Prerequisite
This course assumes knowledge of the first level BTech course in Computer Networks.

Course Outline

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.

Course Outcome
At the end of the course students will be able to (a) Design and analyze network protocols, (b) Have a broad understanding of Internet standards, and (c) simulate network scenarios and analyze the measurements.

Main Texts
2. Hassan, Mahboob and Jain, Raj, "High Performance TCP/IP Networking," Prentice Hall India

Reference Texts
3. A selection of research papers to be provided in the class.

Evaluation Scheme

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<th>Percentage</th>
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<tr>
<td>Lab and Assignment/Project Work</td>
<td>40%</td>
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<tr>
<td>Mid Semester Test(s)</td>
<td>20%</td>
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<tr>
<td>Final Examination</td>
<td>40%</td>
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**Lecture Schedule** (assuming 50 minutes lecture)

1. **Overview and Review**
   - Computer communication: salient features. Datagram, circuit, and connection-oriented networks,
   - Multiple access: contention and ordered techniques, TCP/IP v6 group of protocols: routing and end-to-end reliability, Routing protocols, IPv4.

2. **Internet Protocols**
   - Point-to-point routing: OSPF, BGP. Performance Analysis. Multicast and Anycast protocols.

3. **Wireless Network**
   - Wireless Communication Basics, Wave propagation models, wireless physical layer, Antenna.
   - Link Layer - Wireless Medium Access Control, MAC protocol survey. IEEE 802.11 and variants, Low Power MACs, IEEE 802.15.4, ZigBee. TCP for Wireless Internet.

4. **Traffic Management**
   - QoS definition, Mapping models, Integrated and Differentiated Services Architecture. Label Switching, MPLS.

5. **Software Defined Networking**
   - Switching architectures. Data, control, and management planes, Dynamic tables, autonomous switching. SDN architecture. Network function virtualization, Open flow. SDN implementations.