

Mathematics Course Structure
B.Sc. Common Core Syllabus for All the Students Admitted
From the Academic Year 2025-2026 Batch onwards

Year	Paper	Seme-ster	Subject	Hours per Week	Credits	Marks IA	Marks SEE	Total Marks	Total Marks
I	DSC I	I	Differential Equations	5+1	5	30	70	100	3hrs
	DSC II	II	Real Analysis	5+1	5	30	70	100	3 hrs
II	DSC III	III	Differential and Vector Calculus	5+1	5	30	70	100	3 hrs
	DSC IV	IV	Algebra	5+1	5	30	70	100	3 hrs
III	DSC V	V	Linear Algebra	5+1	5	30	70	100	3 hrs
	DSC VI	VI	a. Numerical Analysis	5+1	5	30	70	100	3 hrs
			b. Integral Transforms						3 hrs
			c. Analytical Solid Geometry						3 hrs
	SEC 4	VI	a. Number Theory	2	2	10	40	50	3 hrs
			b. Quantitative Aptitude						3 hrs
	MDC	V	Basic Mathematics	4	4	30	70	100	3 hrs


H.O.D.
 Dept. of Mathematics
SSR DEGREE COLLEGE
 NIZAMABAD

M. Sanjiv



VC Nominee
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 Department of Mathematics

SEMESTER- I
DIFFERENTIAL EQUATIONS

Theory: 5 hours /week and Tutorials: 1 hour /week

DSC-I

Objective: The main aim of this course is to introduce the student to the techniques of solving Differential Equations and to apply their skills in solving some of the problems of Engineering and Science.

Outcome: After learning the course, the student will be equipped with various tools to solve few types of Differential Equations that arise in several branches of science.

UNIT- I

Differential Equations of First Order and First Degree: Introduction- Equations in Which Variables are Separable – Homogeneous Differential Equations - Differential Equations Reducible to Homogeneous Form – Linear Differential Equations - Differential Equations Reducible to Linear Form – Exact Differential Equations – Integrating Factors – Change in Variables (Text Book : 2.1 to 2.9)

UNIT- II

Equations of First Order But Not of The First Degree: Case I: Equations Solvable for p -Case II : Equations Solvable for y - Equations Solvable for x – Equations that do not Contain x (or y) - Equations Homogeneous in x and y – Equations of First Degree in x and y – Clairaut's Equation.

Applications of First Order Differential Equations: Growth and Decay – Dynamics of Tumor Growth – Radioactivity and Carbon Dating – Compound Interest – Orthogonal Trajectories.

(Text Book : 3.1 to 3.2 & 4.1 to 4.4 & 4.20)

UNIT- III

Higher Order Linear Differential Equations: Introduction - Solution of Homogeneous Linear Differential Equations of Order n with Constant Coefficients - Solution of the Non-Homogeneous Differential Equations with Constant Coefficients by Means of Polynomial Operators - Method of Undetermined Coefficients. (Text Book : 5.1 to 5.4)

UNIT- IV

Method of variation of Parameters – Linear Differential Equations with Non-Constant Coefficients – The Cauchy – Euler Equation – Legendre's Linear Equations – Miscellaneous Differential Equations.

Total Differential Equations – Simultaneous Total Differential Equations – Equations of the form $\frac{dx}{p} = \frac{dy}{q} = \frac{dz}{R}$. (Text Book : 5.5 to 5.9 & 2.10 to 2.12)

TEXT BOOK:

Zafar Ahsan, Differential Equations and Their Applications (Second Edition)

REFERENCE BOOKS :

1. Frank Ayres Jr, Theory and Problems of Differential Equations.
2. Ford, L.R ; Differential Equations.
3. Daniel Murray, Differential Equations.
4. S. Balachandra Rao, Differential Equations with Applications and Programs.
5. Stuart P Hastings, J Bryce McLead; Classical Methods in Ordinary Differential Equations.


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SEMESTER- II
REAL ANALYSIS

Theory: 5 hours /week and Tutorials: 1 hour /week

DSC-II

Objective: The course is aimed at exposing the student to the foundations of analysis which will be useful in understanding various physical phenomena.

Outcome: After the completion of the course the student will be in a position to appreciate the beauty and applicability of the course.

UNIT-I

Real Numbers: Field Structure and Order Structure-Bounded and Unbounded Sets- Completeness in the Set of Real Numbers- Absolute Value of a Real Number (Text Book : Chapter 1: 2 to 5)

Open Sets, Closed Sets and Countable Sets : Limit Points of a Set-Closed Sets-Countable and Uncountable Sets (Text Book : Chapter 2 : 2 to 4)

Real Sequences: Sequences-Limit points of a Sequence-Convergent Sequences-Non-Convergent Sequences (Definitions)-Cauchy's General Principle of Convergence- Algebra of Sequences- Some Important Theorems-Monotonic Sequences.(Text Book : Chapter 3: 1 to 2 & 4 to 9)

UNIT-II

Infinite Series : Introduction-Positive Term Series- Comparison Tests for Positive Term Series- Cauchy's Root test- D'Alembert's Ratio Test-Integral Test-Alternating Series(Leibnitz Test). (Text Book : Chapter 4 : 1 to 5, 8 & 10.1)

Functions of a Single Variable (I): Limits-Continuous Functions-Functions Continuous on Closed Intervals. (Text Book : Chapter 5: 1 to 3)

UNIT -III

Functions of a Single Variable (II):The Derivative-Increasing and Decreasing Functions- Rolle's Theorem-Lagrange's Mean Value Theorem- Cauchy's Mean Value Theorem- Higher Order Derivatives. (Text Book : Chapter 6: 1, 3 & 5 to 8)

UNIT -IV

The Riemann Integral: Definition and Existence of the Integral-Refinement of Partitions-Darboux's Theorem-Conditions of Integrability-Integrability of the Sum and Difference of Integrable Functions-The Integral as a Limit of Sums-Some Integrable Functions-Integration and Differentiation-The Fundamental Theorem of Calculus. (Text Book : Chapter 9: 1 to 9)

TEXT BOOK :

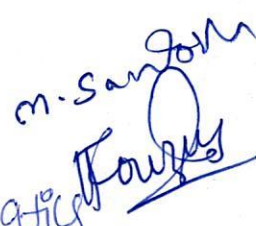
S.C. Malik and Savita Arora, Mathematical Analysis, Fourth Edition, New Age International Publishers

REFERENCE BOOKS:

1. Kenneth A Ross, Elementary Analysis-The Theory of Calculus
2. William F. Trench, Introduction to Real Analysis
3. Lee Larson, Introduction to Real Analysis I
4. Shanti Narayan and Mittal, Mathematical Analysis
5. Brian S. Thomson, Judith B. Bruckner, Andrew M. Bruckner; Elementary Real analysis


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