MA102   Mathematics II

Credit: 2 -1 -0- 3   Approval: Approved in 1st Senate

Prerequisites: Consent of the faculty member

Students intended for: B.Tech. First Year

Elective or Core: Core   Semester: Even

Course objective:

The objective of this course is to introduce the basics of multivariable calculus and Integral Transformers and their applications. The course aims to make the students understand the basic concepts of multiple integrals, vector calculus, Laplace and Fourier transformers, Fourier series and their applications in various engineering problems.

Course Contents:

- **Integral Calculus:** Double and Triple Integrals, Change of Order of Integartion, Change of Variables, Gamma, Beta functions, Dirichelte's Integral. Application (Evaluation of surface area, Volume, Centre of Gravity, Moment of Inertia).

- **Vector Calculus:** Differentiation of Vectors, Gradient, Divergence, Curl and their Physical meaning, Differential Operators and their identities. Line and Surface Integrals. Green's Theorem in a plane. Gauss Divergence Theorem and Stoke's theorem and their applications.

- **Laplace Transform:** Definition, Shifting Theorems, Transform of Derivatives, Differentiation and Integration. Differentiation and Integration of Transforms, Haviside unit step and Dirac-Delta functions. Inverse Laplace Transforms, Solution of Ordinary Differential Equations in Mechanics, Electric Circuits and bending of Beams using Laplace Transforms.

- **Fourier Series:** Trigonometric Fourier Series. Half Range series, Harmonic Analysis.

- **Fourier Transforms:** Definition, Fourier sine and Cosine Transforms, Fourier Integral Formula and Applications

  Text Books:

  1. E.Kreyszig, "***Advanced Engineering Mathematics***", 9th Edition, John (2007). hn Wiley

  2. George B. Thomas, Maurice D. Weir, Joel Hass, Frank R. Giordano, "***Thomas'Calculus***" Pearson, 11th Edition (2004).

  3. Lokenath Debnath, Dambaru Bhatta, "***Integral Transforms And Their Applications***", 2nd Edition, Chapman & Hall/CRC (2006).

  References:

  1. Ian N. Sneddon, "***Fourier Transforms***", Dover Publications (2010).

  2. C Jeormropldan Ey. (M2a0r0s4d)e. n, Anthony J. Tromba, "***Vector Calculus***", 5ed, W. H. Freeman

  3 . Wilfred Kaplan, "***Advanced Calculus***", Addison Wesley Longman (2002).