


“Education for Knowledge, Science, and Culture”
- Shikshanmaharshi Dr. Bapuji Salunkhe

Shri Swami Vivekanand Shikshan Sanstha's
Vivekanand College, Kolhapur
(Autonomous)



Department Of Mathematics

Content with Focus on Employability, Entrepreneurship, Skill Development

Sr. No.	Name of the Course	Course Code	Year of Introduction	Content with focus on employability	Content with focus on entrepreneurship	Content with focus on skill development
B.Sc. Mathematics (Newly Introduced between 2018-19)						
1	Differential Calculus I and II	DSC-1003A	2018-19	Mean Value theorem: Lagrange's mean value theorem, Rolles Theorem Limit and continuity		Mean Value theorem: Lagrange's mean value theorem, Rolles Theorem
2	Differential Equations	DSC-1003B	2018-19	Method of variation parameter to solve second Order differential equation Lagrange's method and charpit's method to solve partial differential equations		Charpit's method, Lagrange method, Linear Differential equations



B.Com I. Mathematics (Newly Introduced between 2018-19)						
3	Business Mathematics Paper I	GEC-1045A	2018-19			Compound interest, ratio, percentage
4	Business Mathematics Paper II	GEC-1045B	2018-19	Application of differentiation, integration and its application		
M.Sc I. Mathematics (Newly Introduced between 2018-19)						
5	Algebra	CP-1170A	2018-19			Normal subgroup, sylow theorem
6	Advanced Calculus	CP-1171A	2018-19	Multivariable differential Calculus:		Pointwise convergence of sequences of functions, Uniform convergence
7	Complex Analysis	CP-1172A	2018-19			radius of convergence, analytic functions, zeros of an analytic function
8	Ordinary Differential Equations	CP-1173A	2018-19			Sturm Louville theory, The Bessel equation,
9	Classical Mechanics	CP-1174A	2018-19			Lagrang's equations of motion, D'Alembert's principle,
10	Linear Algebra	CP-1175B	2018-19	Eigen values and eigenvectors of a linear transformation,		Jordan blocks and Jordan forms, Dual Spaces
11	Measure and Integration	CP-1176B	2018-19			Measurable Sets, Non measurable set



12	General Topology	CP-1177B	2018-19			Continuous Functions, Bases, Subbases
13	Partial Differential Equations	CP-1178B	2018-19	wave equations, Heat equation, Laplace equation,		Charpits method, Jacobi method of solving partial differential equations,
14	Numerical Analysis	CP-1179B	2018-19	Numerical solution of ordinary differential equations		Rate of Convergence, Error analysis, convergence and stability of numerical methods
B.Sc II. Mathematics (Newly Introduced between 2019-20)						
15	Differential Calculus	DSC-1003C	2019-20	Application of Jacobian Gradient, Divergence and curl of vector, vector identities		Jacobian, Curl, Gradient, Divergence
16	Integral Calculus	DSC-1003C	2019-20	Double and triple integral, Moment of Inertia, Fourier series expansion of elementary functions		Beta and gamma function centre of gravity
17	Discrete Mathematics	DSC-1003D	2019-20	Equivalence relations, Boolean functions, Karnaugh Maps, Path, cycle, bridges, graph coloring		Counting principle, Karnaugh maps, Graphs and multigraph
18	Integral Transform	DSC-1019D	2019-20	Laplace transform, Fourier transform, Hankel Transform		



M.Sc.II. Mathematics (Newly Introduced between 2019-20)						
19	Functional Analysis	CC -1180C	2019-20			The Hahn-Banach theorem and its consequences.
20	Advanced Discrete Mathematics	CC -1181C	2019-20	Pigeonhole principle		Pigeonhole principle, generating functions, Total solutions of recurrence relations
21	Number Theory	CBC -1182C	2019-20			G.C.D., Euclidean algorithm, Number Theoretic Functions, Fermats theorem, Wilsons theorem and applications
22	Graph Theory I	CBC -1183C	2019-20	Coloring, Trees and connectivity		Coloring
23	Operational Research -I	CBC -1184C	2019-20			Simplex method
24	Lattice Theory - I	CBC -1185C	2019-20			Congruence relations, Boolean algebras, Pseudo complemented lattices.
25	Dynamical System I	CBC -1186C	2019-20	Bifurcation and chaos		eigenvalues and eigenvectors, The Exponential of a Matrix
26	Commutative Algebra	CBC -1187C	2019-20			Prime ideals and Maximal ideals,
27	Field Theory	CC-1190D	2019-20			Constructions by ruler and compass, Algebraic extensions,



28	Integral Equations	CC-1191D	2019-20			Solutions of Fredholm integralequations, Solutions of Volterra integralequations
29	Algebraic number theory	CBC-1192D	2019-20			Algebraic Numbers, Algebraic integers
30	Graph theory II	CBC-1193D	2019-20			spanning tress and binary trees.
31	Operation Research II	CBC-1194D	2019-20	Inventory – Cost involved in inventory problems,	Inventory – Cost involved in inventory problems,	Queuing systems
32	Fluid Dynamics	CBC-1195D	2019-20	Conservation laws, Rotational and irrotational flows, Dynamic Similarity, Stresses in fluids		
33	Dynamical System II	CBC-1196D	2019-20	data visualization-2D and 3D plots, vector field plots, chaotic phase portraits, solving discrete systems- cobweb plots.		Use of computer softwares to solve problems in Dynamical Systems
34	Combinatorics	CBC-1197D	2019-20	Fibonacci sequence.		Permutations and combinations, Ordinary and Exponential generating functions
35	Fractional Differential Calculus	CBC-1198D	2019-20			The Laplace transform method. The Mellin transform method,



B.Sc III. Mathematics (Newly Introduced between 2020-21)

36	Real Analysis	DSC-1003E1	2020-21	Sequence, limit of sequence, Cauchy sequence, Reimann integral, Improper integrals		Improper integral, convergent and divergent sequence and series
37	Modern Algebra	DSC -1003E1	2020-21	Permutations, Isomorphisms, field		Group
38	Matrix Algebra	DSC-1003E2	2020-21	System of Homogeneous and non-homogeneous equations, eigenvector, eigenvalues		Eigenvalue and eigenvector
39	Numerical Methods I	DSC-1003E2	2020-21			Various method of solving polynomial equations, Newton's method
40	Metric Space	DSC - 1003F1	2020-21			Continuous mappings,
41	Linear Algebra	DSC - 1003F1	2020-21	Vector space, linear transformation, rank and nullity of linear transformation		Linear transformation, Basis of vector space
42	Complex Analysis	DSC - 1003F2	2020-21	Cauchy integral formulae, Taylor's series, Laurent series, application of residue theorem to evaluate real integrals		Analytic function, residues, zeros of analytic function, Convergence of sequences and series of complex variables
43	Numerical Methods II	DSC - 1003F2	2020-21			Numerical differentiation, Numerical integration



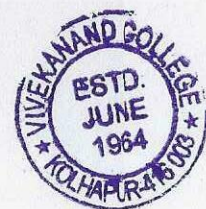
B.Sc. I. Mathematics (Revised between 2021-22)						
44	Calculus	DSC-1003A	2021-22	Limit and continuity, Intermediate value theorem, mean value theorem, Leibnit'z theorem, Maclaurin's theorem		Lagrang's mean value theorem, rolle's theorem continuity
45	Algebra and Geometry	DSC -1003A	2021-22	Fundamental theorem of algebra, eigenvalue eigenvector		Nth root of unity, cardon's method, equivalence classes
46	Multivariable Calculus	DSC-1003B	2021-22	Directional derivatives, extreme values of function of two variables, conservative vector fields		Extreme values of function of two variable, limit and continuity, conservative vector field, Double integration, Volume by triple integrals
47	Ordinary Differential Equations	DSC-1003B	2021-22	Picard's method for successive approximation, Clairaut's form and singular solutions, homogeneous linear differential equation		Picard's theorem of existence and uniqueness of the first order differential equation
B.Com I. Mathematics (Newly Introduced between 2021-22)						



48	Business Mathematics Paper I	GEC-1045A	2021-22			Compound interest, ratio, percentage
49	Business Mathematics Paper II	GEC-1045B	2021-22	Application of differentiation, integration and its application		
M.Sc I. Mathematics (Newly Introduced between 2021-22)						
50	Algebra	CP -1170A	2021-22			subgroups, normal subgroup, Group action on a set, Sylow's theorem
51	Advanced Calculus	CP-1171A	2021-22	Multivariable differential Calculus		Pointwise convergence of sequences of functions, : The Directional derivatives
52	Complex Analysis	CP -1172A	2021-22			radius of convergence, zeros of an analytic function, Laurent series development,
53	Ordinary Differential Equations	CP -1173A	2021-22	Sturm Liouville theory		Initial value problems for the nth order equations, Existence and Uniqueness of solutions to systems
54	Classical Mechanics	CP -1174A	2021-22			D'Alembert's principle, Lagrange's equations of motion
55	Linear Algebra	CP-1175B	2021-22	Eigen values and eigenvectors of a linear transformation,		Jordan blocks and Jordan forms, Dual Spaces
56	Integral Equations	CP -1176B	2021-22			Solution of Volterra integral equations by



						Adomian decomposition method, Solutions of Fredholm integral equations
57	General Topology	CP-1177B	2021-22			Continuous Functions, Bases, Subbases
58	Partial Differential Equations	CP-1178B	2021-22	wave equations, Heat equation, Laplace equation,		Charpits method, Jacobi method of solving partial differential equations,
59	Numerical Analysis	CP -1179B	2021-22	Numerical solution of ordinary differential equations		Rate of Convergence, Error analysis, convergence and stability of numerical methods
B.Sc.II. Mathematics (Newly Introduced between 2022-23)						
60	Number Theory	DSC-1003C	2022-23	Euclidean algorithm, Fermats theorem, number theoretic function		Fermats theorem, wilsons theorem, LCM, HCF, number theoretic function
61	Integral Calculus	DSC-1003C	2022-23	Double integration and triple integration, leibnit's rule for differential under integral sign, error function		Double integration, Beta Gamma function
62	Discrete Mathematics	DSC - 1003 D	2022-23	Recurrence relation, generating function, path, walk, circuit		Recurrence relation, generating function
63	Integral Transform	DSC - 1003D	2022-23	Laplace transform, Fourier transform,		



				Hankel Transform		
M.Sc.II. Mathematics (Newly Introduced between 2022-23)						
64	Functional Analysis	CC -1180C	2022-23			The Hahn-Banach theorem and its consequences.
65	Advanced Discrete Mathematics	CC -1181C	2022-23	Pigeonhole principle		Pigeonhole principle, generating functions, Total solutions of recurrence relations
66	Number Theory	CBC -1183C	2022-23			G.C.D., Euclidean algorithm, Number Theoretic Functions, Fermats theorem, Wilsons theorem and applications
67	Fuzzy Mathematics I	CBC -1185C	2022-23			Fuzzy sets and crisp sets
68	Operational Research -I	CBC -1184C	2022-23			Simplex method, dynamic programming
69	Lattice Theory - I	CBC -1182C	2022-23			Congruence relations, Boolean algebras, Pseudo complemented lattices.
70	Dynamical System I	CBC -1186C	2022-23	Bifurcation and chaos		eigenvalues and eigenvectors, The Exponential of a Matrix
71	Commutative Algebra	CBC -1187C	2022-23			Prime ideals and Maximal ideals,
72	Field Theory	CC-1190D	2022-23			Constructions by ruler and compass, Algebraic extensions,



73	Integral Equations	CC-1191D	2022-23			Solutions of Fredholm integral equations, Solutions of Volterra integral equations
74	Algebraic number theory	CBC-1192D	2022-23			Algebraic Numbers, Algebraic integers
75	Fuzzy Mathematics II	CBC-1193D	2022-23			fuzzy quantifiers
76	Operation Research II	CBC-1194D	2022-23	Inventory - Cost involved in inventory problems,	Inventory - Cost involved in inventory problems,	Queuing systems
77	Introduction to data science	CBC-1195D	2022-23	Machine learning, Distributing data storage and processing with frameworks		Machine learning
78	Dynamical System II	CBC-1196D	2022-23	data visualization-2D and 3D plots, vector field plots, chaotic phase portraits, solving discrete systems- cobweb plots.		Use of computer softwares to solve problems in Dynamical Systems
79	Combinatorics	CBC-1197D	2022-23	Fibonacci sequence.		Permutations and combinations, Ordinary and Exponential generating functions
80	Fractional Differential Calculus	CBC-1198D	2022-23			Methods of solving FDE's: The Laplace transform method. The Mellin transform method



B.Sc.III. Mathematics (Newly Introduced between 2023-24)

81	Real Analysis	DSC - 1003E1	2023-24	Sequence, limit of sequence, Cauchy sequence, Reimann integral, Improper integrals	Convergence and divergence
82	Modern Algebra	DSC - 1003E1	2023-24	Permutations, Isomorphisms, field	Normalsubgroup, Euler's theorem and ferma't's theorem
83	Partial Differential Equations	DSC -1003E2	2023-24	Laplace equation, poisson equation	Non-Linear partial differential equation
84	Numerical Methods	DSC - 1003E2	2023-24	Forward and backward interpolation, numerical differential, numerical integration	Lagrangian interpolating polynomial, Numerical integration, Euler's methods
85	Metric space	DSC -1003F1	2023-24	Compactness, completeness, connectedness	
86	Linear Algebra	DSC -1003F1	2023-24	Vector space, linear transformation, rank and nullity of linear transformation	Linear transformation, Basis of vector space, orthogonality
87	Complex Analysis	DSC - 1003F2	2023-24	Cauchy integral formulae, Taylor's series, Laurent series, application of residue theorem to evaluate real integrals	Analytic function, recidues, zeros of analyticfunction
88	Optimization Technique	DSC -1003F2	2023-24	Transportation problem, assignment	Assignment problem, North-west corner



				problem, simplex method		method, simplex method
B.Sc. I Mathematics NEP (Introduced in 2023-24)						
89	Differential Calculus	DSC03MAT11	2023-24	Mean Value theorem: Lagrange's mean value theorem, Rolles Theorem Limit and continuity		Limit of real valued function Leibnitz theorem and its application, mean value theorem
90	Basic Algebra and Complex Numbers	DSC03MAT12	2023-24	The fundamental theorem of algebra, Demoivre's theorem, system of linear equations		Synthetic division, roots of complex number, system of linear equation
91	Differential Calculus	MIN03MAT11	2023-24	Mean Value theorem: Lagrange's mean value theorem, Rolles Theorem Limit and continuity		Limit of real valued function Leibnitz theorem and its application, mean value theorem
92	Basic Algebra and Complex Numbers	MIN03MAT12	2023-24	The fundamental theorem of algebra, Demoivre's theorem, system of linear equations		Synthetic division, roots of complex number, system of linear equation
93	Logical Reasoning	OEC03MAT11	2023-24			LCM, HCF, syllogism, coding decoding
94	Quantitative Aptitude	OEC03MAT12	2023-24	Percentage, profit and loss		Permutation combination, ratio, proportion, profit loss
95	Indian Knowledge System	IKS03GEC11	2023-24	Sulbhasutra, Great Mathematician and their contribution, Pingala		



96	Differential Equations I	DSC03MAT21	2023-24	Linear differential equation with constant coefficient: general solution, Bernoulli differential equation		Clairauts equation, orthogonal trajectories
97	Geometry	DSC03MAT22	2023-24			Change of axis, polar co-ordinates, sphere, cone
98	Differential Equations I	MIN03MAT21	2023-24	Linear differential equation with constant coefficient: general solution, Bernoulli differential equation		Clairauts equation, orthogonal trajectories
99	Geometry	MIN03MAT22	2023-24			Change of axis, polar co-ordinates, sphere, cone
100	Quantitative Analysis	OEC03MAT21	2023-24	line chart, pie chart, bar chart, time, speed, distance, average		Simple interest, compound interest, line chart, pie chart, bar chart
101	Introduction to Applied Mathematics	OEC03MAT22	2023-24	Matrix, set theory, L.P.P.		Cramer's rule, L.P.P.
102	Foundation of Mathematics	SEC03MAT29	2023-24	-		One-one onto function, induction principle
M.Sc. I Mathematics (NEP) (Newly introduced between 2023-2024)						
103	Modern Algebra	DSC13MAT11	2023-24			normal subgroup, Sylow's theorems
104	Ordinary Differential Equations	DSC13MAT12	2023-24	Sturm Liouville theory		Initial value problems for the n th order equations, Existence



						and Uniqueness of solutions to systems
105	Measure and Integration	DSC13MAT13	2023-24			Measurable Sets, non-measurable set, Littlewood's Three Principles
106	Numerical Analysis I	DSC13MAT14	2023-24			Rate of Convergence, convergence analysis of iterative methods
107	Operational Research	DSE13MAT11	2023-24			Simplex method, dynamic programming
108	Introduction to data science	DSE13MAT12	2023-24	Machine learning, Distributing data storage and processing with frameworks		Machine learning
109	Dynamical System I	DSE13MAT13	2023-24	Bifurcation and chaos		eigenvalues and eigenvectors, The Exponential of a Matrix
110	Research Methodology	MIN13MAT11	2023-24	Mathematical Writing, Quality indices of research publication:		Mathematical Writing, Publishing a Paper, Quality indices of research publication:
111	Linear Algebra	DSC13MAT21	2023-24	Eigen values and eigenvectors of a linear transformation,		Jordan blocks and Jordan forms, Dual Spaces
112	General Topology	DSC13MAT22	2023-24			Connected Spaces, Continuous Functions
113	Advanced Calculus	DSC13MAT23	2023-24	Multivariable differential Calculus		Pointwise convergence of sequences of functions, : The Directional derivatives



114	Numerical Analysis II	DSC13MAT24	2023-24			convergence and stability of numerical methods, Interpolation,
115	Number theory	DSE13MAT21	2023-24			G.C.D., Euclidean algorithm, Number Theoretic Functions, Fermats theorem, Wilsons theorem and applications
116	Fuzzy Mathematics	DSE13MAT22	2023-24			Fuzzy sets and crisp sets,
117	Dynamical System II	DSE13MAT23	2023-24	data visualization-2D and 3D plots, vector field plots, chaotic phase portraits, solving discrete systems- cobweb plots.		Use of computer softwares to solve problems in Dynamical Systems
B.Com. I Mathematics (NEP) (Newly introduced between 2023-2024)						
118	Business Mathematics Paper I	GEC-1045A	2023-24	Linear Programming Problem		Compound interest, ratio, percentage, A.P, G.P.
119	Business Mathematics Paper II	GEC-1045B	2023-24	Application of differentiation, Transportation and assignment problem		Permutation and combination

S.P. Thorat

(Prof. S.P. THORAT)

HEAD

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