Subject Name: EC2403 RF and Microwave Engineering

Staff Name : G.SadiqBasha, Associate Professor

Year : Final Year –ECE ‘B’ Section

**Syllabus:**

**UNIT I TWO PORT RF NETWORKS-CIRCUIT REPRESENTATION**

Low frequency parameters-impedance ,admittance, hybrid and ABCD. High frequencyparameters-Formulation of S parameters, properties of S parameters-Reciprocal andlossless networks, transmission matrix, Introduction to component basics, wire, resistor,capacitor and inductor, applications of RF

**UNIT II RFTRANSISTOR AMPLIFIER DESIGN AND MATCHING NETWORKS**

Amplifier power relation, stability considerations, gain considerations noise figure,impedance matching networks, frequency response, T and Π matching networks,microstripline matching networks

**UNIT III MICROWAVE PASSIVE COMPONENTS**

Microwave frequency range, significance of microwave frequency range - applications ofmicrowaves.Scattering matrix -Concept of N port scattering matrix representation-Properties of S matrix- S matrix formulation of two-port junction. Microwave junctions -Tee junctions -Magic Tee - Rat race - Corners - bends and twists - Directional couplers -two hole directional couplers- Ferrites - important microwave properties and applications– Termination - Gyrator- Isolator-Circulator - Attenuator - Phase changer – S Matrix formicrowave components – Cylindrical cavity resonators.

**UNIT IV MICROWAVE SEMICONDUCTOR DEVICES**

Microwave semiconductor devices- operation - characteristics and application of BJTsand FETs -Principles of tunnel diodes - Varactor and Step recovery diodes – TransferredElectron Devices -Gunn diode- Avalanche Transit time devices- IMPATT and TRAPATTdevices. Parametric devices -Principles of operation - applications of parametricamplifier .Microwave monolithic integrated circuit (MMIC) - Materials and fabricationtechniques

**UNIT V MICROWAVE TUBES AND MEASUREMENTS**

Microwave tubes- High frequency limitations - Principle of operation of Multicavity

Klystron, Reflex Klystron, Traveling Wave Tube, Magnetron. Microwave measurements:

Measurement of power, wavelength, impedance, SWR, attenuation, Q and Phase shift.

**TEXT BOOKS:**

1. Samuel Y Liao, “Microwave Devices & Circuits” , Prentice Hall of India, 2006.

2. Reinhold.Ludwig and PavelBretshko ‘RF Circuit Design”, Pearson Education, Inc.,2006

**REFERENCES:**

1. Robert. E.Collin-Foundation of Microwave Engg –McGraw Hill.

2. Annapurna Das and Sisir K Das, “Microwave Engineering”, Tata McGrawHill Inc., 2004.

3. M.M.Radmanesh , RF & Microwave Electronics Illustrated, PearsonEducation, 2007.

4. Robert E.Colin, 2ed “Foundations for Microwave Engineering”, McGraw Hill, 2001

5. D.M.Pozar, “Microwave Engineering.”, John Wiley & sons, Inc., 2006.