

Branch Name:	Computer Engineering (Software Engineering)
Program Code:	ET203
Course Title:	High Speed Networks
Course Code:	2ET2030308T
Pre-requisite Course:	Familiarity with types of computer network, network architecture and network topologies.

Course Objectives: After successful completion of the course, student will be able to

1. Introduce the high speed networks that have spurred the development of new applications.
2. Introduce to ATM and Frame relay.
3. Up-to-date survey of developments in High Speed Networks.
4. To know techniques involved to support real-time traffic and congestion control. And Analyze the different levels of quality of service (QoS) to different applications.
5. Introduce high speed network Broadband ISDN architecture and Protocols.
6. Learn about real-time problems with Network Design Tradeoffs.

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lect. (L)	Tutorial (T)	Practical (P)	Credit	Theory (Marks)		Practical (Marks)		Total (Marks)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	-	-	3	60	40	-	-	100

Course Contents:

Unit No	Topics	Total Hours	Weightage (%)
1	High-Speed Networks: Introduction to Computer Network, Packet Switching Networks, Frame Relay Networks, The Emergence of High Speed LANs, Ethernet, Fiber Channel, Wireless LANs, Emerging Passive Optical Network Technologies (EPONs), Gigabit Ethernet, 10 Gigabit Ethernet: 802.3ae Emerging Standard, Fiber Optic and the Magic of Light, Wave Length Division Multiplexing (WDM), Dense Wavelength Division Multiplexing (DWDM).	09	15
2	ATM: Introduction: ATM cell Layered organization Connection admission control ATM cell switching routing and addressing - IP over ATM - Segmentation and reassembly SVC establishment - Circuit emulation Performance management Multicast optical	08	20
3	Congestion and Traffic Management: Congestion Control in Data Networks and Internet – Link Level Flow and Error Control – Traffic and Congestion Control in ATM networks	07	15
4	Routing: Overview of graph – interior routing protocol – exterior routing protocol – integrated and differentiated Services – Protocols for QoS Support Optical Networks: Introduction to Optical networks Wavelength division multiplexing (WDM) Introduction to broadcast-and-select networks - Switch architectures - channel accessing Wavelength routed networks Switch architectures - Routing and wavelength assignment virtual topology design IP over SONET over ATM over WDM IP over ATM over WDM IP over WDM	09	20
5	Broadband ISDN architecture and Protocols: Service Capabilities, Bearer Services and Teleservices, Basic and Supplementary services, SS7 Architecture, Protocol Architecture, B-ISDN standards, Broadband services, Requirements, Architecture, B-ISDN Protocol Reference Model, B-ISDN Physical Layer, SONET/ SDH.	08	15
6	Domain Name System: Name space, Domain Name Space, Distribution of Name Space, DNS in the internet, Resolution, DNS messages, E-mail. Needs and Goals for Network Design : Analyzing Business Goals and Constraints: Using a TopDown Network Design Constraints, Analyzing Business Goals, Analyzing Business constraints	05	15

Analyzing Technical Goals & Tradeoffs: Scalability, Availability, Network Performance, Security, Manageability, Usability, Adaptability, Affordability, Making Network Design Tradeoffs – Characterizing Network Traffic		
--	--	--

Reference Books:

1. William Stallings, High Speed Networks and Internet, Pearson Education, Fourth Edition, 2005.
2. Behrouz A. Forouzan, Data Communications and Networking, 4th edition, Tata McGraw-Hill, 2005.
3. Warland&PravinVaraiya, High Performance Communication Networks, Jean Harcourt Asia Pvt. Ltd., II Edition, 2001.
4. IrvanPepelnjk, Jim Guichard and Jeff Aparcar, MPLS and VPN architecture, Cisco Press, Volume 1 and 2, 2003.
5. Rajiv Ramaswami and Kumar N. Sivarajan, Optical Networks: A Practical Perspective, 1st Edition, Morgan Kaufmann, USA, 2001.

List of Open-Source Software/learning website:

1. <https://highspeedlink.net/>
2. <https://www.techtarget.com/whatis/glossary/High-Speed-Networks>
3. https://www.academia.edu/33831793/A_Course_Material_on_HIGH_SPEED_NETWORKS
4. <https://www.highspeedinternet.com/resources/the-consumers-guide-to-internet-speed>
5. https://mec.edu.in/mvlc/lecture_handouts/l_cse/lh_hsn.pdf

Course Learning Outcomes (CLO):

Course Outcomes	Description	Bloom's Taxonomy Level
COL1	Apply the principles and concepts of high speed networks in performance computing	Understanding (2) Applying (3)
COL2	Knowledge on techniques involved to support real-time traffic and congestion control	Applying (3)
COL3	Ability to analyze the different levels of quality of service (QoS) to different applications	Applying (3)
COL4	Understanding of the routing, congestion and traffic management with respect to high speed networks	Applying (3)
COL5	Analyze the basics of high speed network technologies and its components.	Applying (3)

Mapping of CLO with PO and PSO

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes(PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CLO1	H	M	M		M											
CLO2	H	M			M							L				
CLO3	H	M	M		M											
CLO4	M	M	M		M							L				
CLO5	M	M										L				

H: High, M: Medium, L: Low