

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: <ul style="list-style-type: none"> ➤ Historical Perspective. ➤ Basic Concepts. ➤ Optical Communication Systems. ➤ Light wave System Components. 		
2. Optical Fibers: <ul style="list-style-type: none"> ➤ Geometrical-Optics Description. ➤ Wave Propagation. ➤ Dispersion in Single-Mode Fibers. ➤ Dispersion-Induced Limitations. ➤ Fiber Losses. ➤ Nonlinear Optical Effects. ➤ Fiber Manufacturing. 		
3. Optical Transmitters: <ul style="list-style-type: none"> ➤ Basic Concepts. ➤ Light-Emitting Diodes. ➤ Semiconductor Lasers. ➤ Control of Longitudinal Modes. ➤ Laser Characteristics. ➤ Transmitter Design. 		
4. Optical Receivers: <ul style="list-style-type: none"> ➤ Basic Concepts. ➤ Common Photo detectors. ➤ Receiver Design. ➤ Receiver Noise. ➤ Receiver Sensitivity. ➤ Sensitivity Degradation. ➤ Receiver Performance. 		
5. Light wave Systems: <ul style="list-style-type: none"> ➤ System Architectures. ➤ Design Guidelines. ➤ Long-Haul Systems. ➤ Sources of Power Penalty. ➤ Computer-Aided Design. 		
6. Optical Amplifiers: <ul style="list-style-type: none"> ➤ 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.