

SSLC, HSE, DIPLOMA, B.E/B.TECH, M.E/M.TECH, MBA, MCA

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## **OEC755 PHOTONIC NETWORKS**

### DETAILED SYLLABUS

#### **OBJECTIVES:**

- To enable the student to understand the importance of the backbone infrastructure for our present and future communication needs and familiarize them with the architectures and the protocol stack in use
- To enable the student to understand the differences in the design of data plane and the control plane and the routing, switching and the resource allocation methods and the network management and protection methods in vogue
- To expose the student to the advances in networking and switching domains and the future trends

#### **UNIT-I OPTICAL SYSTEM COMPONENTS**

Light Propagation in optical fibers – Loss & bandwidth, System limitations, Non Linear effects; Solitons; Optical Network Components – Couplers, Isolators & Circulators, Multiplexers & Filters, Optical Amplifiers, Switches, Wavelength Converters.

#### **UNIT-II OPTICAL NETWORK ARCHITECTURES**

Introduction to Optical Networks; SONET / SDH, Metropolitan - Area Networks, Layered Architecture; Broadcast and Select Networks – Topologies for Broadcast Networks, Media-Access Control Protocols, Wavelength Routing Architecture.

#### **UNIT-III WAVELENGTH ROUTING NETWORKS**

The optical layer, Optical Network Nodes, Routing and wavelength assignment, Traffic Grooming in Optical Networks, Architectural variations- Linear Light wave networks, Logically Routed Networks.

#### **UNIT-IV PACKET SWITCHING AND ACCESS NETWORKS**

Photonic Packet Switching – OTDM, Multiplexing and Demultiplexing, Synchronisation, Broadcast OTDM networks, Switch-based networks, Contention Resolution Access Networks – Network Architecture overview, Optical Access Network Architectures and OTDM networks.

#### **UNIT-V NETWORK DESIGN AND MANAGEMENT**

Transmission System Engineering – System model, Power penalty - transmitter, receiver, Optical amplifiers, crosstalk, dispersion, Wavelength stabilization, Overall design considerations, Control and Management – Network management functions, Configuration management, Performance management, Fault management, Optical safety, Service interface.

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### **OUTCOMES:**

**At the end of the course, the student would be able to:**

- Use the backbone infrastructure for our present and future communication needs
- Analyze the architectures and the protocol stack
- Compare the differences in the design of data plane, control plane, routing, switch

### **REFERENCES:**

1. Rajiv Ramaswami and Kumar N. Sivarajan, "Optical Networks: A Practical Perspective", Harcourt Asia Pte Ltd., Second Edition 2004.
2. C. Siva Ram Moorthy and Mohan Gurusamy, "WDM Optical Networks: Concept, Design and Algorithms", Prentice Hall of India, 1st Edition, 2002.
3. P.E. Green, Jr., "Fiber Optic Networks", Prentice Hall, NJ, 1993.
4. Biswanath Mukherjee, "Optical WDM Networks", Springer Series, 2006.