SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY
I B.Tech, I -Semester
(18HS0830) Mathematics-I
(Common to all branches)

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Course Objectives:

The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariate analysis and linear algebra. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines. More precisely, the objectives are:

- To introduce the idea of applying differential and integral calculus to notions of curvature and to improper integrals. Apart from some applications it gives a basic introduction on Beta and Gamma functions.
- To introduce the fallouts of Rolle's Theorem that is fundamental to application of analysis to Engineering problems.
- To develop the tool of power series and Fourier series for learning advanced Engineering Mathematics.
- To familiarize the student with functions of several variables that is essential in most branches of engineering.
- To develop the essential tool of matrices and linear algebra in a comprehensive manner.

Course Outcomes:

The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariate analysis and linear algebra. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

UNIT – I
Matrices: (10 hours)
Inverse and rank of a matrix; System of linear equations; Symmetric,skew-symmetric and orthogonal matrices; Eigen values and eigen vectors; Diagonalization of matrices; Cayley-Hamilton Theorem, and Orthogonal transformation.

UNIT – II
Calculus: (8hours)
Evaluation of definite and improper integrals; Applications of definite integrals to evaluate surface areas and volumes of revolutions; Beta and Gamma functions and their properties. Rolle'sTheorem, Mean value theorems (without proof) Taylor's and Maclaurin's theorems.

UNIT – III
Multivariable Calculus :(*Differentiation*)(8 hours)
Limit, continuity and partial derivatives, total derivative; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, directional derivatives, curl and divergence.

UNIT – IV
Sequences and Series (6hours)
Convergence of sequence and series, tests for convergence (Geometric test, P- test, limit comparison test, D' Alember ratio test, Cauchy' s nth root test); Power series, Taylor's series, series for exponential, trigonometric and logarithm functions.

UNIT-V

Fourier Series: (8hours)

Determination of Fourier coefficients- Fourier series- Even and odd functions, Fourier Series in an arbitrary interval, Periodic function, Half range sine and cosine series.

Text Books:
1. *Higher Engineering Mathematics*, B.S.Grewal, Khanna publishers-42nd Edition(2012)
2. *Engineering Mathematics Volume-I,* by T.K.V. Iyengar, S.Chand publication-12thEdition
3. A Text book of B.Sc. mathematics volume-II, V.Venkateswara Rao S.Chand Publications

References:

1. Ramana B.V. Higher Engineering Mathematics,Tata McGraw Hill New Delhi,11thReprint, 2010.
2. Engineering mathematics, volume-I&II, E.Rukmangadachari & E.Keshava Reddy
Pearson Publishers.
3. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, LaxmiPublications, Reprint, 2008.
5.Bhavanari Satyanarayana, T.V.Pradeepkumar&D.Srinivasulu "Linear Algebra & Vector Calculus", Studera Press, New Delhi.