**LESSON PLAN**

**Subject Code & Name: Microwave engineering**

**Branch: E.C.E-A Class / Semester: III/IV-SEM 1I Academic Year:2013-14**

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| **Period** | **Date (Tentative)** | **Topic** | **Unit No.** | **Teaching Methodology** | **Remarks** | **Corrective action upon review** |
|  |  | MICROWAVE TRANSMISSION LINES: Introduction, | **I** |  |  |  |
| 1 | 7.1.14 | Introduction, |  | CB |  |  |
| 2 | 8.1.14 | Microwave Bands, Application |  | CB |  |  |
| 3 | 9.1.14 | Rectangular wave guide |  |  |  |  |
| 4 | 10.1.14 | TE mode analysis |  | CB |  |  |
| 5 | 11.1.14 | TM mode analysis |  |  |  |  |
| 6 | 17.1.14 | Expressions for Fields, Characteristic Equation, Cut-off Frequencies |  | CB |  |  |
| 7 | 18.1.14 | Filter characteristics ,dominant and degenerate modes |  | CB |  |  |
| 8 | 20.1.14 | Sketches for TE&TM mode fields in the cross section Mode Characteristics |  | CB |  |  |
| 9 | 21.1.14 | Phase and group velocities,wave lengths and impedance relations |  | CB |  |  |
| 10 | 22.1.14 | Power Transmission and Power Losses in Rectangular Guide, Related problems |  | CB |  |  |
| 11 | 23.1.14 | **CIRCULAR WAVEGUIDES**: Introduction, Nature of Fields | **II** |  |  |  |
| 12 | 24.1.14 | Characteristic Equation, Dominant and Degenerate  Modes. Impossibility of TEM mode. |  |  |  |  |
| 13 | 25.1.14 | Introduction to  **MICROSTRIP LINES** |  |  |  |  |
| 14 | 27.1.14 | Zo Relations, Effective Dielectric Constant, |  |  |  |  |
| 15 | 28.1.14 | Losses, Q factor. Cavity Resonators– Introduction |  |  |  |  |
| 16 | 29.1.14 | Rectangular cavities ,cylindrical cavities |  |  |  |  |
| 17 | 30.1.14 | Dominant modes and resonant frequencies |  | CB |  |  |
| 18 | 31.1.14 | Q- factor and coupling coefficients |  |  |  |  |
| 19 | 1.2.14 | Related problems |  |  |  |  |
| 20 | 3.2.14 | WAVEGUIDE COMPONENTS& APPLICATIONS -1 | **III** |  |  |  |
| 21 | 4.2.14 | Coupling Mechanisms - probe, loop |  | CB |  |  |
| 22 | 5.2.14 | Waveguide discontinuities-irises |  |  |  |  |
| 23 | 6.2.14 | Tuning screws ,posts and matched loads |  |  |  |  |
| 24 | 7.2.14 | Waveguide Attenuators, |  | CB |  |  |
| 25 | 8.2.14 | Phase Shifters |  | CB |  |  |
| 26 | 11.2.14 | Scattering Matrix |  | CB |  |  |
| 27 | 12.2.14 | Waveguide Multiport Junctions – E plane Tee |  | CB |  |  |
| 28 | 13.2.14 | H plane Tees, Magic Tee, |  | CB |  |  |
| 29 | 14.2.14 | Hybrid Ring, Directional Couplers |  | CB |  |  |
| 30 | 14.2.14 | WAVEGUIDE COMPONENTS& APPLICATIONS –II ferrites composition and characteristics | **IV** |  |  |  |
| 31 | 15.2.14 | Faraday Rotation; Ferrite Components |  | CB |  |  |
| 32 | 18.2.14 | Gyrator, Isolator, Circulator. |  | CB |  |  |
| 33 | 19.2.14 | Scattering matrix significance ,formulation ,properties ,s-matrix calculations for 2 port jn |  | CB |  |  |
| 34 | 20.2.14 | E plane Tee, H plane Tees |  | CB |  |  |
| 35 | 21.2.14 | Magic Tee, Directional Couplers |  |  |  |  |
| 36 | 22.2.14 | Circulator and isolator ,related problems |  |  |  |  |
|  |  | MICROWAVE TUBES – I | **V** |  |  |  |
| 37 | 3.3.14 | Limitations and losses of conventional tubes at microwave frequencies |  | CB |  |  |
| 38 | 4.3.14 | Micro wave tubes O type and M type classifications. |  | CB |  |  |
| 39 | 5.3.14 | O-type tubes Two Cavity Klystrons structure reentrant cavities |  | CB |  |  |
| 40 | 6.3.14 | Velocity Modulation Process, apple gate diagram Bunching Process |  | CB |  |  |
| 41 | 7.3.14 | Small signal theory, expressions for o/p Power,efficiency, |  | CB |  |  |
| 42 | 8.3.14 | Reflex Klystrons – structure |  | CB |  |  |
| 43 | 11.3.14 | Apple gate diagram & principle of working |  |  |  |  |
| 44 | **12.3.14** | Mathematical Theory of Bunching, Power Output, Efficiency & electronic admittance |  |  |  |  |
| 45 | 13.3.14 | Oscillating Modes & o/p characteristics, electronic and mechanical tuning related problems |  | CB |  |  |
| 46 | 14.3.14 | HELIX TWTS: Significance, Types and Characteristics of Slow Wave Structures | **VI** | CB |  |  |
| 47 | 15.3.14 | Structure of TWT and , TWT- Amplification Process, Suppression of Oscillations |  | CB |  |  |
| 48 | 18.3.14 | Nature of the four Propagation Constants , Gain Considerations |  | CB |  |  |
| 49 | 19.3.14 | M-type Tube: Magnetrons – Types,8-Cavity Cylindrical Magnetron |  | CB |  |  |
| 50 | 20.3.14 | Hull Cut-off, Hartree Conditions |  | CB |  |  |
| 51 | 21.3.14 | Modes of resonance PI- Mode Operation. |  | CB |  |  |
| 52 | 22.3.14 | Separation of pi mode and o/p characteristics |  |  |  |  |
| 53 | **25.3.14** | MICROWAVE SOLID STATE DEVICES, CLASSIFICATION & APPLICATION | **VII** |  |  |  |
| 54 | **26.3.14** | TEDS introduction, Gunn Diode – Principle |  |  |  |  |
| 55 | 27.3.14 | , RWH Theory, Characteristics |  | CB |  |  |
| 56 | 28.3.14 | Basic modes of operation oscillating modes |  | CB |  |  |
| 57 | 29.3.14 | Avalanche Transit Time Devices |  | CB |  |  |
| 58 | 1.4.14 | IMPATT Principle of Operation and Characteristics. |  | CB |  |  |
| 59 | 2.4.14 | TRAPATT Diodes Principle of Operation and Characteristics. |  | CB |  |  |
| 60 | 3.4.14 | Micro wave measurements, Description of Microwave Bench | **VIII** | CB |  |  |
| 61 | 5.4.14 | Different Blocks and their Features, Precautions |  | CB |  |  |
| 62 | 8.4.14 | Microwave Power Measurement – Bolometer Method |  | CB |  |  |
| 63 | 9.4.14 | Measurement of Attenuation, Frequency measurement |  | CB |  |  |
| 64 | 10.4.14 | VSWR measurement,cavity Q |  | CB |  |  |
| 65 | 11.4.14 | Impedance measurement |  | CB |  |  |

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