## OPTICAL NETWORKS

**17ECMC2T4** **Credits:4**
**Lecture:4 Periods/week** **Internal assessment: 40 Marks**
**Semester end examination:60 Marks**

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**Prerequisites:** Optical communications, Computer networks.

**Course Objectives:**

- To Analyse layers of different optical networks
- To understand the design and construct WDM network elements
- To study the controls and management functions of networks
- To Understand the survivability of Optical Networks

**Course Outcomes**:

Students will be able to

- Understand layers of optical networks.
- Design and construct WDM network elements.
- Access and manage optical networks.
- To analyse the protection schemes of optical networks.

**UNIT I**

**Client Layers of Optical Networks:** SONET / SDH – Multiplexing, Frame Structure, Physical Layer, Infrastructure, ATM – Functions, Adaptation layers, QoS, Flow Control Signalling and Routing, IP –Routing, QoS, MPLS, Storage Area Networks – ESCON, Fiber Channel, HIPPI, Gigabit Ethernet.

**UNIT II**

**WDM network Elements and Design:** Optical Line Terminals and Amplifiers, Add/Drop Multiplexers, Optical Cross Connects, Cost trade-offs in Network Design, LTD and RWA Problems, Dimensioning – Wavelength Routing Networks.

**UNIT III**

**Network Control and Management:** Network Management Functions, Optical Layer Services andInterfacing, Layers within Optical Layer, Multivendor Interoperability, Performance and FaultManagement, Configuration Management, Optical Safety.

**UNIT IV**

**Network Survivability:** Basic Concepts of Survivability, Protection in SONET/SDH Links and Rings,Protection in IP Networks, Optical Layer Protection – Service Classes, Protection Schemes,Interworking between Layers. Network Architecture, Enhanced HFC, FTTC.

**Text Books:**

1. Optical Networks: A Practical Perspective - Rajiv Rama swami and Kumar N. Sivarajan, 2nd Ed., 2004, Elsevier Morgan Kaufmann Publishers (An Imprint of Elsevier).

2. WDM Optical Networks: Concepts, Design and Algorithms – C. Siva Rama Murthy and Mohan Guruswamy 2nd Ed., 2003, PEI.

**Reference Books**:

1. Optical Fiber Communications: Principles and Practice – John.M.Senior, 2nd Ed., 2000, PE.

2. Fiber Optics Communication – Harold Kolimbris, 2nd Ed., 2004, PEI.

3. Optical Fiber Communications – GovindAgarwal, 2nd Ed., 2004, TMH.

4. Optical Fiber Communications and Its Applications – S.C.Gupta, 2004, PHI.