Department of Mathematical and Computational Sciences
National Institute of Technology Karnataka, Surathkal
Course Plan and Evaluation Plan

Course Code	: MA110
Course Title	: Engineering Mathematics - I
L-T-P	: 3-0-0 (Credits 03)
Course Instructor	: Dr. P. Sam Johnson https://sam.nitk.ac.in/
Course Webpage	: https://sam.nitk.ac.in/MA110.html
Teaching Department	: Mathematical and Computational Sciences (MACS)
Course coverage	: 40hrs Lecture Schedule
Objective of the course	: To expose the students to the calculus of two or more variables and to the theory of Integration over general curves and surfaces
Skill development of the student expected from the course	: Understanding the concept of limits, continuity, differentiability and integration of functions of two or more variables; capability to analyze and solve problems in integral calculus and vector calculus effectively.

Contents

- Functions of two or more variables: Definition, Region in a plane, Level curves, Level surfaces, Limits, Continuity, Partial derivatives, Differentiability, Gradients, Directional derivatives, Normals to level curves and tangents, Extreme values and saddle points, Lagrange multipliers. (Sections 14.1-14.3, 14.4 (Theorems 5 & 6), 14.5-14.8; [1])
- Integral Calculus: Double Integrals, Areas, Double Integrals in Polar Form, Triple Integrals in Rectangular Coordinates, Triple integrals in Cylindrical and Spherical coordinates, Substitutions in Multiple Integrals. (Sections 15.1-15.5, 15.7-15.8; [1])
- Vector Calculus: Line Integrals (exclude "mass and moment calculations"), Vector Fields, Work, Circulation and Flux, Path Independence, Potential Functions, and Conservative Fields, Green's Theorem in the Plane, Surface Area and Surface Integrals, (exclude "mass and moments of thin shells"), Parametrized Surfaces, Stokes' theorem (without proof), The Divergence theorem (without proof), (exclude Gauss's Law of Electromagnetic Theory and the Continuity Equation of Hydrodynamics). (Sections 16.1-16.8; [1])

Reference Books :

1. **Joel Hass, Christopher Heil and Maurice D. Weir, Thomas' Calculus, 14th Edition, Pearson.**
2. R. Courant and F.John, Introduction to calculus and analysis, Volume II, Springer-Verlag
3. N. Piskunov, Differential and Integral Calculus, Vol I & II (Translated by George Yankovsky).
4. E. Kreyszig, Advanced Engineering Mathematics, Wiley Publishers.

Evaluation Plan :

Sl.No.	Exam	Weightage (%)	Date of exam	Tentative syllabus (Sections as per Ref [1])
1	Quiz 1	15	December 12, 2022 (Tentative)	14.1 to 14.8
2	Midsem	20	As per Institute schedule	14.1 to 14.8, 15.1 to 15.4
3	Quiz 2	15	February 06, 2023 (Tentative)	15.5, 15.7 to 15.8, 16.1 to 16.3
4	Endsem	50	As per Institute schedule	Entire course content

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