

<b>BSL-105-A</b>	<b>DIFFERENTIAL EQUATIONS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Cr.</b>
		<b>4</b>	<b>0</b>	<b>0</b>	<b>4</b>

**Common for B Sc (General, Electronics, Computer Science and Information Technology)**

**SECTION-A**

**UNIT-I**

Order and Degree of a differential equation. Differential equations of first order and first degree, variables separable, homogeneous equations. Linear equations and equations reducible to linear form. Exact differential equations and equations reducible to exact forms.

**UNIT-II**

Differential equations of first order but not of first degree. Solvable for x, y, p Clairaut's form, singular solutions. Geometrical meaning of a differential equation, orthogonal trajectories.

**UNIT-III**

Linear differential equations with constant coefficients, Homogeneous linear differential equations, Total differential equations. Linear differential equations of second order. Method of variation of parameters.

**SECTION-B**

**UNIT-IV**

Laplace transformation- Linearity of Laplace transformation. Existence theorem for Laplace transforms. Laplace transforms of derivatives and integrals. Shifting theorems. Convolution theorem. Inverse Laplace transforms

**UNIT-V**

Partial differential equations of first order, Lagrange's solution. Charpit's general method of solution.

**UNIT-VI**

Partial differential equations of second and higher orders. Classification of linear partial differential equations of second order. Homogeneous and non-homogeneous equations with Constant coefficients.

**NOTE:**

1. The syllabus is divided into 2 sections comprising three units each. Total seven questions would be set. One question would be compulsory that would comprise all the units. Remaining six questions will be set from both the sections taking three questions from each section. Students need to attempt at least two questions from each section. A student has to attempt five questions in all.
2. Use of Ordinary calculator is allowed.

**Text Books:-**

1. Differential Equations And Integral Transforms: Pundir & Singh ,Pragati Publication ,Meerut.
2. Ordinary and Partial Differential Equations :M.D.Raisinghania,S.Chand & Company Ltd. New Delhi.

**Books recommended for reference :-**

1. M. Ray, J.C. Chaturvedi & H.S. Sharma : A Text Book of Differential Equations.
2. J.L. Bansal & H.S. Dhama : Differential Equations Vol. I & II, Jaipur Publishing House,Jaipur.
3. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley and Sons Inc., New York, 1999.

<b>BSL-106-A</b>	<b>REAL ANALYSIS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Cr.</b>
		<b>4</b>	<b>0</b>	<b>0</b>	<b>4</b>

**Common for B Sc (General, Electronics, Computer Science and Information Technology)**

**SECTION-A**

**UNIT – I**

The set of real numbers, Intervals, Definition of a sequence, Theorems on limit of sequence, bounded and monotonic sequences, nested interval theorem, Cauchy's sequence, and Cauchy's convergence criterion.

**UNIT – II**

Convergence of series of non-negative terms, their various tests (Comparison, D'Alembert's ratio, Cauchy's  $n^{\text{th}}$  root, Raabe's, Gauss, Logarithmic, De-Morgan) for convergence.

**UNIT – III**

Alternating series, Leibnitz's test, Series of arbitrary terms, absolute and conditional Convergence, Abel's and Dirichlet's tests.

**SECTION-B**

**UNIT-IV**

Equivalent sets. Finite and infinite sets denumerable sets, Countable and uncountable sets. Interior point of a set, open set, limit point of a set, Bolzano-Weierstrass theorem. Closed set. Dense in itself and perfect sets. Cantor's ternary set.

**UNIT-V**

Definition of limit of a function. Continuity of a function, Types of discontinuities. Properties of continuous functions defined on closed intervals. Uniform continuity. Differentiability, Rolle's Theorem, Lagrange's and Cauchy's mean value theorems.

**UNIT –VI**

Taylor's theorem with various forms of remainders. Darboux's intermediate value theorem for derivatives. Darboux sums and their properties.

**NOTE:**

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2. Use of Ordinary calculator is allowed.

**Text Books:-**

1. Real Analysis: Shanti Narayan, Publication, S.Chand & Company Ltd. New Delhi.
2. Mathematical Analysis: Malik and Arora, New Age International ,New Delhi.

**Books recommended for reference :-**

1. S.C. Malik, Mathematical Analysis, Wiley Estern Ltd. New Delhi.
2. S.C. Malik, Principles of Real Analysis, New Age International Ltd., New Delhi.
3. Hari Kishan, Real Analysis, Pragati Prakashan Meerut.
4. J.N. Sharma & A.R. Vasistha, Mathematical Analysis, Krishna Prakashan Mandir, Meerut