

FOURIER ANALYSIS

Course No: **MM24304CR**

Semester: **M.A/M.Sc 3rd Semester**

Continuous Assessment: **Marks 10, Theory Marks: 40**

Total Credits: **02**

Total Marks: **50**

Time Duration: **1½ Hrs**

Course objectives: The primary object of this course is to develop Fourier series and Fourier transforms and give conceptual knowledge of Fourier Series and its applications to heat flow and vibrating string problems.

Course Outcomes: The course enables students in developing understanding of Fourier series, Fourier transforms, and their applications in various mathematical and scientific contexts.

UNIT -I

Fourier Series: Motivation and definition of Fourier series, Fourier series over the interval of length 2π , change of the interval, the complex exponential Fourier series, criteria for the convergence of Fourier series, Riemann-Lebesgue lemma, convergence at a point of continuity and at a point of discontinuity, uniform convergence and convergence in mean of the Fourier series.

UNIT -II

Derivatives and Integrals of Fourier Series: Differentiation of Fourier series, differentiation of the sine and cosine series, convergence theorems related to the derived Fourier series, integration of Fourier series, applications of Fourier series to Heat flow and Vibrating string problems.

Books Recommended.

1. E. M. Stein and R. Shakarchi, Fourier Analysis, An Introduction, Princeton University Press, 2002.
2. K. B. Howell, Principles of Fourier Analysis, Chapman & Hall/ CRC, Press, 2001.
3. Lokenath Debnath, Wavelet Transforms and their Applications, Birkhauser, 2002.
4. G. P. Tolstov, Fourier Series, Dover, 1972.
5. I. G. Loukas, Modern Fourier Analysis, Springer, 2011.
6. G. B. Folland, Fourier Analysis and Its Applications, Brooks/Cole Publishing, 1992.