MA 108 - Differential Equations
Information Booklet, May-June 2022

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Aim of the course

This core course aims at introducing students to the basic concepts of ODEs with an introduction to methods for solving them, and existence and uniqueness conditions for the solution.

The course starts with first order ODEs. First we explore separable equations, linear ODEs, exact equations, integrating factors. Then we move on to Bernoulli equations, orthogonal trajectories and Picard's theorem.

In the second part we consider second order linear ODEs. Some of the topics are linear dependence and wronskians, Abel-Liouville formula, linear ODEs with constant coefficients, Cauchy-Euler equations, method of undetermined coefficients and method of variation of parameters. We generalize all these concepts to n^{th}-order linear ODEs.

In the third part we introduce Laplace transform method of solving ODEs. The course material is of fundamental importance in engineering mathematics.

Course contents

See http://www.math.iitb.ac.in/assets/pdf/btech.pdf and the reference books given there.

Lectures and Tutorials

There will be 3 hours of lectures and 1 hour of tutorial in each week. Divisions 1 and 4 will have their lectures on the zoom channel zoom9@iitb.ac.in while Divisions 2 and 3 will have their lectures on the zoom channel zoom18@iitb.ac.in

Attendance Policy

If you miss an exam for valid medical reasons, submit a medical certificate to Prof. Santanu Dey.

Grading Policy

There will be 1 quiz and one end-semester examination. The allotted 50 marks will be split as follows:

Common quiz : 15 marks
Endsem exam : 35 marks