EE - 4272
Computer Networks

Curricular Designation:  
EE: elective  
CpE: required

EE 4272 – Communications Networks  
Computer network architectures and protocols; design and implementation of link, network, and transport layer functions. Introduction to the Internet protocol suite (TCP, UDP, IP), domain name service and protocols, wireless networks, and network security.

Credits: 3.0  
Lec-Rec-Lab: (0-3-0)  
Semesters Offered: Fall, Spring

Prerequisites: CS 3411.

Restrictions: May not be enrolled in one of the following Class(es): Freshman/Sophomore

Textbooks(s) and/or Other Required Materials:

Prerequisites by Topic:
1. Familiarity with systems programming topics (e.g., sockets, processes, system calls)
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.
4. Circuit Switching: Routing in Circuit Switch Networks, Control Signaling.
5. Packet Switching: Switching/Forwarding, Bridges & LAN Switches, Switching Hardware.
6. Internetworking: IP, Routing, Global Internet, Multicast.
7. End-to-End Protocols: UDP, TCP, QUIC.

9. Network Security: Fundamentals, Cryptographic Basics (Public Key and Shared Key)

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

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Important</th>
<th>Moderately</th>
<th>Minimally</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>an ability to apply knowledge of mathematics, science and engineering</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>b</td>
<td>an ability to design and conduct experiments, as well as to analyze and interpret data</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>c</td>
<td>an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, health and safety, manufacturability and sustainability</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>d</td>
<td>an ability to function on multi-disciplinary teams</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>e</td>
<td>an ability to identify, formulate and solve engineering problems</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>f</td>
<td>an understanding of professional and ethical responsibility</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>g</td>
<td>an ability to communicate effectively</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>h</td>
<td>the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>i</td>
<td>a recognition of the need for, and an ability to engage in life-long learning</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>j</td>
<td>a knowledge of contemporary issues</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>k</td>
<td>the ability to use the techniques, skills, and modern engineering tools necessary for the practice of electrical engineering</td>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>

**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:**
Christopher (Kit) Cischke, Senior Lecturer, November 29, 2016