Department of Electronics & Telecommunication Engineering
B.Tech. VIII Sem (Electronics & Telecommunication Engineering)

Subject Code: EC45602 **Subject Name: OPTICAL NETWORKS**

Lecture Plan

S. NO.	No. of lectures	Topics	References
1.	01	Review of Basics of Optical fiber Communication	
2.	01	Optical network scenario in India and World, Generations of Optical networks	
		CHAPTER 1: SONET/SDH:	
3.	01	Key Nodes in an Optical network, three generations of the digital transport network, North American signal multiplexing hierarchy	[1] [2][5]
4.	01	SONET/SDH architecture, Reasons for the success of SONET /SDH, and broad features of SONET/SDH	
5.	01	Frame structure of SONET/SDH and basic rate	[1] [2][5]
6.	01	SONET /SDH Multiplexing standards and hierarchy of SONET/SDH	
7.	01	SONET /SDH architecture, Functional Components, SONET layers	[1] [2][5][6]
8.	01	Device layer relationship in SONET networks, SONET Problem Detection.	
		CHAPTER 2: Optical Transport Network	[1] [2]
9.	01	Architecture**,** Current Digital Transport Hierarchy, New Optical transport and Digital Transport Hierarchy,	[1] [2], [4]
10.	01	Features of the optical transport network, OTN Layered Model	
11.	01	OTN hierarchy, Frame structure	[1] [2][4]
12.	01	Frame alignment overheads, OTN multiplexing techniques	
13.	01	Generic Framing Procedure (GFP), GFP frame structure	
14.	01	GFP frame types, GFP common aspects client-specific aspects	
		CHAPTER 3: WDM	[1] [2]
15.	01	TDM vs. WDM, Advantages of WDM, Types of WDM – Coarse, dense, Normal DWDM Vs CWDM	[1] [2]

16.	01	Types of WDM network architecture: Broadcast-and-select Networks, Wavelength-Routed Networks	[1] [2][4]
17.	01	WDM network elements- Optical line terminal (OLT), functional elements of OLT	
18.	01	Features of the network - Wavelength reuse, Wavelength conversion, Transparency, Circuit switching, Survivability, Lightpath topology	
19.	01	Optical add/drop multiplexer(OADM) architectures, Optical line amplifiers	[1] [2][4]
20.	01	Optical Crossconnects(OXC)- OXC key functions- Service provisioning, Protection, Performance monitoring, Grooming, configurations	[1] [2]
21.	01	OXC configurations	[1] [2]
		CHAPTER 4: Optical Routers	[1] [2]
22.	01	Switching in Optical Internets, importance of an Optical router.	[1] [2]
23.	01	Evolution of switching and Routing system, electronic switching(O/E/O), All-Optical switching (O/O/O)	
24.	01	Switching implementations, Functional diagram of an Optical router Major functions of router	[1] [2]
25.	01	Parameters of an optical switch- Switching time, Insertion loss, Crosstalk, Extinction ratio etc. Optical Switching Technologies	
26.	01	Optomechanical, Micro Electro Mechanical Systems (MEMS) based optical switch	[1] [2]
27.	01	Optical cross connects	
		CHAPTER 5: Optical Access Networks	
28.	01	Different Access Networks, Criteria for Classification of services, Architecture of Access network,	[5] [6]
29.	01	Switched and broadcast network comparison, Classification of access network based on feeder network, comparison between Dedicated and shared BW	
30.	01	Classification of different types of access networks- cable network, Hybrid fiber coax (HFC),	[5] [6]
31.	01	Next generation of access network- Fiber to the x (FTTx), Enhanced HFC (eHFC)	
32.	01	Passive optical networks (PON), General PON architecture- point to point and Ring, their comparison	[5] [6]
33.	01	PON for telephony (TPON), WDM passive optical network (WPON), WRPON	

34.	01	Features of Optical burst switching(OBS), OCS (Optical circuit switching), OPS (Optical packet switching)	
35.	01	OBS Concept, Characteristics, Purpose, Advantages, Optical CDMA	

TEXT BOOKS:

1. Senior J.M., *Optical Fibre Communications: Principles & Practice*, PHI.
2. Keiser G, *Optical Fibre Communication,* McGraw Hill.
3. Agrawal Govind P., *Fibre Optic Communication Systems*, John Wiley & Sons, students Ed.

Reference Books:

4.. Djfar K Mynbaev & Scheiner, *Fibre Optic Communication Technology*, Pearson.
5. Ramaswami and Sivrajan, *Optical Networks: A Practical Perspective*, Pearson.
6. Black Uyless, *Optical Networks and 3rd Genration Transport Systems*, Pearson.