

SEMESTER <i>Seventh</i>	DEPARTMENT <i>Telecommunications Engineering</i>	COURSE TITLE <i>Optical Fibers</i>
COURSE CODE <i>ET703</i>	HOURS 3 UNITS 3	COURSE SPECIFICATIONS <i>Theoretical Content</i>

1. Introduction:

- Historical Perspective.
- Basic Concepts.
- Optical Communication Systems.
- Light wave System Components.

2. Optical Fibers:

- Geometrical-Optics Description.
- Wave Propagation.
- Dispersion in Single-Mode Fibers.
- Dispersion-Induced Limitations.
- Fiber Losses.
- Nonlinear Optical Effects.
- Fiber Manufacturing.

3. Optical Transmitters:

- Basic Concepts.
- Light-Emitting Diodes.
- Semiconductor Lasers.
- Control of Longitudinal Modes.
- Laser Characteristics.
- Transmitter Design.

4. Optical Receivers:

- Basic Concepts.
- Common Photo detectors.
- Receiver Design.
- Receiver Noise.
- Receiver Sensitivity.
- Sensitivity Degradation.
- Receiver Performance.

5. Light wave Systems:

- System Architectures.
- Design Guidelines.
- Long-Haul Systems.
- Sources of Power Penalty.
- Computer-Aided Design.

6. Optical Amplifiers:

- Basic Concepts.
- Semiconductor Optical Amplifiers.
- Raman Amplifiers.

- Erbium-Doped Fiber Amplifiers.
- System Applications.

7. Dispersion Management:

- Need for Dispersion Management.
- Precompensation Schemes.
- Post compensation Techniques.
- Dispersion-Compensating Fibers.
- Optical Filters.
- Fiber Bragg Gratings.
- Optical Phase Conjugation.
- Long-Haul Light wave Systems.
- High-Capacity Systems.

8. Multichannel Systems:

- WDM Light wave Systems.
- WDM Components.
- System Performance Issues.
- Time-Division Multiplexing.
- Subcarrier Multiplexing.
- Code-Division Multiplexing.

9. Soliton Systems:

- Fiber Solitons.
- Soliton-Based Communications.
- Loss-Managed Solitons.
- Dispersion-Managed Solitons.
- Impact of Amplifier Noise.
- High-Speed Soliton Systems.
- WDM Soliton Systems.

10. Coherent Light wave Systems:

- Basic Concepts.
- Modulation Formats.
- Demodulation Schemes.
- Bit-Error Rate.
- Sensitivity Degradation.
- System Performance.

References:

1. *Fiber-Optic Communication System* by Govind P. Agrawal, 2002.