



MICROWAVE THEORY AND TECHNIQUES

PROF. GIRISH KUMAR

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IIT Bombay

TYPE OF COURSE : Rerun | Elective | UG/PG

COURSE DURATION : 12 weeks (26 Jul'21 - 15 Oct'21)

EXAM DATE : 24 Oct 2021

INTENDED AUDIENCE : Electrical, Electronics and communications Engineering

PRE-REQUISITES : Electromagnetic Waves

INDUSTRIES APPLICABLE TO : Telecom industry, defense industry and space organization

COURSE OUTLINE :

The course will be broadly focusing on analysis, design and development of microwave circuits and systems. The course will cover introduction to Microwaves, Microwave transmission modes, Transmission lines, Impedance Matching, Microwave Network Analysis, Directional Coupler, Power Divider, Microwave Filters, Microwave Attenuator, RF switches and phase shifters, Microwave Amplifiers, Low Noise Amplifier, Microwave Mixers and Oscillators, Microwave Antennas, Microwave Measurements, Microwave Systems, Effect of Microwaves on human body, RF MEMS, Microwave Imaging, etc.

ABOUT INSTRUCTOR :

Prof. Girish Kumar received the Ph.D. degree in Electrical Engineering from Indian Institute of Technology (IIT) Kanpur, India, in 1983. From 1983 to 1985, he was a Research Associate with the Electrical Engineering Department, University of Manitoba, Winnipeg, Canada. From 1985 to 1991, he was an Assistant Professor with the Electrical Engineering Department, University of North Dakota, Grand Forks, ND, USA. Since 1991, he is with IIT Bombay, India, where he is currently a Professor in the Electrical Engineering Department. He has authored more than 300 papers in the international and national journals and conference proceedings. He is an author of three books and filed seven patents. His research interests include microstrip antennas and arrays, broadband antennas, microwave integrated circuits and systems.

COURSE PLAN :

Week 01 : Introduction to Microwaves: History and Applications, Effect of Microwaves on human body

Week 02 : Microwave Transmission Modes, Waveguides, Transmission Lines

Week 03 : Smith Chart, Impedance Matching, ABCD and S-Parameters

Week 04 : Power dividers, Combiners, Couplers

Week 05 : Microwave Filters

Week 06 : Microwave Diodes and Attenuators, RF Switches, Phase Shifters

Week 07 : Microwave Transistors, Amplifiers and LNA

Week 08 : Power Amplifiers and Microwave Tubes

Week 09 : Microwave Oscillators and Mixers

Week 10 : Antennas – Fundamentals, Dipole, Monopole, Arrays, Microstrip, Horn, Helical, Yagi-Uda, Log-Periodic and Reflector Antennas

Week 11 : RF MEMS and Microwave Imaging, Microwave Systems, Microwave Measurements and Lab Demonstration

Week 12 : Software Session