

Branch Name:	Information and Communication Technology
Semester/Year:	Semester II / First Year
Subject Title:	Optical Network
Subject Code:	2ET2080204T
Pre-requisite:	Optical Communication System

Course Objective:

The course provides good knowledge of different optical networks and the mechanism to obtain the same. The course also describes present optical fiber to carry out more messages, handle a wide variety of transmission types and provide improved reliabilities and ease of use.

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								Total (Marks)
					Theory (Marks)				Practical (Marks)				
	L	T	P	Total	SEE		CCE		SEE		CCE		
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
3	3	-	-	3	24	60	16	40	-	-	-	-	100

Subject Contents				
Sr. No	Topic	Total Hours	Weight (%)	
1	Introduction to Optical Networks: Telecommunications Networks Architecture, Services, Circuit Switching and Packet switching, Optical Networks, Optical Packet Switching, Transmission Basics, Components: Multiplexers and Filter Switches, Wavelength Converters.	4	10	
2	Client layers of the optical layer: SONET/SDH: optical transport network, IP, routing and forwarding, multiprotocol label switching.	6	16	
3	WDM network elements: optical line terminals and amplifiers, optical add/drop multiplexers, OADM architectures, reconfigurable OADM, optical cross connects.	6	16	

4	Control and management: network management functions, optical layer services and interfacing, performance and fault management, configuration management, optical safety.	6	16
5	Network Survivability: protection in SONET/SDH & client layer, optical layer protection schemes	4	13
6	WDM network design: LTD and RWA problems, dimensioning wavelength routing networks, statistical dimensioning models.	4	13
7	Access networks: Optical time division multiplexing, synchronization, header processing, buffering, burst switching, test beds, Introduction to PON, GPON, AON	6	16

Review Presentation: The student is expected to spend minimum 2 hours per week (as mentioned in the teaching and evaluation scheme) to refer at least two peer reviewed journal papers related to this domain/subject. The student is expected to identify issues/challenges and emerging trends in the domain/subject. Student is supposed to explore various video lectures (E.g. NPTEL) available in the domain/subject. Student is required to make a review-presentation on the work carried out for the same.

Recommended sites for journal papers are (1) dl.acm.org (2) springer.com (3) sciencedirect.com (4) elsevier.com (5) ieeexplore.ieee.org (6) scholar.google.co.in (7) scopus.com or similar of similar repute.

Course Outcome:

After learning the course the students should be able to:

- Understand the concept of WDM thoroughly and international telecom standards.
- Gain understanding the functions of network elements and network design.
- Wide knowledge of Optical Network applications.
- Understand the routing in optical networks.
- Implement simple optical network and understand further technology developments for future enhanced network.

List of References:

1. Rajiv Ramaswami, Sivarajan, Sasaki, “Optical Networks: A Practical Perspective”, MK, Elsevier, 3rd edition, 2010.
2. C. Siva Ram Murthy and Mohan Gurusamy, “WDM Optical Networks: Concepts Design, and Algorithms”, PHI, EEE, 2001.
3. Optical WDM Networks by Biswanath Mukherjee, Springer

E-Resources:

1. <http://nptel.ac.in/>

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Understand the concept of WDM thoroughly and international telecom standards.	1 Remembering 2 Understanding
CLO2	Gain understanding the functions of network elements and network design.	2 Understanding 3. Apply
CLO3	Wide knowledge of Optical Network applications.	4 Analyze
CLO4	Understand the routing in optical networks.	3 Applying
CLO5	Implement simple optical network and understand further technology developments for future enhanced network.	6 Create
CLO6	Understand and Analyze WDM Network Design Problem	4 Analyze

Mapping of CLOs with POs & PSOs

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	L	L	M			L				H	L		
CLO2		L	M	H	L	L					L	L	M	L		
CLO3	L	M	M	L	M	H		M		L			M	L		
CLO4	M	LM	M	L	M	H		M	L				M	L		
CLO5	M	L	L	L	M	H		M		L			H	L		
CLO6	L	M	L	L	M	H		M			L		H	L		

H: High, M: Medium, L: Low