Course Outline

1. Document Information

Degree Program	Computer Science
Course Number	CS 540
Course Title	Advanced Computer networks
Semester Hours	3
Course Coordinator	Bidyut Gupta
Revision Term	Spring 2021
Latest Revision	Spring 2021

2. Catalog Description

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.

3. Textbooks

- No Books Required.

4. References

5. Course Learning Outcomes

6. Assessment of the Contribution to Student Outcomes

Outcome	1	2	3	4	5	6	7
Assessed		X	X		X		X

7. Prerequisites by Topic

CS 440 with a grade of C or better, or consent of the instructor.

8. 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.