Government Polytechnic Education Society, Manesar (Gurugram)

**LESSON PLAN**

**Name of the Faculty** : Smt Sharmila (Senior Lecturer)

**Discipline** : Electronics & Communication Engineering

**Semester** : 6th

**Subject** : Microwave & Radar Engineering

**Lesson Plan Duration**: Approx.15weeks (From 15 Feb 2024 to 14 June 2024)

**Work Load (Lecture / Practical) per week (in hours):** Lecture-04, Practical-03 Hrs per Group

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| --- | --- | --- | --- | --- |
| **Week** | **Theory** | | **Practical** | |
| **Lecture Day** | **Topic (Including assignment / test)** | **Practical day** | **Topic** |
| 1st | 1st | Introduction about the subject/course and its syllabus | 1st | **Group 1:** Introduction about the course laboratory and its syllabus. |
| 2nd | **Unit-1-**Introduction to microwaves and its applications | 2nd | **Group 2:** Introduction about the course laboratory and its syllabus. |
| 3rd | Classification on the basis of its frequency bands (HF,VHF,UHF, L, C, S, X, SUB mm) |
| 4th | Revision |
| 2nd | 5th | **Unit-2-** Microwave Devices  Multicavity Klystron | 3rd | **Group 1:Exp. 1-**To measure electronics and mechanical tuning range of a Reflex Klystron. |
| 6th | Reflex Klystron | 4th | **Group 2:Exp. 1-**To measure electronics and mechanical tuning range of a Reflex Klystron. |
| 7th | Multicavity Magnetron |
| 8th | Travelling wave tube |
| 3rd | 9th | Gunn Diode | 5th | **Group 1:Exp. 1-**Revision |
| 10th | Impatt Diode |  |  |
| 11th | **Revision & Home Assignment** | 6th | **Group 2:Exp. 1-**Revision |
| 12th | Class Test |
| 4th | 13th | **Unit 3**: Waveguides  Rectangular and Circular Waveguides & their applications | 7th | **Group 1: Exp. 2-**To measure VSWR of a given load. |
| 14th | Mode of Waveguide | 8th | **Group 2: Exp. 2-**To measure VSWR of a given load. |
| 15th | Propagation constant, cut-off wavelength |
| 16th | Guide wavelength and relation with free space wavelength |
| 5th | 17th | Impossibility of TEM mode in a waveguide | 9th | **Group 1: Exp. 2-**Revision |
| 18th | Revision |
| 19th | **Unit 4:** Microwave components  Microwave Tees | 10th | **Group 2: Exp. 2-**Revision |
| 20th | Bends, matched termination |
| 6th | 21st | Twists, detector mount | 11th | **Group 1:Exp. 3-** To measure the klystron frequency by slotted section method. |
| 22nd | Slotted section | 12th | **Group 2:Exp. 3-** To measure the klystron frequency by slotted section method. |
| 23rd | Directional coupler |
| 24th | Fixed and variable attenuator |
| 7th | 25th | Isolator | 13th | **Group 1: Exp. 3-**Revision |
| 26th | Circulator |  |  |
| 27th | Duplexer, Coaxial to waveguide adapter | 14th | **Group 2: Exp. 3-**Revision |
| 28th | Horn antenna |
| 8th | 29th | **Revision & Home Assignment** | 15th | **Group 1: Exp. 4-**  To measure the directivity and coupling of a directional coupler. |
| 30th | Class Test |  |  |
| 31st | **Unit 5:** Microwave Communication System | 16th | **Group 2: Exp. 4-**  To measure the directivity and coupling of a directional coupler. |
| 32nd | Block diagram & working principle of Microwave communication link |
| 9th | 33rd | Troposcatter communication | 17th | **Group 1:Exp. 4-**Revision |
| 34th | Revision |  |  |
| 35th | Revision | 18th | **Group 2:Exp. 4-**Revision |
| 36th | **Unit 6:** Radar systems  Introduction and applications |
| 10th | 37th | Radar range equation and its applications | 19th | **Group 1: Exp. 5-**To plot radiation pattern of a horn antenna. |
| 38th | Block diagram & operating principle of basic Pulse Radar |  |  |
| 39th | Concept of ambiguous range | 20th | **Group 2: Exp. 5-**To plot radiation pattern of a horn antenna. |
| 40th | Radar area of cross section and its dependence on frequency |
| 11th | 41st | Block diagram & operating principle of CW (Doppler) Radar | 21st | **Group 1: Exp. 5-** Revision |
| 42nd | FMCW Radar & applications |
| 43rd | Block diagram & operating principle of MTI Radar | 22nd | **Group 2: Exp. 5-** Revision |
| 44th | Radar display-PPI |
| 12th | 45th | **Revision & Home Assignment** | 23rd | **Group 1:Exp. 6**- To verify the properties of magic Tee. |
| 46th | Class Test |  |  |
| 47th | Revision | 24th | **Group 2:Exp. 6**- To verify the properties of magic Tee. |
| 48th | Revision |
| 13th | 49th | Revision | 25th | **Group 1: Exp. 6-** Revision |
| 50th | Revision |  |  |
| 51st | Revision | 26th | **Group 2: Exp. 6-** Revision |
| 52nd | Revision |
| 14th | 53rd | Revision | 27th | **Group 1:** Revision and Viva |
| 54th | Revision |  |  |
| 55th | Revision | 28th | **Group 2:** Revision and Viva |
| 56th | Revision |
| 15th | 57th | Revision | 29th | **Group 1**: Revision and Viva |
| 58th | Revision |  |  |
| 59th | Revision | 30th | **Group 2**: Revision and Viva |
| 60th | Revision |