

5 <sup>th</sup> Semester	REC5D001	Fiber Optics & Opto Electronics Devices	L-T-P 3-0-0	3Credits
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**Module I: (12 Hours)**

Fundamental of fiber optics, Different generations of optical fiber communication systems. Optical fiber structure, Fiber types, step index fiber and graded index fiber, ray propagation, total internal reflection, Numerical Aperture, acceptance angle. Wave propagation in a cylindrical wave guides, modal concept, V-number, power flow in step index fiber and graded index fiber, attenuation (absorption, scattering and bending) and dispersion (inter and intramodal, chromatic, wave guide and polarization) in fiber, dispersion shifted and dispersion flattened fiber.

**Module II: (12 Hours)**

Fiber fabrication, Double crucible method, Fiber optic cables, Connector and splice. Losses during coupling between source to fiber, fiber to fiber. Schemes for coupling improvement. Optoelectronic Sources, LED, ILD, light source materials, Radiation Pattern modulation capability.

**Module III: (06 Hours)**

Optoelectronic Detector, PIN AND APD, Responsivity, Band width, Detector noise equivalent circuit and SNR calculation.

Optoelectronic Modulators, Basic principle, Electro optic and Acoustoptic modulators.

**Module IV:**

Optical Amplifier, Semiconductor optical Amplifier and Erbium Doped Fiber Amplifier.

**Module V:**

WDM components-couplers, isolators, circulators, filters. Optical switching- self electro optic effect Device, switching speed and energy

**Books:**

- [1] Optical Fiber Communications, Keiser G, Tata McGraw Hill Education Private Limited, 4<sup>th</sup> Edition.
- [2] Optical Fiber Communication Principles and practice, Senior J, Prentice Hall of India.
- [3] Fiber-Optic Communication Systems, G P Agarwal, 4<sup>th</sup> edition, John wiley & sons publication, 2011.
- [4] Fiber optic communications, Joseph C Palais, fourth edition, Pearson Education.
- [5] Semiconductor Optoelectronic Devices, Pallab Bhattacharya, second edition, Pearson Education.
- [6] Fiber optics and Optoelectronics, R.P. Khare, Oxford University Press.

**Digital Learning Resources:**

Course Name: Fibre Optics  
 Course Link: <https://nptel.ac.in/courses/115/107/115107095/>  
 Course Instructor: Prof. V. Rastogi, IIT Roorkee

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