

## SYLLABUS MICROWAVES AND RADAR

Subject Code : 10EC54  
No. of Lecture Hrs/Week : 04  
Total no. of Lecture Hrs : 52

IA Marks : 25  
Exam Hours : 03  
Exam Marks: 100

### PART - A

#### UNIT - 1

**MICROWAVE TRANSMISSION LINES:** Introduction, transmission lines equations and solutions, reflection and transmission coefficients, standing waves and SWR, line impedance and line admittance. Smith chart, impedance matching using single stubs, Microwave coaxial connectors.

**7 Hours**

#### UNIT - 2

**MICROWAVE WAVEGUIDES AND COMPONENTS:** Introduction, rectangular waveguides, circular waveguides, microwave cavities, microwave hybrid circuits, directional couplers, circulators and isolators.

**7 Hours**

#### UNIT - 3

##### **MICROWAVE DIODES.**

Transfer electron devices: Introduction, GUNN effect diodes – GaAs diode, RWH theory, Modes of operation, Avalanche transit time devices: READ diode, IMPATT diode, BARITT diode, Parametric amplifiers Other diodes: PIN diodes, Schottky barrier diodes.

**7 Hours**

#### UNIT - 4

Microwave network theory and passive devices, Symmetrical Z and Y parameters, for reciprocal Networks, S matrix representation of multi port networks.

**6 Hours**

# Microwave And Radar Engineering Notes Vtu

**V. S. Bagad**



## **Microwave And Radar Engineering Notes Vtu:**

Microwave And Radar Engineering, 1/e Sisodia, M L, 2011      *Microwave and Radar Engineering* Gottapu Sasibhushana Rao, 2014 Microwave and Radar Engineering presents the essential features and focuses on the needs of students who take up the subject at undergraduate and postgraduate levels of electronics and communications engineering courses Spread across 17 chapters the book begins with a discussion of wave equations and builds upon the topics step by step with ample illustrations and examples that delineate the concepts to the student s benefit The book will also come in handy for aspirants of competitive examinations      **Microwave Journal** ,1977      **Microwave & Radar Engineering** ,2011      Microwave And Radar Engineering Sumit Srivastav Sweta Agarwal, 2023-06-17      *Microwave & Radar Engineering* V. S. Bagad, 2009

Propagation Through Waveguides Rectangular waveguide Solution of wave equation in rectangular co ordinates Derivation of field equations for TE and TM modes degenerate and dominant mode Power transmission and power loss Excitation of waveguides Non existence of TEM mode in waveguides Introduction to circular waveguides Stripline and microstripline Microwave Cavity Resonators Rectangular and cylindrical cavities Quality factor Excitation of cavities Microwave Components Waveguide couplings Bends and twists Transitions Directional couplers Hybrid couplers Matched load attenuators and phase shifters E plane H plane and Hybrid tees hybrid ring Waveguide discontinuities Windows Irises and tuning screws Detectors Wave meters Isolators and circulators Tunable detector Slotted line carriage VSWR meter Scattering matrix Microwave Measurements Measurement of frequency Wave length VSWR Impedance Attenuation Low and high power Radiation pattern Limitation of conventional active devices at microwave frequency Microwave Tubes Klystron Reflex Klystron Magnetron TWT BWO Their schematic Principle of operation Performance characteristics and applications Microwave Semiconductor Devices PIN diode Tunnel diode LSA diode Varactor diode Gunn devices IMPATT and TRAPATT Their principle of operation Characteristics and applications Principles of Radar Radar block diagram operation Radar range equation Radar frequencies Pulse and C W radar Introduction to Doppler and M T Radar Applications Radar Transmitters and Devices Block diagram of radar receiver for C W and pulse radar front end amplifier Receiver noise figure Duplexers radar antennas Radar displays Introduction to radar clutter      *Microwave And Radar Engineering (2nd Edition)* R. Gowri, 2009-01-01      Microwave and Radar Engineering Er. Rajesh Dhiman, 2014      **Fundamental of Microwave & Radar Engineering** K K Sharma, 2011 For B E B Tech Students This book is intended as an introductory text on MICROWAVE and RADAR ENGINEERING The fundamentals principle on microwave theory and techniques are thoroughly explained in the simplest language IT contains comprehensive up to date text for a standard course on transmission lines waveguides passive waveguide components ferrite devices microwave tubes microwave semiconductor devices microwave measurements microwave antennas and various microwave communication systems This book also covers the RADAR system and microwave propagation at length This written text is supplemented with a large number of suitable diagrams

photographs and a good number of solved examples for better understanding of subject *Microwave and Radar Engineering with Lab Manual* Vinith Chauhan,2015 **Handbook of Microwave and Radar Engineering** Anatoly Belous,2021-01-04 This comprehensive handbook provides readers with a single source reference to the theoretical fundamentals physical mechanisms and principles of operation of all known microwave devices and various radars The author discusses proven methods of computation and design development process schematic schematic technical and construction peculiarities of each breed of the microwave devices as well as the most popular and original technical solutions for radars Coverage also includes the history of creation of the most widely used radars as well as guidelines for their potential upgrading Offers readers a comprehensive systematized view of all contemporary knowledge acquired during the last 20 years on radars and related disciplines Provides a single source reference on the physical mechanisms and principles of operation of the basic components of radio location devices including theoretical aspects of designing the necessary high efficiency electronic devices and systems as well as key practical methods of computation and design Presents complex topics using simple language minimizing mathematics *Microwave and Radar Engineering* Gottapu Sasi Bhushana Rao,2014 **Microwave and Radar Engineering** Ravi Garg,Ankaj Gupta,2012 **Microwave, Radar & RF Engineering** Prakash Kumar Chaturvedi,2018-06-20 This is a textbook for upper undergraduate and graduate courses on microwave engineering written in a student friendly manner with many diagrams and illustrations It works towards developing a foundation for further study and research in the field The book begins with a brief history of microwaves and introduction to core concepts of EM waves and wave guides It covers equipment and concepts involved in the study and measurement of microwaves The book also discusses microwave propagation in space microwave antennae and all aspects of RADAR The book provides core pedagogy with chapter objectives summaries solved examples and end of chapter exercises The book also includes a bonus chapter which serves as a lab manual with 15 simple experiments detailed with proper circuits precautions sample readings and quiz viva questions for each experiment This book will be useful to instructors and students alike

**Microwave and Radar Engineering** M. Kulkarni,2003 **Microwaves And Radar Principles And Applications** A K Maini,1999 *Microwave technology, radar engineering* ,1990 **Microwave & Radar** Bs Nair,2009-01-01 This textbook on MICROWAVE AND RADAR discusses the theory of microwave engineering and radar technology in eight units Units 1 to 6 deal with microwaves and Units 7 and 8 deal with radar The discussion starts with the different aspects of microwave transmission lines like transmission line equations standing wave theory and reflection and transmission of signals through transmission lines A detailed discussion on the versatile Smith chart is also made in this unit Unit 2 is an extension of Unit 1 and in this unit we analyze the theory of various types of waveguides and also discuss passive microwave components such as cavity resonators directional couplers isolators etc Unit 3 deals with various types of microwave diodes such as the Gunn Read IMPATT TRAPATT BARITT diodes and parametric amplifiers In Unit 4 the principles of microwave network theory using

various two port parameters and the S parameter are described S matrix representation of various microwave passive devices is also made in this unit More passive microwave components such as the co axial connectors phase shifters and magic tee are discussed in Unit 5 In Units 6 we discuss the theory and analysis of various microstrip lines The last two units are devoted for describing the basic principles of radar In these units we discuss the basic radar range equation pulsed radar various forms of MTI radar and pulse Doppler radar Features Simple and lucid presentation Physical and intuitive approach Diagrams and sketches are aplenty Worked examples in abundance Review questions to highlight Contents Microwave Transmission Lines Microwave Waveguides Components Microwave Diodes Microwave Network Theory Passive Devices Microwave Passive Devices Strip Lines Introduction to Radar MTI Pulse Doppler Radar *Microwave Sensing Technology with Emphasis on Synthetic Aperture Radar Systems* University of Michigan. Engineering Summer Conferences,1979

**Microwave Noncontact Motion Sensing and Analysis** Changzhi Li,Jenshan Lin,2013-11-11 An authoritative guide to the theory technologies and state of the art applications in microwave noncontact sensing and analysis Engineering researchers have recently developed exciting advances in microwave noncontact sensing and analysis with new applications in fields ranging from medicine to structural engineering manufacturing to transportation This book provides an authoritative look at the current state of the art in the field Drawing upon their years of experience in both cutting edge research and industry applications the authors address microwave radar for both noncontact vital sign detection and mechanical movement measurement They explore key advances in everyday applications of microwave and Doppler radar especially in the areas of radio frequency technologies microelectronic fabrication processes and signal processing hardware and algorithms Microwave Noncontact Motion Sensing and Analysis Reviews the theory and technical basics from electromagnetic propagation to signal processing Discusses all major types of motion sensing radar including Doppler pulse and FMCW Explores important advances in detection and analysis techniques Uses numerous case studies to illustrate current applications in an array of fields Provides integrated coverage of human vital sign detection through wall radar and Doppler vibrometry Offers a well informed look at emerging technologies and the shape of things to come An important resource for engineers and researchers with a professional interest in micro wave sensing technology Microwave Noncontact Motion Sensing and Analysis is also a source of insight and guidance for professionals in healthcare transportation safety the military and law enforcement

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