<table>
<thead>
<tr>
<th>Course Number</th>
<th>CS 540</th>
<th>Course Title</th>
<th>Advanced Computer Networks</th>
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<tbody>
<tr>
<td>Semester Hours</td>
<td>3</td>
<td>Course Coordinator</td>
<td>Bidyut Gupta</td>
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<tr>
<td>Catalog Description</td>
<td>Topics include routing protocols used in internet; data compression techniques; telecommunication systems - its services, architecture and protocols; high speed networks; routing protocols in mobile ad-hoc networks; and a detailed performance analysis of different window flow control and congestion control mechanisms using queuing theory.</td>
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<tr>
<td>Textbooks</td>
<td>No Books Required.</td>
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<td>References</td>
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<td>Course Learning Outcomes</td>
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<td>Assessment of the Contribution to Student Outcomes</td>
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<tr>
<td>Outcome</td>
<td>1</td>
<td>2</td>
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<tr>
<td>Assessed</td>
<td>X</td>
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<td>Prerequisites by Topic</td>
<td>CS 440 with a grade of C or better, or consent of the instructor.</td>
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Major Topics Covered in the Course

1. Queuing Theory
   - M/M/1 queue
   - State-dependent queues – M/M/N/N queue etc. (4 classes)

2. Performance analysis
   - Data Link Layer protocols
   - Flow Control and Congestion Control Mechanisms
   - Virtual circuit model, Sliding window model (4 classes)

3. Queuing Networks
   - Open Queuing Networks
   - Closed Queuing Networks (3 classes)

4. Internet Routing
   - Static Routing
   - Dynamic routing
   - Routing in The Global Internet
   - Interior Gateway Protocols
   - Exterior Gateway Protocols (8 classes)

5. Data Compression Techniques
   - Run length encoding
   - Arithmetic coding
   - String matching Algorithms (4 classes)

6. Routing Protocols in Unidirectional Networks (2 classes)

7. High Speed Networks
   - ATM
   - High speed LANs (4 classes)

8. Introduction to Telecommunication Systems
   - GSM – Services, Architecture, and Protocols (5 classes)

9. Routing Protocols in Mobile Ad-hoc Networks (4 classes)

10. Quality of Service (2 classes)

11. Term Paper, there may be some Lab(s) which is up to the instructor.