ENGINEERING MATHEMATICS-II

Course Code: BECSE1C020

Course Title: Engineering Mathematics-II

Semester: II

Credits: 03

Rationale

To familiarize with the important tools and theorems of integral calculus and transforms essential in all the branches of engineering. It will also develop the in-depth knowledge of types and operations on vector calculus, laplace and fourier transforms.

Course Outlines

Contents	No. of Lectures
Unit - I Integral Calculus: Convergence of improper integrals; Beta and Gamma integrals; Differentiation under integral sign; Double and Triple integrals - computation of surface areas and volumes; change of variables in double and triple integrals.	**10**
Unit - II Vector Calculus: Scalar and vector fields; vector differentiation; level surfaces; directional derivative; gradient of a scalar field; divergence and curl of a vector field;	**10**
Unit -III Laplacian: Line and Surface integrals; Green's theorem in a plane; Stoke's theorem; Gauss Divergence theorem.	**10**
Unit - IV Laplace Transforms: Laplace transforms; inverse Laplace transforms; Properties of Laplace transforms; Laplace transforms of unit step function, impulse function, periodic function; Convolution theorem.	**10**
Unit - V Fourier Transforms: Fourier transformation and inverse transforms - sine, cosine transformations and inverse transforms - simple illustrations.	**10**

Course Outcomes

Upon successful completion of this course, candidates will be able to:

- Analyze improper integrals
- Evaluate multiple integrals in various coordinate systems
- Apply the concepts of gradient, divergence and curl to formulate engineering problems

- Convert line integrals into surface integrals and surface integrals into volume integrals
- Apply Laplace transforms and Fourier transforms to solve physical problems arising in engineering.

Text Books

1. B. S. Grewal, "Higher Engineering Mathematics", 42nd Edition, Khanna Publications, 2019
2. Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley and Sons, 8th Edition, 2015.

Reference Books

1. R. K. Jain and S. R. K. Iyengar, "Advanced Engineering Mathematics", Narosa Publishing House, 5th Edition, 2016.
2. George B. Thomas and Ross L. Finney, “Calculus and Analytic Geometry, Pearson, Ninth Edition, 2020
3. Dennis G. Zill, “Advanced Engineering Mathematics”, Jones & Bartlett Learning, Sixth Edition, 2018