"Education for Knowledge, Science and Culture"

-Shikshanmaharshi Dr. Bapuji Salunkhe

Shri Swami Vivekanand Shikshan Sanstha's

VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR.

M. Sc. Part – I C.B.C.S. Syllabus with effect from June, 2018

M.Sc. Mathematics

Semester wise Syllabus

M.Sc. Semester- I

CP-1170A : Algebra

CP-1171A : Advanced Calculus

CP-1172A : Complex Analysis

CP-1173A : Ordinary Differential Equations

CP-1174A : Classical Mechanics

M.Sc. Semester- II

CP-1175B : Linear Algebra

CP-1176B : Measure and Integration

CP-1177B : General Topology

CP-1178B : Partial Differential Equations

CP-1179B : Numerical Analysis

Semester- I

Core Code: - CP-1170A Credit – 05

I) Title of paper: - Algebra

II) A brief note: - Theorems and proofs are expected to be prepared from recommended books.

III) Syllabus:

UNIT-I:

Permutation Group, Group of symmetry, Dihedral Group, Commutator subgroups, Simple groups, simplicity of An (n > 5), normal and subnormal series, Jordan-Holder theorem, Solvable groups, Nilpotent groups, isomorphism theorems, Zassenhaus Lemma, Schreier refinement theorem. 15 Lectures

Unit II:

Group action on a set, isometry subgroups, Burnside theorem, Direct product and semidirect product of groups , Syllow's theorems, p-subgroups, Group of order 2p and pq, Class equation and applications. 15 Lectures

Unit III: Ring of Polynomials, Factorization of polynomials over fields, irreducible polynomials, Eisenstein criterion, ideals in F[x], unique factorization domain, principal ideal domain, Gauss lemma, Euclidean Domain. 15Lectures

Unit IV: Modules, sub-modules, quotient modules, homomorphism and isomorphism theorems, fundamental theorem for modules, Completely reducible modules, free modules. 15 Lectures

UNIT - V :

Examples, Problems, assignments, seminars etc. based on units I to IV above. 15 Lectures

(IV) Recommended Reading :a) Basic Reading:-

1) John Fraleigh, A first course in Abstract Algebra by (3rd edition), Narosa publishing house, New Delhi.

2) C. Musili, Rings and Modules, Narosa Publishing house.

3) Joseph A. Gallian, Contemporary Abstract Algebra, Narosa Publication, Fourth Edition, 1999.

b) Additional Reading:-

1) Bhattacharya, Jain and Nagpal , “Basic Abstract Algebra” , 2nd edition, Narosa Publishing House, New Delhi.

2) I. N. Herstein, Topics in Algebra, Vikas Publishing House.

c) References :- Books: N. Jacobson, Basic Algebra’ , Hind Publishing Corporation 1984.

Core Code: - CP-1171A Credit – 05

I) Title of paper: - Advanced Calculus

II) A brief note: - Theorems and proofs are expected to be prepared from recommended books.

III) Syllabus

UNIT-I:

Functions of Bounded Variation& Rectifiable Curves – Introduction, Properties of monotonic functions, functions of Bounded Variation(B.V.), Total Variation(T.V.), additive property of T.V., T.V. on [a, x] as function of x, function of B.V. expressed as the difference of increasing functions, continuous functions of B.V., curves & paths, rectifiable paths, line integral, Green's theorem, Stoke's theorem. 12 lectures

UNIT-II

The Riemann-Stieltje's (R.S.) Integral – Introduction, notation, definition, linear property, integration by parts, change of variable, reduction to Riemann integration, Step functions as integrator, reduction to finite sum, Euler's summation formula, additive & linearity property of upper & lower integrals, Riemann's condition, Comparison theorem, Integration of B.V., Necessary condition for existence of RS integrals, Sufficient condition for existence of R.S. integrals. 12 lectures

UNIT-III

Sequences and series of functions - Pointwise convergence of sequences of functions, uniform convergence, Uniform convergence and continuity, Cauchy condition for uniform convergence, Uniform convergence and Riemann integration, Uniform convergence and differentiation, double sequence, uniform convergence and double sequences, mean convergence. Multiplication of series, Power series, multiplication of power series, substitution theorem, reciprocal of power series, Real power series, The Taylor series generated by function, Bernstein's theorem, Binomial series, Abel's limit theorem, Tauber's theorem. 12 lectures

UNIT-IV:

Multivariable differential Calculus: The Directional derivatives, directional derivatives and continuity, total derivative, total derivatives expressed in terms of partial derivatives, The matrix of linear function, Jacobin matrix, Chain rule, mean value theorem for differentiable functions, A sufficient condition for differentiability, sufficient condition for equality of mixed partial derivatives, Taylor's formula for functions from R_n to R_1. The inverse function theorem (Statement only) 12 lectures

UNIT – V

Implicit Functions - The implicit function theorem (Statement only) and their applications. Extrema of real valued functions of one variable, Extrema of real valued functions of several variables. 12 lectures

UNIT - V :

Examples, Problems, assignments, seminars etc. based on units I to IV above. 15 lectures

Recommended Reading :

a) Basic Reading :-

1) T. M. Apostal, Mathematical Analysis, Second Edition, Narosa Publishing House.
2) T. M. Apostol, Advanced Calculus Vol II .

b) Additional Reading :- Walter Rudin, Principles of mathematical Analysis, third Edition, McGraw Hill book company

c) References :- i) Books: Methods of Real Analysis, Richard Goldberg, Blaisdell.

Core Code: - CP-1172A Credit – 05

I) Title of paper: - Complex Analysis

II) A brief note: - Theorems and proofs are expected to be prepared from recommended books

III) Syllabus

UNIT-I:

Power series, radius of convergence, analytic functions, zeros of an analytic function, Cauchy-Riemann equations, Harmonic functions, Mobius transformations, line integral. 15 lectures

UNIT - II :

Power series representation of analytical function, zeros of an analytic function, Liouville's theorem, Fundamental theorem of algebra, Maximum modulus theorem, the index of closed curve, Cauchy's theorem and integral formula, Morera's theorem. 15 lectures

UNIT - III :

Counting zero's, The open mapping theorem, Goursat's Theorem, Classification of singularities, Laurent series development, Casorati-weierstrass theorem, residues, residues theorem ,evaluation of real integrals. 15 lectures

UNIT - IV :

The argument principle , Rouche's theorem, the maximum principle, Schwarz's lemma and its applications to characterize conformal maps. 15 lectures

UNIT - V :

Examples, Problems, assignments, seminars etc. based on units I to IV above. 15 lectures

Recommended Book :

John B. Conway, Functions of one complex variable. (Narosa Publishing house)

Reference Books :-

1. Lar's V. Ahlfors : Complex Analysis (Mc Graw Hill).

2. Ruel V. Churchill / James Ward Brown : Complex Variables and Applications (McGraw Hill).

3.S. Ponnusamy, Herb Silverman, Complex variables with applications analysis,Birkhauser,2006

4. S. Ponnusamy, Foundations of complex analysis, Narosa publishing House.

Core Code: - CP-1173A Credit - 05

I) Title of paper: - Ordinary Differential Equations

II) A brief note: - Theorems and proofs are expected to be prepared from recommended books.

III) Syllabus

UNIT – I: 15 Lectures

Linear Equations with constant coefficients: The second order homogeneous equation, Initial value problems for second order equations, Linear dependence and independence, A formula for the Wronskian, The non-homogeneous equations of order two, The homogeneous equations of order n.

Unit - II 15 Lectures

Initial value problems for the nth order equations, The non-homogeneous equation of nth order. Linear Equations with variable coefficients: Initial value problems for the homogeneous equations. Solutions of the homogeneous equations, The Wronskian and linear independence, Reduction of the order of a homogeneous equation, The non-homogenous equations.

Unit – III 15 Lectures

Sturm Liouville theory, Homogeneous equations with analytic coefficients, The Legendre equations. Linear Equations with regular singular points: The Euler equations, Second order equations with regular singular points.

Unit – IV 15 Lectures

The Bessel equation, Regular singular points at infinity, Existence and uniqueness of solutions: The method of successive approximations, The Lipschitz condition of the successive approximation. Convergence of the successive approximation. Existence and Uniqueness of solutions to systems, Existence and Uniqueness for linear systems, Equations of order n.

(IV) Recommended Reading **:**

a) Basic Reading:-

1) Coddington E. A.: An introduction to ordinary differential equations. (1974) Prentice Hall of India Pvt.Ltd. New Delhi.

2) Birkoff G. and Rota G.G.: Ordinary Differential equations, John Willey and Sons

b) Additional Reading:-

Simmons G.F. , Differential Equations with Applications and Historical note, McGraw Hill, Inc. New York. (1972)

c) References

Books:-

1. Coddington E.A. and Levinson: Theory of ordinary differential equations McGraw Hill, New York(1955)

2. Rainvills E.D.,Elementary differential equations, The Macmillan company, New York. (1964)

Core Code: - CP-1174A Credit - 05

I) Title of paper: - Classical Mechanics

II) A brief note: - Theorems and proofs are expected to be prepared from recommended books.

III) Syllabus

UNIT – I:

Mechanics of a particle, Mechanics of a system of particles, conservation theorems, constraints, Generalised coordinates, D' Alembert's Principle, Lagrange's equations of motion, simple applications of Lagrangian formulation, Kinetic energy as a homogeneous function of generalised velocities, Non-conservation of total energy due to the existence of non-conservative forces. Cyclic co-ordinates and generalised momentum, conservation theorems. 15 Lectures

UNIT – II:

Functionals, basic lemma in calculus of variations, Euler- Lagrange's equations, first integrals of Euler- Lagrange's equations, the case of several dependent variables Undetermined end conditions, Geodesics in a plane and space, the minimum surface of revolution, the problem of Brachistochrone, Isoperimetric problems, problem of maximum enclosed area.Hamilton's Principle, Derivation of Hamilton's principle from D'Alembert's principle,Lagrange's equations of motion from Hamilton's principle. Lagrange's equations of motion for nonconservative systems (Method of Langrange's undetermined multipliers) 15 Lectures

UNIT – III:

Hamiltonian function, Hamilton's canonical equations of motion, Derivation of Hamilton's equations from variational principle, Physical significance of Hamiltonian, the principle of least action, cyclic co-ordinates and Routh's procedure. Orthogonal transformations, Properties of transformation matrix, infinitesimal rotations. 15 Lectures

UNIT – IV:

The Kinematics of rigid body motion: The independent co-ordinates of a rigid body, the Eulerian angles, Euler's theorem on motion of rigid body,Angular momentum and kinetic energy of a rigid body with one point fixed,the inertia tensor and moment of inertia, Euler's equations of motion,Cayley- Klein parameters, Matrix of transformation in Cayley- Klein parameters, Relations between Eulerian angles and Cayley- Klein parameters. 15 Lectures

UNIT V: Examples, Seminars, Group Discussion on above units, Oral examinations. 15 Lectures

(IV) Recommended Books :

1) Goldstein, H. Classical Mechanics. (1980), Narosa PublishingHouse, New Delhi.

2) Weinstock: Calculus of Variations with Applications to Physics and Engineering (International Series in Pure and Applied Mathematics). (1952), Mc Graw Hill Book Company, New York.

(V) Additional Reading :-

1) Whittaker, E. T. A treatise on the Analytical Dynamics of particles and rigid bodies. (1965), Cambridge University Press.

2) Rana, N.C. and Joag, P. S. Classical Mechanics. (1991) Tata McGraw Hill, New Delhi.

3) Bhatia, V. B. Classical Mechanics with Introduction to Non-linear Oscillation and Chaos.(1997), Narosa publishing House.

4) Gupta, A. S. Calculus of Variations with Applications (1997), Prentice Hall of India.

5) Gelfand, I. M. and Fomin, S. V. Calculus of Variations (1963), Prentice Hall of India.

6) Mondal, C. R. Classical Mechanics (2001), Prentice Hall of India.

7) L. N. Katkar, Problems in Classical Mechanics

Semester- II

Core Code: - CP-1175B Credit – 05

I) Title of paper: - Linear Algebra

II) A brief note: - Theorems and proofs are expected to be prepared from recommended books.

III) Syllabus:

UNIT-I: 15 Lectures

Direct sum of a vector space, Dual Spaces, Annihilator of a subspace, Quotient Spaces, Algebra of Linear transformations.

UNIT-II: 15 Lectures

Adjoint of a linear transformation, Inner product spaces, Eigen values and eigenvectors of a linear transformation, Diagonalization, Invariant subspaces.

UNIT-III: 15 Lectures

Canonical forms, Similarity of linear transformations, Reduction to triangular forms, Nilpotent transformations, Primary decomposition theorem, Jordan blocks and Jordan forms, Invariants of linear transformations.

UNIT-IV**:** 15 Lectures

Hermitian, Self adjoint, Unitary and normal linear transformation, Symmetric bilinear forms, skew symmetric bilinear forms, Group preserving bilinear forms**.**

UNIT V: Examples, Seminars, Group Discussion on above units, Oral examinations. 15 Lectures

(IV) Recommended Reading:

a) Basic Reading:-

1) Herstein I. N. : Topics in Algebra, 2nd Edition, Willey eastern Limited

2) Hoffman, Kenneth and Kunze R: Linear Algebra, Prentice Hill of India Private Limited, 1984.

b) Additional Reading: Sahai and Bist, Linear Algebra, Narosa Publishing House.

c) Reference Books:

1. Rao A. R. and Bhimashankaran P., Linear Algebra, Hidustan Book Agency (200)

2. Singh Surjit, Linear Algebra, Vikas publishing House (1997)

Core Code: - CP-1176B Credit – 05

I) Title of paper: - Measure and Integration

II) A brief note: - Theorems and proofs are expected to be prepared from recommended books.

III) Syllabus

UNIT-I:

Open Sets, Closed Sets and Borel Sets, Lebesgue Outer Measure, The sigma algebra of Lebesgue Measurable Sets, Countable Additivity, Continuity and Borel-Cantelli Lemma, Non measurable set

UNIT- II:

Sums, Product and Composition of Measurable Functions, Sequential Pointwise limits and Simple Approximation. Littlewood's Three Principles, Egoroff's Theorem and Lusin's Theorem, Lebesgue Integration of a Bounded Measurable Function, Lebesgue Integration of a Non-negative Measurable Function.

UNIT–III:

The General Lebesgue Integral, Characterization of Riemann and Lebesgue Integrability, Differentiability of Monotone Functions, Lebesgue's Theorem, Functions of Bounded Variations: Jordan's Theorem.

UNIT – IV:

Absolutely Continuous Functions, Integrating Derivatives: Differentiating Indefinite Integrals, Normed Linear Spaces, Inequalities of Young, Holder and Minkowski, The Riesz-Fischer Theorem.

UNIT V: Examples, Seminars, Group Discussion on above units, Oral examinations. 15 Lectures

(IV) Recommended Reading:

a) Basic Reading:-

1) Royden H. L., Fitzpateick P.M., Real Analysis. (2009) 4th edition. Prentice Hall of India, New Delhi

b) Additional reading:-

1) G. deBarra. Measure Theory and Integration. (1981) Wiley Eastern Ltd.

2) Rana, I. K. An Introduction to Measure and Integration. (1997) Narosa Book Company.

c) References Books:

1) Berberian, S. K. Measure and Integration. (1965) McMillan, New York.

2) Jain P. K. and Gupta V. P. ,Lebesgue measure and Integration, (1986), Wiley Easter Limited.

3) Rudin W., Principles of Mathematical Analysis, (1964) McGraw-Hill Book Co.

Core Code: - CP-1177B Credit – 05

I) Title of paper: - General Topology

II) A brief note: - Theorems and proofs are expected to be prepared from recommended books

III) Syllabus:

UNIT- I: 15 Lectures

Topological spaces, Examples, Limit points, Closed sets and closure, Interior, exterior, Neighborhoods, Different ways of defining topologies , Bases, Subbases, Subspaces of topological space. Hereditary properties

UNIT- II: 15 Lectures

Connected Spaces, Components, Connected subspaces of real lines, Compact Spaces,One point compactification, Continuous Functions, Homeomorphisms, Topological properties.

UNIT- III: 15 Lectures

Separation axioms: T_0, T_1, T_2-spaces, First and second axioms spaces, Separable Spaces, Lindelof spaces, Regular and T_3 -Spaces, Normal and T_4-Spaces.

UNIT- IV: 15 Lectures

Completely Regular and $T_{3\,1/2}$-Spaces , Completely Normal and T_5 -Spaces , Product Spaces (For T_0, T_1, T_2, -compact, and connected spaces), Urysohn lemma and Urysohn metrization theorem.

Unit – V: 15 Lectures

Examples, Problems, assignments, seminars etc. based on units I to IV above.

Text Book :-

1. Pervin W. J., Foundations of General Topology, Academic Press, New York, 3rd edition, 1970.

Reference Book:

1) Munkers J. R., Topology: A First Course, Prentice Hall of India Pvt. Ltd.

2) Simmons G. F., Introduction to Topology and Modern Analysis, Mc Graw Hill Book Company, New Delhi, 1963.

3) Joshi K. D., General Topology.

4) Willard, Topology, Academic press.

Core Code: - CP-1178B Credit - 05

I) Title of paper: - Partial Differential Equations

II) A brief note: - Theorems and proofs are expected to be prepared from recommended books.

III) Syllabus

Unit I: 15 Lectures

Curves and surfaces, First order Partial Differential Equations, , classification of first order partial differential equations, classifications of Integrals, Linear equations of first order. Pfaffian differential equations, Criteria of Integrability of a Pfaffian differential equation. Compatible systems of first order partial differential equations.

UNIT- II: 15 Lectures

Charpits method, Jacobi method of solving partial differential equations, Cauchy Problem, Integral surfaces through a given curve for a linear partial differential equations, for a non-linear partial differential equations, Method of characteristics to find the integral surface of a quasi linear partial differential equations.

UNIT- III: 15 Lectures

Second order Partial Differential Equations. Origin of Partial differential equation, wave equations, Heat equation. Classification of second order partial differential equation. Vibration of an infinite string (both ends are not fixed) Physical Meaning of the solution of the wave equation. Vibration of an semi infinite string, Vibration of a string of finite length, Method of separation of variables, Uniqueness of solution of wave equation. Heat conduction Problems with finite rod and infinite rod, Cauchy problems

UNIT-IV: 15 Lectures

Families to equipotential surfaces, Laplace equation, Solution of Laplace equation, Laplace equation in polar form, Laplace equation in spherical polar coordinates. Kelvin's inversion theorem. Boundary Value Problems: Dirichlets problems and Neumann problems. maximum and minimum principles, Stability theorem.

UNIT -V : 15 lectures

Examples, Problems, assignments, seminars etc. based on units I to IV above.

Recommended Book: Amarnath T.: An elementary course in Partial differential equations, Narosa publication, 1987.

Reference Books: 1.Sneddon I. N.,: Elements of Partial Differential Equations, McGraw Hill Int.
2. Frite John: Partial Differential Equations

Core Code: - CP-1179B Credit - 05

I) Title of paper: - Numerical Analysis

II) A brief note: - Theorems and proofs are expected to be prepared from recommended books.

III) Syllabus

UNIT I: 15 Lectures

Iterative solutions of Transcendental & polynomial equations: Bisection method, Iteration methods based on First degree equation (Secant method, Regula Falsi method, Newton Raphson method), Rate of Convergence, Iteration methods, Birge –Vieta method, Bairstow method.

UNIT- II: 15 Lectures

linear System of algebraic equations and Eigenvalue problems: Iteration methods (Jacobi iteration method, Gauss seidel iteration method) convergence analysis, Matrix factorization methods (Doo little reduction, Crout reduction), Eigen values and eigenvectors, Gerschgorin theorem, Brauer theorem, Jacobi method for symmetric matrices, Householder's method for symmetric matrices, power method.

UNIT- III: 15 Lectures

Interpolation, differentiation and integration: Lagrange and Newton interpolation, Truncation error bounds, Newtons divided difference interpolation, finite difference operators, Hermites interpolation, Cubic spline interpolation, numerical differentiation, methods based on interpolation, numerical integration, Error analysis, methods based on interpolation Newton cotes methods, Error estimates for trapezoidal and Simpson's rule.

UNIT- IV: 15 Lectures

Numerical solution of ordinary differential equations: Euler's method, analysis of Euler's method, Backward Euler's method, order of Euler's method, Explicit Runge –Kutta method of order two and four, midpoint method, Taylor series method,convergence and stability of numerical methods, Truncation error, error analysis.

UNIT-V: Examples, Seminars**,** Group Discussion on above units, Oral examinations.15 Lectures

(IV) Recommended Books: Jain M. K.,. Iyengar S. R. K, Jain R. K., 'Numerical methods for scientific and Engineering Computation', New Age International Limited Publishers 1993.

Additional Reading :-

1. Jain M. K., Numerical Mathematics, Numerical solutions of Differential Equations
2. Sastry S. S., 'Introductory methods of Numerical Analysis', Prentice Hall of India New Delhi.
3. Atkinson. K. E., An introduction to Numerical analysis.
4. Buchaman J. I., P.R. Turner, Numerical methods and analysis.

Nature of Question Paper

***Instructions*:** *1) Questions **No. 1** is **compulsory**.*

*2) Attempt any **four** questions from que. no. 2 to que. no. 7.*

3) All questions carry equal marks.

4) Figures to right indicates full marks.

5) Use of log table/calculator is allowed.

Time: 3 hours **Total Marks: 90**

Q. 1. A) Choose correct alternative. (2 Marks each) **08**

i)

A) B) C) D)

ii)

A) B) C) D)

iii)

A) B) C) D)

iv)

A) B) C) D)

B) Fill in the blanks. (2 Marks each) **10**

Q.2. A) **18**

B)

C)

OR

A) **18**

B)

Q.3. A) **18**

B)

C)

OR

A) **18**

B)

Q.4 A) **18**

B)

C)

OR

A) **18**

B)

Q.5. A) **18**

B)

C)

OR

A) **18**

B)

Q.6. A) **18**

B)

C)

OR

A) **18**

B)

Q.7. A) **18**

B)

C)

OR

A) **18**

B)

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REMARK:

Note that the distribution of marks for A, B, C or A, B (Q.N.2 to Q.N.-7) may vary according to the nature of question.

SCHEME OF MARKING (THEROY)

Sem.	CP	Marks	Evaluation	Answer Books	Standard of passing
I	CP1170A TO CP1174A	90	Semester wise	As per Instruction	35% (36 marks)
II	CP1175B TO CP1179B	90	Semester wise	As per Instruction	35% (36 marks)

SCHEME OF MARKING (CIE) Continuous Internal Evaluation

Sem.	CP	Marks	Evaluation	Sections	Answer Books	Standard of passing
I	CP 1170 A TO CP 1174 A	30	Concurrent	-	As per Instruction	35% (12 marks)
II	CP1175 A TO CP1179 A	30	Concurrent	-	As per Instruction	35% (12 marks)

*A separate passing is mandatory

M.Sc – I Mathematics C B C S PATTERN (2018-19)

S E M E S T E R – I (Duration – 6 Months)																		
Sr. No	Course Title	**Teaching Scheme**						**Examination scheme**										
								Theory								Practical		
		Theory			Practical			Theory			Internal			Total		Total		
		No.of lectures	Hours	Credits	No. of Lectures	Hours	Credits	Max.	Min.	Hours	Max.	Min.	Hours	Max.	Min.	Max.	Min.	Hours.
1	CP-1170A	5	5	5	-	-	-	90	36	3	30	12	1	120	48	**N0 PRACTICAL EXAMINATION**		
2	CP-1171A	5	5	5	-	-	-	90	36	3	30	12	1	120	48			
3	CP-1172A	5	5	5	-	-	-	90	36	3	30	12	1	120	48			
4	CP-1173A	5	5	5	-	-	-	90	36	3	30	12	1	120	48			
5	CP-1174A	5	5	5	-	-	-	90	36	3	30	12	1	120	48			
	Total	25	25	**25**	-	-	-	450	-	-	150	-		600	-			
	Semester-II(duration 6 months)																	
6	CP-1175B	5	5	5	-	-	-	90	36	3	30	12	1	120	48	**N0 PRACTICAL EXAMINATION**		
7	CP-1176B	5	5	5	-	-	-	90	36	3	30	12	1	120	48			
8	CP-1177B	5	5	5	-	-	-	90	36	3	30	12	1	120	48			
9	CP-1178B	5	5	5	-	-	-	90	36	3	30	12	1	120	48			
10	CP-1179B	5	5	5	-	-	-	90	36	3	30	12	1	120	48			
				25	-	-	-	450	-	-	150	-		600	-			
	Total	5	5	**50**	-	-	-	900			300			1200	48			

- Student contact hours per week : 25 Hours (Min.)
- Theory Lectures : 60 Minutes Each
- Total Marks for M.Sc.-I : **1200**
- Total Credits for M.Sc.-I (Semester I & II) : **50**
- CP-Core Paper
- Course list as per enclosed Annexure. ***Separate passing is mandatory for Theory, Internal.***
- No Practical Examination