IT531 Advanced Computer Networks 3-0-0-3  
Semester I, 2009-2010

Lectures
Mon, Wed 09:30-11:00; CEP 205
Instructor
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Course Outline
This course assumes an exposure to basic knowledge of networking concepts and background, such as basics of Internet protocols, various link layer and framing concepts etc. However, an in-depth review of undergraduate level networks material will be done in this course.

This course will emphasize the concepts and issues underlying the design and implementation of the Internet. We will also spend time learning to quantitatively analyze the performance of network protocols. A combination of reference books and a set of research papers will be used to cover the fundamentals, seminal findings and new directions in networking research.

Main Texts
- Kurose, James and Ross, Keith, "Computer Networking - A Top Down Approach," Pearson Education
- Hassan, Mahboob and Jain, Raj, "High Performance TCP/IP Networking," Prentice Hall India

Reference Texts

A selection of research papers to be provided in the class

Evaluation Scheme

<table>
<thead>
<tr>
<th>Period</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Lab Work</td>
<td>20</td>
</tr>
<tr>
<td>Quiz and Home Assignments</td>
<td>20</td>
</tr>
<tr>
<td>Mid Semester Test</td>
<td>20</td>
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<tr>
<td>Final Examination</td>
<td>40</td>
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# Lecture Schedule

1 **Overview**
   - 1.1 Computer communication: salient features
   - 1.2 Datagram, circuit, and connection-oriented networks
   - 1.3 Multiple access: contention and ordered techniques
   - 1.4 TCP/IP group of protocols: routing and end-to-end reliability

2 **Review-Link Layer**
   - 2.1 Point to point vs point to multipoint vs. multipoint to multipoint
   - 2.2 Open and Closed loop flow control
   - 2.3 CSMA/CD protocol analysis - efficiency, latency

3 **Routing Protocols**
   - 3.1 point-to-point routing: OSPF, BGP, convergence, Performance Analysis
   - 3.2 Multicast protocols and Anycast protocols
   - 3.3 Reliability Issues in Broadcast and Multicast

4 **Transport Layer Protocols**
   - 4.1 TCP and its variants
   - 4.2 Performance Issues in TCP: Modeling and Analysis
   - 4.3 Active Queue Management in TCP Networks

5 **Traffic Management**
   - 5.1 QoS definition, Mapping models
   - 5.2 Integrated and Differentiated Services Architecture
   - 5.3 Label Switching, MPLS

6 **Additional Topics**
   - 6.1 IPv6
   - 6.2 Mobility support in Internet