**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 |

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| **Introduction to Microwaves** |
| Introduction to microwaves and its applications |
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 | 1stGroup-1 | **1.** To measure electronic and mechanical tuning range of a Reflex Klystron |
| 2nd |

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| Classification on the basis of its |
| frequency bands (HF, VHF, UHF, L, S, C, X, KU, KA, mm, SUB, mm) |

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| 3rd | * **assignments**
* **Class Test**
 | 2ndGroup-2 | **1.** To measure electronic and mechanical tuning range of a Reflex Klystron |
| 2nd | 4th |

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| **Wave guides** |
| Rectangular and circular wave guides and their Applications.  |

 | 3rdGroup-1 | **2.**To measure VSWR of a given Load |
| 5th |

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|  Mode of wave guide;  |
| Propagation constant of a rectangular wave guide |

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| 6th |

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| cut off wavelength, guide wavelength and their  |
| relationship with free space wavelength (no Mathematical Derivation). |
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 | 4thGroup-2 | **2.**To measure VSWR of a given Load |
| 3rd | 7th |

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| Impossibility of TEM mode in a wave guide. |
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 | 5thGroup-1 | **Revision** |
| 8th | * **assignments**
* **Class Test**
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| 9th |

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| **Microwave Components** |
| Constructional features |

 | 6thGroup-2 | **Revision** |
| 4th | 10th |

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| Characteristics and application of tees, bends, matched |
| termination |

 | 7thGroup-1 | **3.** To measure the Klystron frequency by slotted section method |
| 11th | twists, detector, mount, slotted section, directional coupler |  |  |
| 12th |

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|  Fixed and variable attenuator, isolator, circulator |
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 | 8thGroup-2 | **3.** To measure the Klystron frequency by slotted section method |
| 5th | 13th |

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| duplex, coaxial to wave guide adaptor |
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 | 9thGroup-1 | **4.** To measure the directivity and coupling factor of directional coupler |
| 14th | * **assignments**
* **Class Test**
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| 15th |

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| **Microwave Devices** |
| Basic concepts of thermionic emission and vacuum Tubes |

 | 10thGroup-2 | **4.** To measure the directivity and coupling factor of directional coupler |
| 6th | 16th |

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| Effects of inter- electrode capacitance, Lead Inductance and Transit time on the high frequencyperformance of conventional vacuum tubes and Step to extend their high frequency operations. |
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 | 11thGroup-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 | 12thGroup-2 | **Revision** |
| 7th | 19th | Construction, characteristics, operating principles and typical applications of Multi Cavity magnetron | 13thGroup-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 | 14thGroup-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  | 15thGroup-1 | **Revision** |
| 23th | * **assignments**
* **Class Test**
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| 24th |

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| **Microwave antennas** |
| Structure characteristics and typical applications of Horn antenna |

 | 15thGroup-2 | **Revision** |
| 9th | 25th | Structure characteristics and typical applications of Dish antenna | 17thGroup-1 | **6.** To verify the properties of magic TEE |
| 26th | * **assignments**
* **Class Test**
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| 27th |

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| **Microwave Communication systems** |
|  Block diagram and working principles of microwaveCommunication link. |

 | 18thGroup-2 | **6.** To verify the properties of magic TEE |
| 10th | 28th | Troposcatter Communication: Troposphere and its properties | 19thGroup-1 | **Revision** |
| 29th | Tropospheric duct formation and propagation |  |  |
| 30th | troposcatter propagation  | 20thGroup-2 | **Revision** |
| 11th | 31th | * **assignments**
* **Class Test**
 | 21thGroup-1 | **Revision** |
| 32th |

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| **Radar Systems** |
| Introduction to radar, its various applications |

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| 33th |

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| Radar range equation (no derivation) |
| And its applications. |

 | 22thGroup-2 | **Revision** |
| 12th | 34th | Block diagram and operating principles of basic pulse radar | 23thGroup-1 | **Revision** |
| 35th |

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| Concepts of ambiguous range, radar area ofCross-section and its dependence on frequency. |
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| 36th |

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| Block diagram and operating principles of CW (Doppler)  |
| And their applications. |

 | 24thGroup-2 | **Revision** |
| 13th | 37th |

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| Block diagram and operating principles of FMCW Radar  |
| And their applications. |

 | 25thGroup-1 | **Test** |
| 38th | Block diagram and operating principles of MTI radar  |  |  |
| 39th | Radar display- PPI  | 26thGroup-2 | **Test** |
| 14th | 40th |

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| * **assignments**
* **Class Test**
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 | 27thGroup-1 | **Revision** |
| 41th |

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| Introduction to VSAT transponders multiple access techniques |

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| 42th | VSAT and its features | 28thGroup-2 | **Revision** |
| 15th | 43th | * **assignments**
* **Class Test**
 | 29thGroup-1 | **Revision** |
| 44th | * **Class Test**
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| 45th | * **Class Test**
 | 30thGroup-2 | **Revision** |