

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Electronics & Communication Engineering, VII-Semester

Departmental Elective EC- 702 (A) MICROWAVE ENGINEERING

Prerequisite:- Electromagnetic fields , Antenna and wave propagation.

Course Outcome:-

Students should be able to :

- 1. Identify of various types of Microwave electronic components and systems.**
- 2. Understand different modes of operation of various RF and Microwave circuits.**
- 3. Design and analyze of high frequency circuits and systems.**
- 4. Solving complex RF & Microwave communication network design problems S**

SYLLABUS

- Unit 1.** Features and applications of microwaves, Wave propagation in striplines and microstrip lines, Slot lines, Limitations of conventional vacuum tubes, Microwave tubes like Two cavity klystron and Reflex klystron, Magnetron, TWT, Backward wave oscillator etc.
- Unit 2.** Solid state microwave sources, transferred electron devices, Tunnel diode Gunn diode and oscillators, IMPATT diode, TRAPATT diode, Pin diode, Varactor diode, Schottky diode, Parametric amplifiers, Crystal diode, Frequency multipliers, Microwave BJT & FET,
- Unit 3.** Scattering matrix, S-parameters & its applications in Network analysis, Matching Network, Detector diodes, detector mounts, detector output indicator, slotted line, measurement of power, impedance & S-parameter, measurement of frequency & VSWR.
- Unit 4.** Impedance transformer, Microwave filters, Power dividers and directional couplers, E-plane Tee, H-plane tee, Matched hybrid Tee., Wave propagation in ferrite medium, Isolators, Circulators, YIG resonators, Simulation Techniques for design of **Microwave** Components.
- Unit 5.** Analysis and design of Dielectric resonators; Design of RF and microwave low noise and power amplifiers & oscillators using S-parameter techniques, Mixer and converter design, diode phase shifters, attenuators, Design of hybrid and monolithic, microwave and millimeter wave integrated circuits.

Text Books Recommended :

1. Liao S., Microwave Devices & Circuits”, 2nd ed. 2001,PHI.
2. Gupta K.C., Microwave Engg., 3rd ed. 2004,Wiley Easter Pub.
3. Watson, Solid State Microwave Devices, 5th ed. 2008,Wiley.
4. David M. Pozar, Microwave Engineering, 3rd edition, 2011 Willey India.

Reference Books Recommended :

1. Gandhi, Microwave Engineering & Application, 2nd ed. 2005,McMillan Int. Ed.
2. Reich, Microwave Principles, 5th ed. 2009,CBS Publ.
3. Collin, Foundations for microwave engineering, 4th ed. 2001, Wiley Publ.