**LESSION PLAN**

**NAME OF THE FACULTY** : - HIMANSHU YADAV

**DISCIPLINE** : - ECE

**SEMESTER** : - SIXTH

**SUBJECT** : - MICROWAVE ENGG

**LESSON PLAN DURATION** : - 15 weeks (from JAN 2020 to APRIL 2020)

WORK LOAD (LECTURE/PRACTICAL) PER WEEK (IN HOURS):- LECTURE-**03**, PRACTIACL-**06**

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| --- | --- | --- | --- | --- |
| **WEEK** | **THEORY** | | **PRACTICAL** | |
| **LECTURE DAY** | **TOPIC**  **(including assignment/test)** | **PRACTICAL DAY** | **TOPIC** |
| 1st | 1st | |  | | --- | | **Introduction to Microwaves** | | Introduction to microwaves and its applications | |  | | 1st  Group-1 | **1.** To measure electronic and mechanical tuning range of a Reflex Klystron |
| 2nd | |  | | --- | | Classification on the basis of its | | frequency bands (HF, VHF, UHF, L, S, C, X,  KU, KA, mm, SUB, mm) | |  |  |
| 3rd | * **assignments** * **Class Test** | 2nd  Group-2 | **1.** To measure electronic and mechanical tuning range of a Reflex Klystron |
| 2nd | 4th | |  | | --- | | **Wave guides** | | Rectangular and circular wave guides and their  Applications. | | 3rd  Group-1 | **2.**To measure VSWR of a given Load |
| 5th | |  | | --- | | Mode of wave guide; | | Propagation constant of a rectangular wave guide | |  |  |
| 6th | |  | | --- | | cut off wavelength, guide wavelength and their | | relationship with free space wavelength (no  Mathematical Derivation). | |  | | 4th  Group-2 | **2.**To measure VSWR of a given Load |
| 3rd | 7th | |  | | --- | | Impossibility of TEM mode in a wave guide. | |  | |  | | 5th  Group-1 | **Revision** |
| 8th | * **assignments** * **Class Test** |  |  |
| 9th | |  | | --- | | **Microwave Components** | | Constructional features | | 6th  Group-2 | **Revision** |
| 4th | 10th | |  | | --- | | Characteristics and application of tees, bends, matched | | termination | | 7th  Group-1 | **3.** To measure the Klystron frequency by slotted section method |
| 11th | twists, detector, mount, slotted section, directional coupler |  |  |
| 12th | |  | | --- | | Fixed and variable attenuator, isolator, circulator | |  | | 8th  Group-2 | **3.** To measure the Klystron frequency by slotted section method |
| 5th | 13th | |  | | --- | | duplex, coaxial to wave guide adaptor | |  | | 9th  Group-1 | **4.** To measure the directivity and coupling factor of directional coupler |
| 14th | * **assignments** * **Class Test** |  |  |
| 15th | |  | | --- | | **Microwave Devices** | | Basic concepts of thermionic emission and vacuum  Tubes | | 10th  Group-2 | **4.** To measure the directivity and coupling factor of directional coupler |
| 6th | 16th | |  | | --- | | Effects of inter- electrode capacitance, Lead  Inductance and Transit time on the high frequency  performance of conventional vacuum tubes and  Step to extend their high frequency operations. | |  | |  | | 11th  Group-1 | **Revision** |
| 17th | Construction, characteristics, operating principles and typical applications of  Multi Cavity Klystron |  |  |
| 18th | Construction, characteristics, operating principles and typical applications of  Reflex Klystron | 12th  Group-2 | **Revision** |
| 7th | 19th | Construction, characteristics, operating principles and typical applications of  Multi Cavity magnetron | 13th  Group-1 | **5.** To plot the radiation pattern of a HORN antenna in horizontal and vertical planes |
| 20th | Construction, characteristics, operating principles and typical applications of  TWT |  |  |
| 21th | Construction, characteristics, operating principles and typical applications of  Gunn Diode | 14th  Group-2 | **5.** To plot the radiation pattern of a HORN antenna in horizontal and vertical planes |

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| --- | --- | --- | --- | --- |
| 8th | 22th | Construction, characteristics, operating principles and typical applications of  Impatt Diode | 15th  Group-1 | **Revision** |
| 23th | * **assignments** * **Class Test** |  |  |
| 24th | |  | | --- | | **Microwave antennas** | | Structure characteristics and typical applications of  Horn antenna | | 15th  Group-2 | **Revision** |
| 9th | 25th | Structure characteristics and typical applications of  Dish antenna | 17th  Group-1 | **6.** To verify the properties of magic TEE |
| 26th | * **assignments** * **Class Test** |  |  |
| 27th | |  | | --- | | **Microwave Communication systems** | | Block diagram and working principles of microwave  Communication link. | | 18th  Group-2 | **6.** To verify the properties of magic TEE |
| 10th | 28th | Troposcatter Communication: Troposphere and its properties | 19th  Group-1 | **Revision** |
| 29th | Tropospheric duct formation and propagation |  |  |
| 30th | troposcatter propagation | 20th  Group-2 | **Revision** |
| 11th | 31th | * **assignments** * **Class Test** | 21th  Group-1 | **Revision** |
| 32th | |  | | --- | | **Radar Systems** | | Introduction to radar, its various applications | |  |  |
| 33th | |  |  | | --- | --- | | Radar range equation (no derivation) | | | And its applications. | | 22th  Group-2 | **Revision** |
| 12th | 34th | Block diagram and operating principles of basic pulse radar | 23th  Group-1 | **Revision** |
| 35th | |  |  | | --- | --- | | Concepts of ambiguous range, radar area of  Cross-section and its dependence on frequency. | | |  | |  |  |
| 36th | |  |  | | --- | --- | | Block diagram and operating principles of CW (Doppler) | | | And their applications. | | 24th  Group-2 | **Revision** |
| 13th | 37th | |  |  | | --- | --- | | Block diagram and operating principles of FMCW Radar | | | And their applications. | | 25th  Group-1 | **Test** |
| 38th | Block diagram and operating principles of MTI radar |  |  |
| 39th | Radar display- PPI | 26th  Group-2 | **Test** |
| 14th | 40th | |  | | --- | | * **assignments** * **Class Test** | | 27th  Group-1 | **Revision** |
| 41th | |  | | --- | | Introduction to VSAT transponders multiple access  techniques | |  |  |
| 42th | VSAT and its features | 28th  Group-2 | **Revision** |
| 15th | 43th | * **assignments** * **Class Test** | 29th  Group-1 | **Revision** |
| 44th | * **Class Test** |  |  |
| 45th | * **Class Test** | 30th  Group-2 | **Revision** |