**LESSON PLAN**

**NAME OF THE FACULTY: - Sh. Bhupinder Kumar**

**DISIPLANE: - ECE**

**SAMESTER:- 6th**

**SUBJECT— Microwave & Radar**

**Lesson Plan Duration:- 15 weeks**

**Work Load (Lecture/Practical) per week (In hours): Lecture 03, Practical -03**

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| --- | --- | --- | --- | --- |
| Week | Theory | | Practical | |
|  | **Lecture Day** | **Topic (Including assignment/test)** | **Practical** | **Topic** |
|  |  |  |  |
| 1st | 1st | Introduction to microwaves and its applications, | 1st | To measure electronics and mechanical tuning range of a reflex klystron |
| 2nd | Classification on the basis of its frequency bands |
| 3rd | (HF, VHF, UHF, L, S, C, X, KU, KA, mm, SUB, mm) |
| 2nd | 4th | Rectangular and circular wave guides and their applications. | 2nd | To measure VSWR of a given load. |
| 5th | Mode of wave  guide |
| 6th | Propagation constant of a rectangular wave gui  de, cut off wavelength,  guide |
| 3rd | 7th | wavelength and their relationship with free space wavelength (no  mathematical derivation). | 3rd | To measure the Klystron frequency by slotted section method |
| 8th | Impossibility of TEM mode in a wave guide |
| 9th | Constructional features, characteristics and app  lication of tees |
| 4th | 10th | bends, matched  termination, | 4th | To measure the directivity and coupling of a directional coupler. |
| 11th | twists, detector, mount, slotted section, |
|  | 12th | directional coupler, fixed and variable attenuator |
| 5th | 13th | directional coupler, fixed and variable attenuator | 5th | To plot radiation pattern of a horn antenna in horizontal and vertical planes. |
| 14th | coaxial to wave guide  adapter. |
| 15th | Basic concepts of the  rmionic emission and vacuum tubes |
| 6th | 16th | Effects of inter  electrode capacitance, Lead Inductance | 6th | To  verify the properties of magic tee. |
| 17th | Transit time on the high frequency  performance of conventional vacuum tubes |
| 18th | steps to extend their high frequency operations. |
| 7th | 19th | Construction, characteristics,  operating principles and typical applications of the  following devices (No mathematical treatment) Multi cavity klystron | 7th |  |
| 20th | Reflex klystron  Multi cavity magnetron  Traveling wave tube |
| 21 | Gunn diode and  Impatt diode |
| 8th | 22 | Microwave antenn  As Structure characteristics and typical applications | 8th |  |
| 23 | Horn and Dish antennas |
| 24 | Microwave Communication systems |
| 9th | 25 | Block diagram and working principles of microwave communication link. | 9th |  |
| 26 | Application of Microwave |
| 27 | Introduction to Propagation |
| 10th | 28 | Troposcatter  Communication |  |  |
| 29 | Troposphere and  its properties, |  |  |
| 30 | Tropospheric duct formation and propagation, |  |  |
| 11th | 31 | Troposcatter propagation. |  |  |
| 32 | Introduction to radar, its various applications, |  |  |
| 33 | Radar range equation (no derivation) and its applications. |  |  |
| 12th | 34 | Block diagram and operating principles of basic pulse radar. |  |  |
| 35 | Concepts of  ambiguous range |  |  |
| 36 | Radar area of cross  section and its dependence on  frequency |  |  |
| 13th | 37 | Block diagram and operating principles of CW |  |  |
| 38 | Doppler Effect |  |  |
| 39 | FMCW radars,  and their applications |  |  |
| 14th | 40 | Block diagram and operating of Radar |  |  |
| 41 | principles of MTI radar |  |  |
| 42 | Radar display  PPI |  |  |
| 15th | 43 | Introduction to VSAT |  |  |
| 44 | transponders multiple access techniques |  |  |
| 45 | VSAT and its  features |  |  |

**Teacher Name Bhupinder Kumar**