forwarding, Bridges & LAN Switches, ATM, Switching Hardware.
6. Internetworking: IP, Routing, Global Internet, Multicast.
7. End-to-End Protocol: UDP, TCP.
8. Congestion Control & Resource Allocation: Queuing Disciplines, TCP Congestion Control, QoS.
9. Term project/paper

**Relationship of the Course Content to Program Outcomes:**

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<th>Topics and Level of Coverage</th>
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<tr>
<td></td>
<td>Outcome</td>
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<tr>
<td>a</td>
<td>an ability to apply knowledge of mathematics, science and engineering</td>
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<td>b</td>
<td>an ability to design and conduct experiments, as well as to analyze and interpret data</td>
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<td>c</td>
<td>the ability to design a system, component, or process to meet desired needs within realistic constraints such as...</td>
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<td>d</td>
<td>an ability to function on multi-disciplinary teams</td>
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<td>e</td>
<td>an ability to identify, formulate and solve engineering problems</td>
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<td>f</td>
<td>an understanding of professional and ethical responsibility</td>
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<td>g</td>
<td>an ability to communicate effectively</td>
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<td>h</td>
<td>the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context</td>
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<td>i</td>
<td>a recognition of the need for, and an ability to engage in life-long learning</td>
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<td>j</td>
<td>a knowledge of contemporary issues</td>
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<td>k</td>
<td>the ability to use the techniques, skills, and modern engineering tools necessary for the practice of electrical engineering</td>
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**Contribution of Course to Meeting Degree Requirements:**
3 Credit Hours – Engineering Topics

**Class/Laboratory Schedule** (note: 1 hour = 50 minutes):
Lecture: 42 hours = 3 hours/week for 14 weeks

**Prepared by:**
Chunxiao (Tricia) Chigan, Assistant Professor, March 8, 2010