

(MDC-06) OPTICAL COMMUNICATION

Theory paper: 100 Marks

Sessional: 50 Marks

Int. to optical communication, principles of light transmission. optical fiber modes and configuration. Mode theory for circular waveguides. single mode fibers. Multi - mode fibers. Numerical Aperture. Mode Field Diameter. V-Number. Fiber Fabrication Technique.

Optical sources. L.E.D's, LASER Diodes, Modal Reflection Noise, Power Launching & Coupling. Population Inversion. Fiber splicing, optical connector, photodetector PIN.

Avalanche, Detector Response Time, Avalanche Multiplication Noise

Signal Degradation in optical fibers. Attenuation losses. signal distortion in optical waveguides, material dispersion, waveguide dispersion, chromatic dispersion, Intermodal distortion, pulse broadening in graded-index fibers. mode coupling. Advance fiber design: Dispersion shifted. Dispersion flattened. Dispersion compensating fiber. Design optimization of single mode fibres.

Coherent optical fiber communication. Modulation Techniques, Misalignment, Fiber to Fiber joints.

Optical Fiber Link Design: Rise Time Budget and Link power Budget. Long-Haul systems. Bit error Rate.

Line Coding: NRZ. RZ, Block codes, Error correction.

WDM concepts and components. operation, fiber gratings, Hologram, Tunable Filters, Directional coupler.. Dispersion Management.

Optical Amplifiers - EDFA, Photonic Switching.

Optical Networks - SONET/SDH. Optical Interfaces. Ring Topology, Star Architecture

Suggested Text Books and References:

1. G. Keiser, "Optical Fiber Communication (3rd Edition)". Mc Graw Hill International, 2000.
- 2 D.F Mynbaev and L. Scheiner. "Fiber optic communication technology", Pearson Education.
3. (Ghatak and K. Thyangarajan. "Int. to fiber optics. Cambridge University press, 1998.