

Dr. Surender Kumar (Asst. Prof.)
2nd Sem. Calculus (Major)

Sr. No	Unit	Lesson Plan: Bachelor of Arts Aided: 2025-2026 Sem(II) -Calculus		Months
		Theory	Practical	
1.	Unit-1	Limit and Continuity ($\epsilon - \delta$ definition), Discontinuity & its types, Differentiability of the functions, Successive differentiation, Leibnitz rule and its applications, L' Hospital's rule: Indeterminate forms. Taylor's theorem with Lagrange's and Cauchy's forms of remainders, Maclaurin's and Taylor's series expansions	1. Study of Concavity, Convexity and point of inflexion using graph (i) $f(x) = (x - \alpha)(x - \beta)$ (ii) $f(x) = (x - \alpha)(x - \beta)(x - \gamma)$ (iii) $f(x) = x - \alpha (x - \beta)$ (iv) $f(x) = \frac{x+1}{x^2+3}$ 2. Plotting of graphs of the function $\sin(ax+b)$, $\cos(ax+b)$, $\sinh(ax+b)$, $\cosh(ax+b)$ for various values of a and b. 3. Plotting of graphs of the function e^{ax+b} , $\log(ax+b)$, $\frac{e}{ax+b}$, C^{ax+b} for various values of a, b and c. 4. Sketching parametric curves (E.g. Trochoid, Cycloid, Epicycloids, Hypocycloid).	January
2.	Unit-II	Tangent and Normal, Asymptotes of Curves in Cartesian and polar co-ordinates, Curvature, Radius of Curvature for Cartesian curves, parametric, polar and pedal form of curves, Circle of Curvature, Chord of Curvature. Concavity, Convexity and Inflexion points.	5. Determine Asymptotes in Curve using graphs: (i) $\frac{1}{x-3}$, (ii) $y = \tan x$, (iii) $y = e^{\frac{1}{x}}$, (iv) $y = x + \frac{1}{x}$, (v) $y = \frac{x^2 + 2x - 1}{x}$	February
3.	Unit-III	Tracing of curves in Cartesian, parametric and polar co-ordinates of Standard curves (Cubic curves, Semicubical Parabola, Folium of Descartes, Cardioid, Lemniscate of Bernoulli, Astroia, Rose curve, Logarithmic Spiral,	6. Form the table for Sine function, Cosine function for 0° , 1° , 2° , ..., 90° using Maclaurin's series expansion. 7. Plotting the graphs of polynomials of degree 2, 3, 4 and 5, the derivative graph, second derivative graph and comparing them.	March

		Epispiral, Cycloid, Catenary).		
4.	Unit-IV	Functions of Several Variables, Limits and Continuity, Partial Differentiation and Euler's theorem on homogenous functions, Chain rule, Directional derivatives, Gradient vector and Tangent Plane.	8. Trace the curves (i) $y^2(a^2+x^2)=x^2(a^2-x^2)$ (ii) $a^2 y^2=a^2 s^4-x^4$ 10. Sketching parametric curves (E.g. Trochoid, Cycloid, Epicycloids, Hypocycloid, Catenary) 13. Sketching Polar Curves (Cardioid, Astroid, Rose Curve, Logarithmic spiral).	April


 Dr. Surender Kumar
 Asst. Prof
 Department of Mathematics
 C.B.D.C. Rourkela

Dr.
 Sem-IVth, Mathematical Computing using Python
(Dr. Surender Kumar) (Minor)

Sr. No.	Unit	Lesson Plan: Bachelor of Arts Aided: 2025-2026 Sem (IV) (Minor) -Mathematical Computing using Python		Months
		Theory	Practical	
1.	Unit-1	Python Basics: Introduction, Thrust Area of Python, Installing Anaconda Python Distribution, Installing PyCharm, Getting Started with Python, Python as A Calculator, Installing and using Jupyter Notebook. Identifiers, Keywords, Statement and Expressions, Variables, Mathematical Operators, Precedence and Associativity, Data types, Comments, Reading Input, Print Output, Type Conversions, The Type() Function and is Operator.	Installation & Introductory Programs	January
2.	Unit-II	Control Flow Statements: The if, if...else, if...elif...else Decision Control Flow Statement, Nested if Statements, The while Loop, The for Loop, The continue and break Statements, Catching Exceptions using try and except Statement. Mathematical Function: Built-In Functions, commonly used Mathematical Modules, Mathematical Function: Definition and Calling the Function, The return Statement and void Function, Scope and Lifetime of Variables, Default Parameters.	Flow Control Programs	February
3.	Unit-III	Strings: Creating and Storing strings, Basic String Operations, Accessing Characters in String by Index Number, String Slicing and Joining, String Methods, Formatting Strings	String/List/Functions related Programs	March
4.	Unit-IV	Lists: Creating List, Basic List Operations, Indexing and Slicing in Lists, Built-In Functions Used in Lists, List Methods, The del Statement. Basic Matrix Computations using Python Programming.	Programs based on Matrices	April


Dr. Surender Kumar,
Asstt. Prof. Dept of Mathematics
C.B.D.C. Rohtak

Sem. ~~IV~~^{IVth} Real Analysis (Maths, Major)
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Sr. No.	Unit	Lesson Plan: Bachelor of Arts Aided: 2025-2026	Months
		Sem (IV)	
		Theory-Real Analysis	
1.	Unit-1	Finite and infinite sets, Countable and uncountable sets, Bounded sets, Suprema and infima, Completeness property of $\mathbb{R}$, Archimedean property of $\mathbb{R}$.	January
2.	Unit-II	Riemann integral, Integrability of continuous and monotonic functions, Fundamental theorem of integral calculus. Mean value theorems of integral calculus.	February
3.	Unit-III	Improper integrals and their convergence, Comparison tests, Abel's and Dirichlet's tests, Frullani's integral, Integral as a function of a parameter. Continuity, Differentiability and integrability of an integral of a function of a parameter.	March
4.	Unit-IV	Jacobians, Beta and Gamma functions, Double and Triple integrals, Dirichlet's integrals, Change of order of integration in double integrals.	April


 Dr. Surender Kumar
 Asstt. Prof. (Department of
 Mathematics)
 U.B.D.C. Rohlok.

Sem VIth Real and Complex Analysis (
 (Dr. Surender Kumar)

Sr. No.	Unit	Lesson Plan: Bachelor of Arts Aided: 2025-2026 Sem (VI)	Months
		Theory- Real and Complex Analysis	
1.	Unit-1	Jacobians, Beta and Gamma functions, Double and Triple integrals, Dirichlet's integrals, Change of order of integration in double integrals.	January
2.	Unit-II	Fourier's series: Fourier expansion of piecewise monotonic functions, Properties of Fourier coefficients, Dirichlet's Conditions, Parsval's identity for fourier series, Fourier series for even and odd functions, half range series, Change of Intervals.	February
3.	Unit-III	Extended complex plane, Steriographic Projection of Complex Numbers, Continuity and Differentiability of Complex functions, Analytic functions, Cauchy- Riemann Equations, Harmonic functions.	March
4.	Unit-IV	Mappings by elementary functions: Translation, Rotation, Magnification and inversion, Conformal Mappings, Mobius Transformations, Fixed Points, Cross Ratio, Inverse Points and Critical mappings.	April


Dr. Surender Kumar
Asst. Prof. Dep. of Mathematics
C. B. D. C. Rohtak

Dr. Santosh Kumar (Associate Prof.)

2nd Sem Mathematical Reasoning (MDC)

Sr. No.	Unit	Lesson Plan: Bachelor of Arts Aided: 2025-2026 Sem(II). MDC	Months
		Theory-Mathematical Reasoning	
1.	Unit-1	Analogy, Classification, Series Completion, Coding-Decoding, Blood relation, Puzzle Test, Sequential output tracing, Logical Venn Diagram.	January
2.	Unit-II	Alphabet Test, Number, Ranking and Time sequence test, Mathematical operation, Logical sequence and Word, Arithmetical Reasoning.	February
3.	Unit-III	Data Interpolation and Reasoning: Tabulation, Bar Graphs, Line Graphs, Pie Chart, Venn Diagrams, Analytical Reasoning, Mirror images.	March-April

Dr.
Dr. Santosh Kumar
(Asso. Prof.)
Department of Mathematics
Gr-B.D.C Rohlok.

B.A. 6th Sem

Dynamics

(Dr. Santosh Kumar)

Sr. No.	Unit	Lesson Plan: Bachelor of Arts Aided: 2025-2026 Sem(VI)	Months
		Theory- Dynamics	
1.	Unit-1	Velocity and acceleration along radial, Transverse, Tangential and Normal directions. Relative velocity and acceleration. Simple harmonic motion. Elastic strings.	January
2.	Unit-II	Mass, Momentum and Force. Newton's laws of motion. Work, Power and Energy. Definitions of Conservative forces and Impulsive forces.	February
3.	Unit-III	Motion on smooth and rough plane curves. Projectile motion of a particle in a plane. Vector angular velocity.	March
4.	Unit-IV	General motion of a rigid body. Central Orbits, Kepler laws of motion. Motion of a particle in three dimensions. Acceleration in terms of different co-ordinate systems	April

Dr.

Dr. Santosh Kumar

Asso. Prof

Department of Mathematics

C.B.D.C. Rohk.

B. A. 6th Sem
Linear Algebra.

Sr. No.	Unit	Lesson Plan: Bachelor of Arts Aided: 2025-2026 Sem(VI)	Months
		Theory-Linear Algebra	
1.	Unit-1	Vector spaces, Subspaces, Sum and direct sum of subspaces, Linear span, Linearly Independent and dependent subsets of a vector space, Finitely generated vector space, Existence theorem for basis of a finitely generated vector space, Finite dimensional vector spaces, Invariance of the number of elements of basis sets, dimensions, quotient space and its dimension	January
2.	Unit-II	Homomorphism and isomorphism of vector spaces, Linear transformations and linear forms on vector spaces, Vector space of all the linear transformations, Dual spaces, Bidual spaces, Annihilator of subspaces of finite dimensional vector spaces, Null space, Range space of a linear transformation, Rank and Nullity theorem.	February
3.	Unit-III	Algebra of linear transformation, Minimal polynomial of a linear transformation, Singular and non-singular linear transformations, Matrix of a linear transformation, Change of basis, Eigen values and eigen vectors of linear transformations	March
4.	Unit-IV	inner product spaces, Cauchy-Schwarz inequality, Orthogonal vectors, Orthogonal complements, Orthogonal sets and Basis, Bessel's Inequality for finite dementional vector spaces, Gram-Schmidt Orthogonalisation process, adjoint of a linear transformation and its properties, Unitary linear transformations	April


 Dr. Santosh Kumar
 Asso. Prof.
 Department of Mathematics
 C. B. D. C. College