Nirma University
Institute of Technology, School of Technology
M.Tech Computer Science and Engineering / M.Tech Computer Science and Engineering (Information and Network Security)

Semester-II

L	T	P	C
2	0	2	3

Course Code	3CS1206
Course Title	Advanced Computer Networks

Course Learning Outcomes (CLOs):

At the end of the course, students will be able to -

1. demonstrate the knowledge of modern networking concepts and data center network planning
2. apply suitable methods to optimize performance of modern networks
3. design and configure networks to support a specified set of applications

Syllabus	Teaching Hours
Unit I **Network Concepts and Protocols:** Networking Principles, Network Elements, IPv6 addressing and interoperability with IPv4, Congestion control and TCP, QUIC, SPDY, Split TCP, Websockets	**8**
Unit II **Routing:** Router scheduling algorithms, Router architectures, Border Routing protocols BGP, MPLS	**7**
Unit III **Software Defined Networking**: Data Plane, Control Plane, Application Plane, Controller design, Virtualization, OpenFlow protocol for SDN	**4**
Unit IV **Data Center Networking:** Data center architectures, Data center congestion control, Data center network protocols, MPTCP, DCTCP, Low Latency protocols for Data center	**5**
Unit V **Case Studies and Applications:** Content delivery and video streaming networks, Content Centric Networks, Backbone of Internet, Internet exchange points and BGP, Large scale data centers, Cognitive radio networks	**6**

Self-Study:

The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents.

Laboratory Work:

Laboratory work will be based on above syllabus with minimum 6 experiments to be incorporated.

Suggested Readings^:

1. James Kurose and Keith Ross, Computer Networking: A Top-Down Approach, Pearson
2. William Stallings, Foundations of Modern Networking (SDN, NFV, QoE, IoT and Cloud), Pearson
3. William Stallings, High-speed networks and Internets – Performance and Quality of Service, PHI
4. Hans W. Barz, Gregory A. Bassett, Multimedia Networks: Protocols, Design and Applications, Wiley
5. Rajkumar Buyya, Mukaddim Pathan and Athena Vakali, Content Delivery Networks, Springer
6. Relevant research papers for the topics

L=Lecture, T=Tutorial, P=Practical, C=Credit

^this is not an exhaustive list