Lesson Plan: 1ˢᵗ Semester

Session-2024-2025   B.A/B.Sc – Calculus

Dr.Sandeep Kumari, Assistant Professor, Mathematics

No.Of Weeks	Section	Topics
1	Section A.	εδ definition of limit and continuity of a real valued function, Basic properties of limits
2	Section A.	Types of discontinuities, Differentiability of functions, Application of L'Hospital rule to indeterminate forms,
3	Section A.	Successive differentiation, Leibnitz theorem, Taylor's and Maclaurin's series expansion with different forms of remainder
4	Section B	Asymptotes: Horizontal, vertical and oblique asymptotes for algebraic curves, Asymptotes for polar curves
5	Section B	Intersection of a curve and its asymptotes, Curvature and radius of curvature of curves
6	Section B	curvature of curves (cartesian, parametric, polar & intrinsic forms), Newton's method, Centre of curvature and circle of curvature.
7	Section C	Multiple points, Node,
8	Section C	Cusp, Conjugate point, Tests for concavity and convexity,
9	Section C	Points of inflexion, Tracing of curves, Reduction formulae.
10	Section D	Rectification, intrinsic equation of a curve,
11	Section D	Quadrature, Area bounded by closed curves,
12	Section D	Volumes and surfaces of solids of revolution.

Books Recommended :

1. Differential and Integral Calculus : Shanti Narayan.

2. Murray R. Spiegel : Theory and Problems of Advanced Calculus. Schaun's Outline

series. Schaum Publishing Co., New York.

3. N. Piskunov : Differential and integral Calculus. Peace Publishers, Moscow.

4. Gorakh Prasad : Differential Calculus. Pothishasla Pvt. Ltd., Allahabad.

5. Gorakh Prasad : Integral Calculus. Pothishala Pvt. Ltd., Allahabad

Followed by

Dr. Sandeep Kumari

Assistant Prof. Department Of Mathematics

Govt P.G. College Mahindergarh.

Lesson Plan: 3ʳᵈ Semester

Session 2024-2025 B.A/B.Sc – Advance Calculus

Dr. Sandeep Kumari, Assistant Professor, Mathematics

No.Of weeks	Unit	Topics
1	Section A	Continuity, Sequential Continuity, properties of continuous functions, Uniform continuity, chainrule of differentiability
2	Section A	Mean value theorems; Rolle's Theorem and Lagrange's mean valuetheorem and their geometrical interpretations
3	Section A	Taylor's Theorem with various forms ofremainders, Darboux intermediate value theorem for derivatives, Indeterminate forms.
4	Section B	Limit and continuity of real valued functions of two variables. Partial differentiation. TotalDifferentials;
5	Section B	Composite functions & implicit functions. Change of variables. Homogenousfunctions & Euler's theorem on homogeneous functions.
6	Section B	Taylor's theorem for functions of twovariables.
7	Section C	Differentiability of real valued functions of two variables. Schwarz and Young's theorem
8	Section C	Implicit function theorem. Maxima, Minima
9	Section C	Saddle points of two variables. Lagrange'smethod of multipliers.
10	Section D	Curves: Tangents, Principal normals, Binormals,

		Serret-Frenet formulae. Locus of the centre ofcurvature,
11	Section D	Spherical curvature, Locus of centre of Spherical curvature, Involutes, evolutes,
12	Section D	Bertrand Curves. Surfaces: Tangent planes, one parameter family of surfaces, Envelopes

Books Recommended:

1. C.E. Weatherburn : Differential Geometry of three dimensions, Radhe Publishing HouseCalcutta

2. Gabriel Klaumber : Mathematical analysis, Mrcel Dekkar, Inc., New York, 1975

3. R.R. Goldberg : Real Analysis, Oxford & I.B.H. Publishing Co., New Delhi, 1970

4. Gorakh Prasad : Differential Calculus, Pothishala Pvt. Ltd., Allahabad

5. S.C. Malik : Mathematical Analysis, Wiley Eastern Ltd., Allahabad.

6. Shanti Narayan : A Course in Mathemtical Analysis, S.Chand and company, New Delhi

7. Murray, R. Spiegel : Theory and Problems of Advanced Calculus, Schaum Publishingco., New York

Dr. Sandeep Kumari

Department of Mathematics

Govt. P.G. College Mahindergarh

Govt.P.G. College Mahindergarh
Haryana
Lesson Plan
Session 2024-2025
Subject: Mathematics.
Semester: V   B.sc (N.M) Real Analysis
Subject code: 12BSM351

No. Of Week	Section Name	Topics
1.	Section A:	Riemann integral
2.	Section A: Cont.	Integrabililty of continuous and monotonic functions
3.	Section A: Cont.	The Fundamental theorem of integral calculus.Mean value theorems of integral calculus.
4.	Section B:	Improper integrals and their convergence, Comparison tests, Abel's and Dirichlet's tests
5	Section B: Cont.	Frullani's integral, Integral as a function of a parameter.
6.	Section B: Cont.	Continuity, Differentiability and integrability of an integral of a function of a parameter.
7.	Section C	Definition and examples of metric spaces, neighborhoods, limit points, interior points,
8.	Section C: Cont.	open and closed sets, closure and interior, boundary points, subspace of a metric space, equivalent metrics
9.	Section C : Cont.	Cauchy sequences, completeness, Cantor's intersection theorem, Baire's category theorem, contraction Principle
10.	Section D	Continuous functions, uniform continuity, compactness for metric spaces, sequential compactness,
11	Section D: Cont	Bolzano-Weierstrass property, total boundedness, finite intersection property,
12	Section D: Cont	continuity in relation with compactness, connectedness , components, continuity in relation with connectedness.

Books Recommended:

Book s Recommended: 1. P.K. Jain and Khalil Ahmad: Metric Spaces, 2nd Ed., Narosa, 2004

2. T.M. Apostol: Mathematical Analysis, Narosa Publishing House, New Delhi, 1985

3. R.R. Goldberg : Real analysis, Oxford & IBH publishing Co., New Delhi, 1970

4. D. Somasundaram and B. Choudhary : A First Course in Mathematical Analysis, Narosa Publishing House, New Delhi, 1997

5. Shanti Narayan : A Course of Mathematical Analysis, S. Chand & Co., New Delhi

6. E.T. Copson, Metric Spaces, Cambridge University Press, 1968.

7. G.F. Simmons : Introduction to Topology and Modern Analysis, McGraw Hill, 1963.

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