Microwave Devices, Circuits and Materials (RP 4.1.3)

An overview of microwave devices, circuits and materials with applications. (2)

Device characterization models at microwave frequencies: Small-signal linear model using S-parameters, Large-signal non-linear models. (4)

High power microwave tube: Concept of Cyclotron Maser interaction for microwave signal generation in Gyrotron, Gyromonotron oscillator, Gyro-TWT amplifier. (3)

Modeling of microwave passive circuits: Equivalent circuits of discontinuities and obstacles in waveguides, Discontinuities in microstrip and fin-lines. (4)

Microwave filters: Filter design by insertion loss method, Filter transformation and implementation, coupled-line and coupled cavity filters. (4)

Microwave Oscillators, Amplifiers and Power combiners: Schemes for microwave oscillator, amplifier and power combiner using Gunn and IMPATT devices, design methodology and typical design. Dielectric resonator oscillator. (6)

Non-reciprocal Devices: Ferrite as microwave materials Electromagnetic wave propagation in magnetized ferrite medium, Resonance absorption Isolator, Y-circulator, Ferrite phase shifter. (3)

Metamaterial: Plasmonic and transmission line metamaterial, counter-intuitive properties of metamaterial with applications. (4)