

Fiber Optic Instrumentation [FOI]

(Elective – I)

B.E. Sem. VII [INST]

EVALUATION SYSTEM

	Time	Marks
Theory Exam	3 Hrs.	100
Practical & Oral Exam	–	–
Oral Exam	–	25
Term Work	–	25

SYLLABUS

1. Introduction to Optical Fiber Communication

Elements of an Optical Fiber Transmission link., Optical Fiber modes, and configurations, Single mode fibers, Fiber materials, Fiber fabrication, Fiber Optics – basic characteristics, sensors – basic principle and operational details.

Holography : principles, holographic recording and readout devices, its application. Optical signal processing – Fourier optics, optical applications.

2. Optoelectronics

Light sources – LED, Laser Diodes. Optical detectors, their characterization. Light source- linearity, Reliability considerations. Opto-isolators: their characteristics, advantages and limitations. Lasers- theory, types, characteristics.

3. Power Launching & Coupling

Sources to Fiber power launching, Lensing schemes for coupling improvement, Fiber to fiber joints, LED coupling to single mode fibers, Fiber splicing, Optical Fiber connectors.

4. Photodetector

Physical principles of photo diodes, Photo detector noise, Detector response time, Avalanche multiplication noise, Temperature effect on avalanche gain.

5. WDM Concepts & Components

Operational principle of WDM, Passive components, Tunable sources, Tunable filters.

6. Optical Networks

Basic networks, SONET / SDH, Broadcast and select WDM networks, Wave length routed networks, Non linear effects on network performance, Performance of WDM +EDFA systems, Optical CDMA, Ultra high capacity networks.

7. Measurements Applications

Measurement Standards & Test Procedure Test equipments, Attenuation Measurement, Dispersion measurement, Distance measurement, Flow measurement, Level measurement, Pressure and Vibration measurement, Endoscopy, Holography.

8. Remote Sensing

Parameters of a Sensors, Definition : Components of Remote sensing – Energy, sensor, interacting Body, Active & passive Remote sensing – platforms—Aerial & space platforms--Balloons, Helicopter, Aircraft & satellites – Synoptivity and Receptivity--Electro Magnetic Radiation (EMR) - EMR spectrum--visible, Infra Red (IR), Near IR, Middle IR, Thermal IR & Microwave-Black body radiation-plank's Law- Stefan-Boltzman Law.

Reference :

1. Fiber optics – communication (*Gerd Keiser*).
2. Integrated circuits and semiconductor devices theory and application (*Deboo Burrous*) McGraw Hill Second Edition.
3. Opto Electronics – An Introduction (*J.Wilson J.F.B.Hawkes*) Prentice Hall of India New Delhi. 1996.
4. Optical fiber communications principles and practice (*J.M. senior*) Prentice Hall of India , Second Edition 1996
5. Fiber optics - communication and other application (*H. Zanger and Zanger*) McGraw Pub
6. Optical fiber systems, Tecnology, Design & Application (*Kao C.K.*) McGraw Hill.
7. Introduction to optical fibers (*Cherin*) McGraw Hill.
8. Text book on optical fiber Communication & it's application (*S.C.Gupta*) PHI.
9. Basics of Remote Sensing & GIS (*Dr. S. Kumar*) Laxmi publications.

