**LESSON PLAN**

**Subject Code & Name: Microwave engineering**

**Branch: E.C.E-A Class / Semester: III/IV-SEM 1I Academic Year:2014-15**

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| **Period** | **Date (Tentative)** | **Topic** | **Unit No.** | **Teaching Methodology** | **Remarks** | **Corrective action upon review** |
|  |  | MICROWAVE TRANSMISSION LINES: Introduction, | **I** |  |  |  |
| 1 | 19.1.15 | Introduction, Microwave Bands, Applications |  | CB |  |  |
| 2 | 20.1.15 | Rectangular wave guide, TE mode analysis |  |  |  |  |
| 3 | 21.1.15 | TM mode analysis, Expressions for Fields, |  |  |  |  |
| 4 | 22.1.15 | Characteristic Equation, Cut-off Frequencies, Filter characteristics |  | CB |  |  |
| 5 | 23.1.15 | dominant and degenerate modes, Sketches for TE&TM mode fields in the cross section |  | CB |  |  |
| 6 | 27.1.15 | Mode Characteristics, Phase and group velocities |  | CB |  |  |
| 7 | 28.1.15 | wave lengths and impedance relations Power Transmission and Power Losses in Rectangular Guide, |  | CB |  |  |
| 8 | 29.1.15 | Related problems |  | CB |  |  |
| 9 | 30.1.15 | CIRCULAR WAVEGUIDES: Introduction, Nature of Fields, Characteristic Equation | **II** |  |  |  |
| 10 | 2.2.15 | Dominant and Degenerate  Modes. Impossibility of TEM mode. |  |  |  |  |
| 11 | 3.2.15 | Introduction to MICROSTRIP LINES |  |  |  |  |
| 12 | 4.2.15 | Zo Relations |  |  |  |  |
| 13 | 5.2.15 | Effective Dielectric Constant, Losses |  |  |  |  |
| 14 | 6.2.15 | Q factor. Cavity Resonators– Introduction Rectangular cavities ,cylindrical cavities |  |  |  |  |
| 15 | 9.2.15 | Dominant modes and resonant frequencies, Q- factor and coupling coefficients |  | CB |  |  |
| 16 | 10.2.15 | Related problems |  |  |  |  |
| 17 |  | WAVEGUIDE COMPONENTS& APPLICATIONS -1 & 2 | **III & IV** |  |  |  |
| 18 | 11.2.15 | Coupling Mechanisms - probe, loop,apearture |  | CB |  |  |
| 19 | 12.2.15 | Waveguide discontinuities-irises, Tuning screws ,posts |  |  |  |  |
| 20 | 13.2.15 | Waveguide Attenuators, |  | CB |  |  |
| 21 | 16.2.15 | Phase Shifters |  | CB |  |  |
| 22 | 17.2.15 | ferrites composition and characteristics Faraday Rotation; Ferrite Components |  | CB |  |  |
| 23 | 18.2.15 | Scattering Matrix significance ,formulation ,properties , |  |  |  |  |
| 24 | 19.2.15 | Waveguide Multiport Junctions – s-matrix calculations for 2 port jn |  | CB |  |  |
| 25 | 20.2.15 | E-plane tee,calculation of s matrix |  |  |  |  |
| 26 | 23.2.15 | H plane Tees, calculation of s matrix |  |  |  |  |
| 27 | 24.215 | Magic Tee, calculation of s matrix |  | CB |  |  |
| 28 | 25.2.15 | Hybrid Ring, |  | CB |  |  |
| 29 | 2.3.15 | Directional Couplers, calculation of s matrix |  |  |  |  |
| 30 | 3.3.15 | Ferrite componants Gyrator,s matrix | **IV** |  |  |  |
| 31 | 4.3.15 | Isolator, s matrix |  | CB |  |  |
| 32 | 5.3.15 | Circulator, s matrix |  | CB |  |  |
| 33 | 6.3.15 | related problems |  | CB |  |  |
| 34 |  | MICROWAVE TUBES – I | **V** |  |  |  |
| 35 | 16.3.15 | Limitations and losses of conventional tubes at microwave frequencies |  | CB |  |  |
| 36 | **17.3.15** | Micro wave tubes O type and M type classifications. |  | CB |  |  |
| 37 | 18.3.15 | O-type tubes Two Cavity Klystrons structure reentrant cavities |  | CB |  |  |
| 38 | 19.3.15 | Velocity Modulation Process, apple gate diagram |  | CB |  |  |
| 39 | 20.3.15 | Bunching Process ,Small signal theory, expressions for o/p Power,efficiency, |  | CB |  |  |
| 40 | 23.3.15 | Reflex Klystrons – structure  Apple gate diagram & principle of working |  | CB |  |  |
| 41 | 24.3.15 | Mathematical Theory of Bunching, Power Output, Efficiency |  |  |  |  |
| 42 | **25.3.15** | & electronic admittance Oscillating Modes & o/p characteristics, |  | CB |  |  |
| 43 | 26.3.15 | electronic and mechanical tuning related problems |  |  |  |  |
| 44 | 27.3.15 | HELIX TWTS: Significance, Types and Characteristics of Slow Wave Structures | **VI** | CB |  |  |
| 45 | 30.3.15 | Structure of TWT and , TWT- Amplification Process, Suppression of Oscillations |  | CB |  |  |
| 46 | 31.3.15 | Nature of the four Propagation Constants , |  | CB |  |  |
| 47 | 1.4.15 | Gain Considerations M-type Tubes introduction |  | CB |  |  |
| 48 | 2.4.15 | Cross field effects,Magnetrons – Types,8-Cavity Cylindrical Magnetron |  |  |  |  |
| 49 | 3.4.15 | Hull Cut-off, Hartree Conditions |  | CB |  |  |
| 50 | 6.4.15 | Modes of resonance PI- Mode Operation. |  | CB |  |  |
| 51 | 7.4.15 | Separation of pi mode and o/p characteristics |  |  |  |  |
| 52 | 8.4.15 | MICROWAVE SOLID STATE DEVICES, introduction | **VII** |  |  |  |
| 53 | 8.4.15 | Classification,applications,TEDS |  |  |  |  |
| 54 | 10.4.15 | Gunn Diode – Principle,, RWH Theory, Characteristics |  |  |  |  |
| 55 | 13.4.15 | Basic modes of operation oscillating modes |  | CB |  |  |
| 56 | 14.4.15 | Avalanche Transit Time Devices introduction |  | CB |  |  |
| 57 | 15.4.15 | IMPATT diode Principle of Operation and Characteristics. |  |  |  |  |
| 58 | 16.4.15 | TRAPATT Diodes Principle of Operation and Characteristics. |  | CB |  |  |
| 59 | 17.4.15 | Micro wave measurements, Description of Microwave Bench | **VIII** | CB |  |  |
| 60 | 20.4.15 | Different Blocks and their Features, Precautions |  | CB |  |  |
| 61 | 21.4.15 | Microwave Power Measurement – Bolometer Method |  | CB |  |  |
| 62 | 22.4.15 | Measurement of Attenuation, |  | CB |  |  |
| 63 | 23.4.15 | Frequency measurement |  |  |  |  |
| 64 | 24.4.15 | Low VSWR measurement |  |  |  |  |
| 65 | 27.4.15 | High VSWR measurement |  |  |  |  |
| 66 | 29.4.15 | cavity Q measurement |  | CB |  |  |
| 67 | 1.5.15 | Impedance measurement |  | CB |  |  |

**CB: CHALK & BOARD PPT: POWER POINT PRESENTATION**