Government Polytechnic Education Society, Manesar

**Lesson Plan**

**Name of the Faculty : Devender Singh**

**Discipline : Electronics & Communication Engg.**

**Department : Electronics & Communication Engg.**

**Semester :** 5th

**Subject :** Optical Fiber Communication

**Lesson Plan Duration :** 15 weeks( From 15 sep.22 to 16jan.2023)

**Work load (Lecture / Practical) per week (in hours) : Lectures-03, Practicals -03**

**Theory Practical**

**Week Lecture**

**day**

1st

**Topic**

**(Including assignment / test) UNIT 1. Introduction:**

Historical perspective

**Practical Day**

**Topic**

Setting up of fiber analog link

1st

2nd

3rd

4th

5th

6th

7th

8th

9th

10th

2nd

3rd 4th 5th

6th 7th

8th

9th 10th 11th 12th 13th 14th

15th

16th 17th 18th 19th 20th

21st

22nd

23rd 24th

25th

26th

27th

28th 29th 29th 30th

Basic communication systems, optical frequency range

Advantages of optical fibre communication, application of fibre optic communication

Electromagnetic spectrum used

Advantages and disadvantages of optical communication. Principle of light penetration

Reflection, critical angle.

**UNIT 2. Optical Fibers and Cables:**

Fiber types construction Multimedia and monomode fibers Step index and graded index fibers Acceptance angle

Types of optical fiber cables

**Revision/ Seminar/ Expert lecture Assignment No. 1, Sessional Test - 1, Quiz UNIT 3. Losses in optical fiber cable:** Absorption Losses, Bending loses.

Scattering Losses, Radiation losses Compelling losses and Bending loses.

Dispersion, Material dispersion wave guide dispersion

Modal dispersion, total dispersion and bit rate.

**UNIT 4. Optical sources**

Characteristics of light source used in optical communication, principle of operation of LED Different type of LED structures used and their brief description

LED driving circuitry, Injection Laser diode Different types of injection laser diodes

Comparison of LED and ILD, non semiconductor laser.

**UNIT 5. Optical Detector**

Characteristics of photo detectors used in optical communication

PIN Diode

Avalanche photo diode (APD) Noise in Detectors

**Revision/ Seminar/ Expert lecture Assignment No. 2, Sessionals Test - 2, Quiz**

1st (3Hours)

2nd (3Hours)

3rd (3Hours)

4th (3Hours)

5th (3Hours)

6th (3Hours)

7th (3Hours)

8th (3Hours)

9th (3Hours)

10th (3Hours)

Setting up to optic digital link

Measurement of various losses in optical fibers

**Revision**

To observe and measure the splice or connector loss

To measure and calculate numerical aperture of optical fiber

To observe characteristics of optical source

To Splice the available optical fiber

To observe characteristics of optical detector

To Connectorise a fiber with connector at both ends

**Week Lecture**

**day**

31st

11th

32nd

33rd 34th

12th 35th

**Topic**

**(Including assignment / test) UNIT 6. Optical Amplifiers**

Type of optical Amplifiers Principle of operation of SOA Types of SOA, EDFA

Raman Amplifiers,

Comparison of SOA,EDFA and Raman Amplifiers

**Assignment No. 3, Sessionals Test - 3, Quiz**

**Practical Day**

11th (3Hours)

**Topic**

To identify and use various components and Tool used in optical fiber communication.

12th

(3Hours)

**Revision**

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