

COURSE CODE	COURSE TITLE	L	T	P	C
1152CS102	HIGH SPEED NETWORK	3	0	0	3

Course Category: Program Elective

A. Preamble:

To introduce the new developments in modern networking systems, multimedia communications and high speed networks.

B. Pre-requisites:

Sl. No	Course Code	Course Name
1	1151CS111	Computer Networks

C. Related Courses:

Sl. No	Course Code	Course Name
1	1152CS101	Cryptography and Network Security.
2	1152CS107	Mobile Adhoc and Sensor Networks.

D. Course Educational Objectives:

Students undergoing this course are exposed to

- Demonstrate the knowledge of network planning and optimization
- Develop an in-depth understanding, in terms of architecture, protocols and applications, of major high-speed networking technologies
- Evaluate various technologies and identify the most suitable one to meet a given set of requirements for a hypothetical corporate network
- Develop necessary background to be able to manage projects involving any of the high-speed networking technologies

E. Course Outcomes :

Upon the successful completion of the course, learners will be able to

CO Nos.	Course Outcomes	Level of learning domain (Based on revised Bloom's taxonomy)
C01	Explain the Asynchronous Transfer Mode Protocol architecture and High Speed Local Area Network Applications.	K2
C02	Apply the Queuing Models, frame relay to manage the traffic and congestion control in High Speed Network.	K3
C03	Compare congestion control and traffic management in TCP with Asynchronous Transfer Mode protocol in High Speed Networks	K2
CO4	Explain the Architecture of Integrated and Differentiated services	K2
CO5	Outline the protocols for Quality of Service Support	K2

F. Correlation of COs with POs:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02	PS03
CO1	M	L	L	L		L					M		L	M	
CO2	H	M	M				L						M		M
CO3	M	L	L												
CO4	M	M	M	L									M		
CO5	M	L	L				L							M	M

H- High; M-Medium; L-Low

G. Course Content :

UNIT I HIGH SPEED NETWORKS

9

Frame Relay Networks – Asynchronous transfer mode – ATM Protocol Architecture, ATM logical Connection – ATM Cell – ATM Service Categories – AAL. High Speed LAN's: Fast Ethernet – Gigabit Ethernet– Fibre Channel – Wireless LAN's, WiFi and WiMax Networks applications, requirements – Architecture of 802.11.

UNIT II CONGESTION AND TRAFFIC MANAGEMENT

8

Queuing Analysis – Queuing Models – Single Server Queues – Effects of Congestion – Congestion Control – Traffic Management – Congestion Control in Packet Switching Networks – Frame Relay Congestion Control.

UNIT III TCP AND ATM CONGESTION CONTROL

12

TCP Flow control – TCP Congestion Control – Retransmission – Timer Management – Exponential RTO backoff – KARN's Algorithm – Window management – Performance of TCP over ATM. Traffic and Congestion control in ATM – Requirements – Attributes – Traffic Management Frame work, Traffic Control – ABR traffic Management – ABR rate control, RM cell formats – ABR Capacity allocations – GFR traffic management.

UNIT IV INTEGRATED AND DIFFERENTIATED SERVICES

8

Integrated Services Architecture – Approach, Components, Services- Queuing Discipline – FQ – PS – BRFQ – GPS – WFQ – Random Early Detection – Differentiated Services.

UNIT V PROTOCOLS FOR QOS SUPPORT

8

RSVP – Goals & Characteristics, Data Flow, RSVP operations – Protocol Mechanisms– Multiprotocol Label Switching – Operations, Label Stacking – Protocol details – RTP – Protocol Architecture – Data Transfer Protocol– RTCP.

Total: 45Hours

H. Learning Resources:

i. Text Books:

1. William Stallings, “High speed networks and internet”, Second Edition, Pearson Education, 2002.

ii. References:

1. Warland, Pravin Varaiya, “High performance communication networks”, Second Edition , Jean Harcourt Asia Pvt. Ltd., , 2001.
2. IrvanPepelnjk, Jim Guichard, Jeff Aparcar, “MPLS and VPN architecture”, Cisco Press, Volume 1 and 2, 2003.

3. Abhijit S. Pandya, Ercan Sea, "ATM Technology for Broad Band Telecommunication Networks", CRC Press, New York, 2004

.iii. Online Resources:

1. <https://www.sics.se/~peter/HSN-visions.html>