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 04/08/2025 to 26/11/2025)

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Week** | **Theory** | | **Practical** | |
| **Lecture**  **day** | **Topic**  **(Including assignment / test)** | **Practical**  **Day** | **Topic** |
| 1st | 1st | **UNIT 1. Introduction:** | 1st (3Hours) | Setting up of fiber analog link |
| Historical perspective |
| 2nd | Basic communication systems, optical frequency range |
| 3rd | Advantages of optical fibre communication, application  of fibre optic communication |
| 2nd | 4th | Electromagnetic spectrum used | 2nd (3Hours) | Setting up to optic digital link |
| 5th | Advantages and disadvantages of optical communication. |
| 6th | Principle of light penetration |
| 3rd | 7th | Reflection, critical angle. | 3rd (3Hours) | Measurement of various losses in optical fibers |
| 8th | **UNIT 2. Optical Fibers and Cables:** |
| Fiber types construction |
| 9th | Multimedia and monomode fibers |
| 4th | 10th | Step index and graded index fibers | 4th (3Hours) | **Revision** |
| 11th | Acceptance angle |
| 12th | Types of optical fiber cables |
| 5th | 13th | **Revision/ Seminar/ Expert lecture** | 5th (3Hours) | To observe and measure the splice or connector loss |
| 14th | **Assignment No. 1, Sessional Test - 1, Quiz** |
| 15th | **UNIT 3. Losses in optical fiber cable:** |
| Absorption Losses, Bending loses. |
| 6th | 16th | Scattering Losses, Radiation losses | 6th (3Hours) | To measure and calculate numerical aperture of optical fiber |
| 17th | Compelling losses and Bending loses. |
| 18th | Dispersion, Material dispersion |
| 7th | 19th | wave guide dispersion | 7th (3Hours) | To observe characteristics of optical source |
| 20th | Modal dispersion, total dispersion and bit rate. |
| 21st | **UNIT 4. Optical sources** |
| Characteristics of light source used in optical  communication, principle of operation of LED |
| 8th | 22nd | Different type of LED structures used and their brief  description | 8th (3Hours) | To Splice the available optical fiber |
| 23rd | LED driving circuitry, Injection Laser diode |
| 24th | Different types of injection laser diodes |
| 9th | 25th | Comparison of LED and ILD, non semiconductor laser. | 9th (3Hours) | To observe characteristics of optical detector |
|  | **UNIT 5. Optical Detector** |
| 26th | Characteristics of photo detectors used in optical  communication |
| 27th | PIN Diode |
| 28th | Avalanche photo diode (APD) |
| 10th | 29th | Noise in Detectors | 10th (3Hours) | To Connectorise a fiber with connector at both ends |
| 29th | **Revision/ Seminar/ Expert lecture** |
| 30th | **Assignment No. 2, Sessionals Test - 2, Quiz** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Week** | **Lecture**  **day** | **Topic**  **(Including assignment / test)** | **Practical**  **Day** | **Topic** |
| 11th | 31st | **UNIT 6. Optical Amplifiers** | 11th (3Hours) | To identify and use various components and Tool used in optical fiber communication. |
| Type of optical Amplifiers |
| 32nd | Principle of operation of SOA |
| 33rd | Types of SOA, EDFA |
| 12th | 34th | Raman Amplifiers, | 12th (3Hours) | **Revision** |
| 35th | Comparison of SOA,EDFA and Raman Amplifiers |
|  | **Assignment No. 3, Sessionals Test - 3, Quiz** |

**.**