# TRANSFORM CALCULUS AND ITS APPLICATIONS IN DIFFERENTIAL EQUATIONS

MATHEMATICS

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**TYPE OF COURSE** : New | Core | UG/PG
**INTENDED AUDIENCE** : All UG/PG students
**COURSE DURATION** : 12 weeks (28 Jan'19 - 19 Apr'19)
**EXAM DATE** : 28 April 2019

## COURSE OUTLINE :

For undergraduate students in the discipline of Mathematics, the course on Transform Calculus has become an integral part. This course is designed to train students with the basic Integral Transform techniques. Application of these transforms techniques in solving ordinary differential equations and partial differential equations will be discussed. We will also introduce some higher level concepts that will prepare them for future research and development projects.

## ABOUT INSTRUCTOR :

Adrijit Goswami joined the Institute as a Faculty member in 1992. He received his M.Sc. and Ph.D. degree from Jadavpur University, India in 1985 and 1991 respectively. His research interest and publications have been on Operations Research and Theoretical Computer Science. His initial interest has been in developing mathematical models in Inventory Control under deterministic, probabilistic and fuzzy environment. For the past several years he has been involved in various aspects of database systems, data mining and cryptography and computer network as a researcher.

## COURSE PLAN :

**Week 01** : Introduction to Laplace transform: Definition and properties
**Week 02** : Laplace Transform of derivatives and integrals
**Week 03** : Laplace Transform of some special functions
**Week 04** : Inverse Laplace Transform
**Week 05** : Application of Laplace Transform to Ordinary Differential Equations and Integral Equations
**Week 06** : Fourier Series
**Week 07** : Introduction to Fourier Transforms: Definition and properties
**Week 08** : Fourier Sine and Cosine transforms of different functions
**Week 09** : Parseval's Identity for Fourier Sine and Cosine Transforms
**Week 10** : Application of Fourier Transform to Ordinary Differential Equations and Integral Equations
**Week 11** : Application of Fourier Transform to Partial Differential Equations
**Week 12** : Finite Fourier transform and its application to Boundary Valued Problems