



ELECTROMAGNETIC WAVES IN GUIDED AND WIRELESS MEDIA

PROF. PRADEEP KUMAR K

Department of Electrical Engineering
IIT Kanpur

TYPE OF COURSE : Rerun | Elective | UG/PG

COURSE DURATION : 8 weeks (21 Feb'22 -15 Apr'22)

EXAM DATE : 24 Apr 2022

INTENDED AUDIENCE : Undergraduate students and first year graduate students

PRE-REQUISITES : Vector analysis, Electrostatics, and Magnetostatics

INDUSTRIES APPLICABLE TO : Of interest to all companies that deal with electromagnetic waves and wireless communications. In addition, DRDO, ISRO, etc will value the course.

COURSE OUTLINE :

A thorough understanding of propagation and radiation of electromagnetic waves in both wired and wireless media is important in many fields such as microwave and RF engineering, antennas, wireless communications, and fiber-optics. In this course, we discuss guided electromagnetic wave propagation in transmission lines and metallic waveguides, light propagation in optical waveguides, fibers, and free-space. In the final part of the course, we cover basic concepts of antennas and channel models for wireless communications. Pre-requisites include familiarity with vector analysis and vector calculus, electrostatics, and magnetostatics. Assignments include both conceptual and computational problems.

ABOUT INSTRUCTOR :

Dr. K Pradeep Kumar is currently an Associate Professor in the Department of Electrical Engineering at IIT Kanpur. His research interests include Quantum key distribution, optical communications, and nonlinear fiber optics. He has taught several popular NPTEL courses on Electromagnetics and Fiber-Optics.

COURSE PLAN :

Week 01 : Transmission lines

Week 02 : Applications of transmission lines

Week 03 : EM waves in free-space

Week 04 : Diffraction of EM waves

Week 05 : Guided waves in metallic waveguides

Week 06 : Guided waves in dielectric waveguides

Week 07 : Fundamentals of radiation

Week 08 : Wireless channel modeling