


INTRODUCTION TO METHODS OF APPLIED MATHEMATICS

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PREREQUISITES : Some basic knowledge of Calculus, Differential Equations, Topics related to Mathematics – I, II will be an advantage.

INTENDED AUDIENCE : Any Interested Learners

COURSE OUTLINE

This course is aimed at final year undergraduate and graduate students in engineering, physics and applied mathematics. This will cover the very important and essential topics used by almost all branches of Science and engineering.

ABOUT INSTRUCTOR

Prof. Vivek Kumar Aggarwal in presently worked as an Assistant Professor dept. of Applied Mathematics, DTU Delhi. He earned his PhD in Mathematics from IIT Kanpur in 2005.

Prof. Mani Mehra is presently working as an Associate Professor in the department of Mathematics, IIT Delhi. She earned her PhD from IIT Kanpur in 2005.

COURSE PLAN

Week 1 :Introduction to first order linear and non-linear ordinary differential equations (ODE), Riccati equation

Week 2 : Solving second order ODE

Week 3 :Introductions to Green's functions for second order linear ODE

Week 4 :Introduction to Adjoint operators and their Green's functions

Week 5 :Laplace Transforms and its properties

Week 6 : Application of Laplace Transforms to solve ODE

Week 7 :Introduction to Fourier Series

Week 8 :Fourier integrals and Fourier Transform and properties

Week 9 :Riesz bases, frames and orthonormal bases and shortcoming of Fourier Series

Week 10: Shortcomings of Fourier transforms, Gabor transform, Window Fourier Transform, Multiresolution Analysis

Week 11:Daubechies wavelet, wavelet series and wavelet transform and different properties of wavelets

Week 12:Revision and Problem-solving sessions