

Department of Electronics & Communication Engineering
Study Material for Microwave Engineering
(B.Tech 8th Sem ECE)

Subject Code: ECE-804

L T P: 2 1 0

Credits: 03

Syllabus

Unit I

Introduction to Microwave Communication: Need, Advantages and application of microwave signals.

Unit II

Microwave Passive Devices: Scattering Matrix (S Parameter) representation of multi-port networks, Tees, Directional Coupler, Circulator and Isolator.

Unit III

Microwave Active Devices: Limitations of conventional vacuum tubes at microwave frequencies, Klystrons, Traveling wave tube, Magnetron, Microwave Detectors, Mixers-Single ended and Balanced

Unit IV:

High Frequency Devices: PIN diode, Varactor diode, Tunnel diode, Read diode , IMPATT, TRAPATT and Gunn diode, Microwave Switches

Unit V:

Microwave Amplifiers and Oscillators: Microwave Transistors-Bipolar and Field Effect Transistor Characteristics, Gain and Stability, Microwave Amplifier design, Gunn and transistor oscillators.

TEXT BOOKS:

1. Microwave Devices and Circuits, Third edition; S.Y. Liao (Prentice Hall)
2. Microwave Engineering, David M. Pozar (John Wiley & Sons, Inc)
3. Foundations for Microwave Engineering , Robert E Collin (McGraw Hill)

Course Module/Plan

Unit	Unit Name	Topics	NPTEL Videos Link
I	Introduction to Microwave Communication	Need, Advantages and application of microwave signals.	https://nptel.ac.in/courses/108/103/108103141/ Lecture 1 Microwave Engineering By Prof. Ratnajit Bhattacharjee EEE Deptt. IIT Guwahati
II	Microwave Passive Devices	Scattering Matrix (S Parameter) representation of multi-port networks	https://nptel.ac.in/courses/108/103/108103141/ Lecture 8-10 Microwave Engineering By Prof. Ratnajit Bhattacharjee EEE Deptt. IIT Guwahati
		Tees, Directional Coupler	https://nptel.ac.in/courses/108/103/108103141/ Lecture 17-18 Microwave Engineering By Prof. Ratnajit Bhattacharjee EEE Deptt. IIT Guwahati
		Circulator and Isolator	https://nptel.ac.in/courses/108/103/108103141/ Lecture 31 Microwave Engineering By Prof. Ratnajit Bhattacharjee EEE Deptt. IIT Guwahati
III	Microwave Active Devices	Limitations of conventional vacuum tubes at microwave frequencies,	https://nptel.ac.in/courses/108/103/108103141/ Lecture 28 Microwave Engineering By Prof. Ratnajit Bhattacharjee EEE Deptt. IIT Guwahati
		Klystrons, Traveling wave tube, Magnetron	https://nptel.ac.in/courses/108/103/108103141/ Lecture 29-30 Microwave Engineering By Prof. Ratnajit Bhattacharjee

		Microwave Detectors, Mixers-Single ended and Balanced.	https://nptel.ac.in/courses/108/103/108103141/ Lecture 29-30 Microwave Engineering By Prof. Ratnajit Bhattacharjee EEE Deptt. IIT Guwahati
IV	High Frequency Devices	PIN diode & Microwave Switches	https://nptel.ac.in/courses/108/103/108103141/ Lecture 22 Microwave Engineering By Prof. Ratnajit Bhattacharjee EEE Deptt. IIT Guwahati
		Detectors and Tunnel diode	https://nptel.ac.in/courses/108/103/108103141/ Lecture 23 Microwave Engineering By Prof. Ratnajit Bhattacharjee EEE Deptt. IIT Guwahati
		Gunn diodes, Read diodes , IMPATT, TRAPATT and Varactor diodes	https://nptel.ac.in/courses/108/103/108103141/ Lecture 24 Microwave Engineering By Prof. Ratnajit Bhattacharjee EEE Deptt. IIT Guwahati
V	Microwave Amplifiers and Oscillators	Microwave Transistors-Bipolar and Field Effect Transistor Characteristics	https://nptel.ac.in/courses/108/103/108103141/ Lecture 21 Microwave Engineering By Prof. Ratnajit Bhattacharjee EEE Deptt. IIT Guwahati
		Gain and Stability	https://nptel.ac.in/courses/108/103/108103141/ Lecture 25 Microwave Engineering By Prof. Ratnajit Bhattacharjee EEE Deptt. IIT Guwahati
		Microwave Amplifier design, Gunn and transistor oscillators.	https://nptel.ac.in/courses/108/103/108103141/ Lecture 26-27 Microwave Engineering By Prof. Ratnajit Bhattacharjee EEE Deptt. IIT Guwahati