

**Syllabus
MATHEMATICS
(UG courses)
Admitted Batch 2008 -2009**



**May 2008
A.P. State Council of Higher Education**

SUBJECT COMMITTEE

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Osmania University
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P.R.Govt. Degree College,
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MODEL CURRICULUM**B.Sc. Courses (Structure)***First year:*

S.no.	<u>Subject</u>	Hrs per week
1.	English language including communication skills	6
2.	Second language	4
3.	Core1-I	4
4.	Core2-I	4
5.	Core3-I	4
6.	Core1-lab I	3
7.	Core2-lab I	3
8.	Core3-lab I	3
9.	Foundation course	3
10.	Computer skills	2
	Total	36

Second year:

S.no.	<u>Subject</u>	Hrs per week
1.	English language including communication skills	6
2.	Second language	4
3.	Core1-II	4
4.	Core2-II	4
5.	Core3-II	4
6.	Core1-lab II	3
7.	Core2-lab II	3
8.	Core3-lab II	3
9.	Environmental studies	4
10.	Computer skills	2
	Total	37

Third year:

S.no.	<u>Subject</u>	Hrs per week
1.	Core1-III	3
2.	Core1-IV	3
3.	Core2-III	3
4.	Core2-IV	3
5.	Core3-III	3
6.	Core3-IV	3
7.	Core1-lab III	3
8.	Core1-lab IV	3
9.	Core2-lab III	3
10.	Core2-lab IV	3
11.	Core3-lab III	3
12.	Core3-lab IV	3
13.	Foundation course	3
	Total	39

STRUCTURE OF MODEL CURRICULUM

MATHEMATICS

YEAR	THEORY/ PRACTICAL	TITLE	WORKLOAD HRS/ WEEK
FIRST	Theory – I	Differential Equations & Solid Geometry	4
	Practical - I	---	3
SECOND	Theory - II	Abstract Algebra & Real Analysis	4
	Practical - II	---	3
THIRD	Theory – III	Linear Algebra and Vector Calculus	3
	Theory – IV	<u>ELECTIVES:</u> 1. Numerical Analysis 2. Fourier Series and Integral Transforms 3. Number Theory 4. Discrete Mathematics 5. Linear Programming 6. Lattice Theory 7. Mechanics	3
	Practical – III	---	3
	Practical – IV	---	3

NOTE:

- (i) Each paper comprises Theory and Practicals Work load for each Theory Paper I, II is 4 hrs/ week and for each of Paper III, IV is 3 hrs/week, workload for each Practical is 3 hrs/week for Papers I, II, III, IV.
- (ii) Duration of Theory Examination is 3 hrs with 100 marks.
- (iii) Duration of Practical Examination is 3 hrs with 50 marks (Record 10 marks, Viva-Voce 10 marks, Practical Examination 30 marks).

ANDHRA UNIVERSITY

MATHEMATICS SYLLABUS B.A./B.Sc ADMITTED BATCH W.E.F. 2008-09

Mathematics: Paper - I

120 hrs
(4 hrs/ week)

DIFFERENTIAL EQUATIONS & SOLID GEOMETRY

DIFFERENTIAL EQUATIONS

UNIT - I: (25 hours)

Differential equations of first order and first degree

Linear differential equations; Differential equations reducible to linear form; Exact differential equations; Integrating factors; Change of variables; Simultaneous differential equations; Orthogonal trajectories.

Differential equations of the first order but not of the first degree:

Equations solvable for p ; Equations solvable for y ; Equations solvable for x ; Equations that do not contain x (or y); Equations of the first degree in x and y - Clairaut's equation.

UNIT - II: (35 hours)

Higher order linear differential equations

Solution of homogeneous linear differential equations of order n with constant coefficients. Solution of the non-homogeneous linear differential equations with constant coefficients by means of polynomial operators. Method of undetermined coefficients; Method of variation of parameters; Linear differential equations with non-constant coefficients; The Cauchy-Euler equation

System of linear differential equations:

Solution of a system of linear equations with constant coefficients; An equivalent triangular system. Degenerate Case: $p_1(D) p_4(D) - p_2(D) p_3(D) = 0$.

Prescribed Text book: Scope and treatment as in Differential Equations and Their Applications by Zafar Ahsan, published by Prentice-Hall of India Pvt. Ltd. New Delhi-Second edition: Sections: - 2.5 to 2.9, 3.1, 3.2, 4.2, 5.2 to 5.7, 7.3, 7.4.

Reference Book: Rai Singhania, "Ordinary and Partial Differential Equations", S.Chand & Company, New Delhi

SOLID GEOMETRY

UNIT - III: (35 hours)

The Plane

Equation of plane in terms of its intercepts on the axis, Equations of the plane through the given points, Length of the perpendicular from a given point to a given plane, Bisectors of

angles between two planes, Combined equation of two planes, Orthogonal projection on a plane.

The Line:

Equations of a line, Angle between a line and a plane, The condition that a given line may lie in a given plane, The condition that two given lines are coplanar, Number of arbitrary constants in the equations of a straight line. Sets of conditions which determine a line, The shortest distance between two lines. The length and equations of the line of shortest distance between two straight lines, Length of the perpendicular from a given point to a given line, Intersection of three planes, Triangular Prism.

The Sphere:

Definition and equation of the sphere, Equation of the sphere through four given points, Plane sections of a sphere. Intersection of two spheres; Equation of a circle. Sphere through a given circle; Intersection of a sphere and a line. Power of a point; Tangent plane. Plane of contact. Polar plane, Pole of a plane, Conjugate points, Conjugate planes; Angle of intersection of two spheres. Conditions for two spheres to be orthogonal; Radical plane. Coaxial system of spheres; Simplified form of the equation of two spheres.

UNIT - IV: (25 hours)

Cones, Cylinders and conicoids:

Definitions of a cone, vertex, guiding curve, generators. Equation of the cone with a given vertex and guiding curve. Enveloping cone of a sphere. Equations of cones with vertex at origin are homogenous. Condition that the general equation of the second degree should represent a cone. Condition that a cone may have three mutually perpendicular generators. Intersection of a line and a quadric cone. Tangent lines and tangent plane at a point. Condition that a plane may touch a cone. Reciprocal cones. Intersection of two cones with a common vertex. Right circular cone. Equation of the right circular cone with a given vertex, axis and semi-vertical angle.

Definition of a cylinder. Equation to the cylinder whose generators intersect a given conic and are parallel to a given line, Enveloping cylinder of a sphere. The right circular cylinder. Equation of the right circular cylinder with a given axis and radius.

The general equation of the second degree and the various surfaces represented by it; Shapes of some surfaces. Nature of Ellipsoid. Nature of Hyperboloid of one sheet.

Prescribed Text book: Scope as in *Analytical Solid Geometry* by Shanti Narayan and P.K. Mittal, Published by S. Chand & Company Ltd. Seventeenth edition:

Sections:-2.4, 2.7, 2.9, 3.1 to 3.8, 6.1 to 6.9, 7.1 to 7.8, 8.1, 8.2, 8.6

Reference Book:

P.K. Jain and Khaleel Ahmed, "A Text Book of Analytical Geometry of Three Dimensions", Wiley Eastern Ltd., 1999.

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MATHEMATICS SYLLABUS B.A./B.Sc ACADEMIC YEAR 2009-10

Mathematics: Paper - II

Abstract Algebra & Real Analysis

120 hrs
(4 hrs/ week)

UNIT - I: (30 hours)

GROUPS :

Binary operations- Definitions and properties, Groups--Definition and elementary properties, Finite groups and group composition tables, Subgroups and cyclic subgroups. Permutations-- Functions and permutations ,groups of permutations, cycles and cyclic notation, even and odd permutations, The alternating groups. Cyclic groups - Elementary properties ,The classification of cyclic groups , sub groups of finite cyclic groups. Isomorphism - Definition and elementary properties, Cayley's theorem, Groups of cosets, Applications, Normal subgroups - Factor groups , Criteria for the existence of a coset group, Inner automorphisms and normal subgroups, factor groups and simple groups, Homomorphism- Definition and elementary properties, The fundamental theorem of homomorphisms, applications.

UNIT - II: (30 hours)

RINGS:

Definition and basic properties, Fields, Integral domains, divisors of zero and Cancellation laws, Integral domains, The characteristic of a ring, some non – commutative rings, Examples, Matrices over a field, The real quaternions ,Homomorphism of Rings - Definition and elementary properties, Maximal and Prime ideals, Prime fields.

Prescribed text book:

Scope and treatment as in The first course in Abstract Algebra by John B Fraleigh , Narosa Publishing house , chapter 1 to 7,11 to 13,23,24.1 to 24.3 , 25.1,25.4 and chapter 29 to 31.

Reference Books:

- 1.Topics in Algebra , I.N.Herstein,Wiley Eastern.
- 2.Contemporary Abstract algebra by Joseph A Gallian , Narosa Publishing House

UNIT – III: (35 hours)

REAL NUMBERS:

The Completeness Properties of \mathbb{R} , Applications of the Supremum Property.

(No question is to be set from this portion)

Sequences and Series - Sequences and their limits, limit theorems, Monotonic Sequences, Sub-sequences and the Bolzano-Weirstrass theorem,The Cauchy's Criterion ,Properly divergent sequences, Introduction to series, Absolute convergence, test for absolute convergence, test for non-absolute convergence.

Continuous Functions--continuous functions, combinations of continuous functions, continuous functions on intervals, Uniform continuity.

UNIT – IV : (25 hours)

DIFFERENTIATION AND INTEGRATION:

The derivative, The mean value theorems, L'Hospital Rule, Taylor's Theorem.

Riemann integration - Riemann integral , Riemann integrable functions, Fundamental theorem.

Prescribed text Book:

Scope as in “**Introduction to Real analysis**”, by Robert G. Bartle and Donald R. Sherbert , John Wiley ,3rd edition. Chapter 3, (3.1 to 3.7), Chapter 5 (5.1 to 5.4), Chapter 6 (6.1 to 6.4), Chapter 7 (7.1 to 7.3), Chapter 9 (9.1,9.2 and 9.3).

Reference Books:

1. A course of Mathematical Analysis, Shanthi Narayan and P.K.Mittal, S.Chand & Company
2. Mathematical analysis by S.C.Malik and Savita Arora, Wiley Eastern Ltd.

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MATHEMATICS SYLLABUS B.A./B.Sc ACADEMIC YEAR 2010-11

Mathematics: Paper – III LINEAR ALGEBRA AND VECTOR CALCULUS

90 hrs
(3 hrs/ week)

Part A: Linear Algebra

Unit-I: (25 Hours)

Vector spaces, General properties of vector spaces, Vector subspaces, Algebra of subspaces, linear combination of vectors. Linear span, linear sum of two subspaces, Linear independence and dependence of vectors, Basis of vector space, Finite dimensional vector spaces, Dimension of a vector space, Dimension of a subspace. Linear transformations, linear operators, Range and null space of linear transformation, Rank and nullity of linear transformations, Linear transformations as vectors, Product of linear transformations, Invertible linear transformation.

Unit-II: (20 Hours)

The adjoint or transpose of a linear transformation, Sylvester's law of nullity, characteristic values and characteristic vectors, Cayley- Hamilton theorem, Diagonalizable operators. Inner product spaces, Euclidean and unitary spaces, Norm or length of a vector, Schwartz inequality, Orthogonality, Orthonormal set, complete orthonormal set, Gram - Schmidt orthogonalisation process.

Prescribed text book: Linear Algebra by J.N.Sharma and A.R.Vasista, Krishna Prakasham Mandir, Meerut-250002.

Reference Books: 1. Linear Algebra by Kenneth Hoffman and Ray Kunze, Pearson Education (low priced edition), New Delhi

2. Linear Algebra by Stephen H. Friedberg et al Prentice Hall of India Pvt. Ltd. 4th edition 2007

Part B : Multiple integrals and Vector Calculus

Unit-III: (25 Hours)

Multiple integrals : Introduction, the concept of a plane, Curve, line integral- Sufficient condition for the existence of the integral. The area of a subset of R^2 , Calculation of double integrals, Jordan curve, Area, Change of the order of integration, Double integral as a limit, Change of variable in a double integration.

Prescribed book: A Course of Mathematical Analysis by Santhi Narayana and P.K.Mittal, S. Chand Publications. Chapters 16 and 17.

Unit-IV: (20 Hours)

Vector differentiation. Ordinary derivatives of vectors, Space curves, Continuity, Differentiability, Gradient, Divergence, Curl operators, Formulae involving these operators. Vector integration, Theorems of Gauss and Stokes, Green's theorem in plane and applications of these theorems.

Prescribed text Book: Vector Analysis by Murray. R.Spiegel, Schaum series Publishing Company ,Chapters 3, 4,5,6, and 7

Reference Books: 1.Text book of vector Analysis by Shanti Narayana and P. K. Mittal, S. Chand & Company Ltd, New Delhi.

2. Mathematical Analysis by S.C. Mallik and Savitha Arora, Wiley Eastern Ltd.

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MATHEMATICS SYLLABUS B.A./B.Sc ACADEMIC YEAR 2010-11

Mathematics: Paper IV (Elective - 1)
NUMERICAL ANALYSIS

90 hrs
(3 hrs/ week)

UNIT-I: (20 hours)

Errors in Numerical computations: Numbers and their Accuracy, Errors and their Computation, Absolute, Relative and percentage errors, A general error formula, Error in a series approximation.

Solution of Algebraic and Transcendental Equations: The bisection method, The iteration method, The method of false position, Newton-Raphson method, Generalized Newton-Raphson method, Ramanujan's method, Muller's method

UNIT-II: (25 hours)

Interpolation : Errors in polynomial interpolation, Forward differences, Backward differences, Central Differences, Symbolic relations, Detection of errors by use of D.Tables, Differences of a polynomial, Newton's formulae for interpolation formulae, Gauss's central difference formula, Stirling's central difference formula, Interpolation with unevenly spaced points, Lagrange's formula, Error in Lagrange's formula, Derivation of governing equations, End conditions, Divided differences and their properties, Newton's general interpolation.

UNIT-III: (20 hours)

Curve Fitting: Least-Squares curve fitting procedures, fitting a straight line, nonlinear curve fitting, Curve fitting by a sum of exponentials

Numerical Differentiation and Numerical Integration : Numerical differentiation, Errors in numerical differentiation, Maximum and minimum values of a tabulated function, Numerical integration, Trapezoidal rule, Simpson's $1/3$ -rule, Simpson's $3/8$ -rule, Boole's and Weddle's rule.

UNIT-IV: (25 hours)

Linear systems of equations, Solution of linear systems – Direct methods, Matrix inversion method, Gaussian elimination method, Method of factorization, Ill-conditioned linear systems. Iterative methods: Jacobi's method, Gauss-siedal method,

Numerical solution of ordinary differential equations : Introduction, Solution by Taylor's Series, Picard's method of successive approximations, Euler's method, Modified Euler's method, Runge – Kutta methods, Predictor – Corrector methods, Milne's method.

Prescribed text Book: Scope as in Introductory Methods of Numerical Analysis by S.S. Sastry, Prentice Hall India (4th Edition.), Chapter - 1 (1. 2, 1. 4, 1, 1.5, 1.6); Chapter - 2 (2.2 – 2.7); Chapter - 3 (3.2, 3.3, 3.7.2, 3.9.1, 3.9.2, 3.10.1, 3.10.2); Chapter - 4. (4.2); Chapter.- 5(5.2 – 5.4.5); Chapter - 6 (6.3.2, 6.3.4, 6.3.7, 6.4); Chapter - 7 (7.2-7.5; 7.6.2).

Reference Books: 1. G.Sankar Rao New Age International Publishers, New – Hyderabad.
2. Finite Differences and Numerical Analysis by H.C. Saxena S. Chand and Company, New Delhi

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MATHEMATICS SYLLABUS B.A./B.Sc ACADEMIC YEAR 2010-11

Mathematics: Paper IV (Elective - 2)
FOURIER SERIES AND INTEGRAL TRANSFORMS

90 hrs
(3 hrs/ week)

UNIT - I: (20 hours)**Fourier series :**

Fourier series, Theorems, Dirichlet's conditions, Fourier series for even and odd functions, Half range Fourier series, Other forms of Fourier series

Prescribed text Book: Scope as in *A course of Mathematical Analysis* by Shanthi Narayan and P.K Mittal, Published by S. Chand & Company, Chapter 10.

UNIT - II: (25 hours)**Laplace transforms:**

Definition of Laplace transform, linearity property- Piecewise continuous function.

Existence of Laplace transform, Functions of exponential order and of class A. First and second shifting theorems of Laplace transform, Change of scale property- Laplace transform of derivatives, Initial value problems, Laplace transform of integrals, Multiplication by t , Division by t , Laplace transform of periodic functions and error function, Beta function and Gamma functions. Definition of Inverse Laplace transform, Linearity property, First and second shifting theorems of inverse Laplace transform, Change of scale property, Division by p , Convolution theorem, Heaviside's expansion formula (with proofs and applications).

UNIT - III: (25 hours)

Fourier transforms : Dirichlet's conditions, Fourier integral formula (without proof), Fourier transform, Inverse Theorem for Fourier transform, Fourier sine and cosine transforms and their inversion formulae. Linearity property of Fourier transforms, Change of scale property, Shifting theorem, Modulation theorem, Convolution theorem of Fourier transforms, Parseval's identity, Finite Fourier sine transform, Inversion formula for sine transform, Finite Fourier cosine Transform, Inversion formula for cosine transform.

UNIT - IV: (20hours)**Applications of Laplace and Fourier transforms :**

Applications of Laplace transforms to the solution of ordinary differential equations with constant coefficients and variable coefficients, Simultaneous ordinary differential equations, Partial differential equations. Applications of Fourier transforms to initial and boundary value problems.

Prescribed text Book: Scope as in *Integral transforms* by A.R. Vasishtha & Dr. R.K. Gupta Published by Krishna Prakashan Media Pvt. Ltd. Meerut.

Chapter I, Chapter II: all sections except 2.3 and 2.18; Chapter III: sections 3.1, 3.2, 3.3, 3.4; Chapter VI: Sections 6.1 to 6.20 except 6.16; Chapter VII: Sections 7.1 to 7.4; Chapter VIII: Section 8.2.)

Reference Book: Operational Mathematics by R.V.Churchil, McGraw Hill Company

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MATHEMATICS SYLLABUS B.A./B.Sc ACADEMIC YEAR 2010-11

Mathematics: Paper – IV (Elective - 3) NUMBER THEORY

90 hrs
(3 hrs/ week)

UNIT – I : (25 hours)

The division algorithm, The greatest common divisor, The Euclid algorithm, The Diophantine equation $ax + by = c$, Basic properties of congruence, Special divisibility tests, Linear congruencies

UNIT – II : (20 hours)

The Little Fermat's theorem, Wilson's theorem, The functions τ and σ , The Möbius inversion formula, The greatest integer function

UNIT – III : (25 hours)

Euler's Phi-function, Ruler's theorem, Some properties of the Phi-function, Ruler's criterion, The Legendre's symbol and its properties, Quadratic reciprocity

UNIT – IV : (20 hours)

The search for perfect numbers, Mersenne primes, Fermat numbers, Sums of two squares, Sums of more than two squares

Prescribed text Book: Scope as in Elementary Number Theory – David M. Burton,
2nd Edition, Universal book Stall, New Delhi.

Reference Books:

1. An Introduction to the Theory of Numbers – I. Niven and H. Zuckerman
1980, 4th Edition, John Wiley & Sons, New York.
2. Elementary Number Theory & Its Applications – Kenneth Rosen
1987, 2nd Edition, Reading Mass Addison – Wesley.

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MATHEMATICS SYLLABUS B.A./B.Sc ACADEMIC YEAR 2010-11

Mathematics - Paper -IV (Elective - 4) DISCRETE MATHEMATICS

90 hrs
(3 hrs/ week)

UNIT – I: (15 hours)

Sets and Operations of sets, Relations and functions, Some methods of proof and problem solving strategies, Fundamentals of logic, Logical inferences, Methods of proof of an implication, First order logic and other methods of proof, Rules of inference for quantified prepositions, Mathematical induction.

UNIT – II: (25 hours)

Recurrence Relations:

Generating functions of sequences, Calculating coefficients of generating functions; Recurrence relations; Solving recurrence relations by substitution and generating functions; The method of characteristic roots; Solutions of in-homogenous linear recurrence relations.

UNIT – III: (25 hours)

Graph Theory:

Basic concepts, Isomorphisms and subgraphs, Trees and their properties, Spanning trees, Directed trees, Binary trees, Planar graphs, Euler’s formula, Multi graphs and Euler circuits, Hamiltonian graphs, Chromatic numbers. Four – color problem.

UNIT – IV: (25 hours)

Boolean Algebra :

Relations, Properties of special binary relations, Equivalence relations, Ordering relations, Lattices and enumerations , Boolean algebra, Boolean functions, Switching mechanism, Minimization of Boolean functions.

Prescribed text book Scope as in Discrete Mathematics for computer Scientists and Mathematicians by Joe L.Mott, Abraham Kandel, Theodore P.Baker, Printice-Hall of India (Second edition) Chapters 1, 3, 4, 5, 6.

Reference text Books:

1. Discrete Mathematical structures by Bernard Kolman, Robert C. Busby, Sharon Ross, Prentice- Hall of India
2. Discrete Mathematics and its applications by Kenneth H.Rosen, Tata McGraw- Hill.

MODEL CURRICULUM - B.A/B.Sc**Mathematics - Paper -IV (Elective - 5)
LINEAR PROGRAMMING****90 hrs**
(3 hrs/ week)**UNIT-I:** (20 hours)

Linear Programming Problem : Convex Set, Extreme points of a convex set, Convex combination, Convex hull, Convex polyhedron, Fundamental theorem of linear programming, Definition, Formulation of linear programming of problems (LPP), Graphical solution of linear programming problems, General formulation of LP problems, Standard form and matrix form of LP problems.

UNIT-II: (25 hours)

Simplex Method : Introduction, Definitions and notations, Computational procedure of simplex algorithm, Simple way for simplex computations, Artificial variables, Two-phase method, Alternative method of two-phase simplex method, Big-M method, Degeneracy in LPP and method to resolve degeneracy, Alternative solutions, Unbounded solutions, Non-existing feasible solutions, Solution of simultaneous equations by Simplex method.

UNIT-III: (20 hours)

Duality in Linear Programming and Dual Simplex Method : Introduction, Definition of Dual Problems, General rules for converting any primal into its Dual, Relation between the solution of Primal and Dual problem, Initial solution for Dual Simplex Method, Dual Simplex Method.

UNIT-IV: (25 hours)

Assignment and Transportation problems : Introduction, Mathematical formulation of Assignment problem, Reduction theorem, Hungarian Method for solving Assignment problem, Unbalanced Assignment problem, The Traveling salesman problem, Formulation of Traveling salesman problem as an Assignment problem and Solution procedure.

Mathematical formulation of Transportation problem, Tabular representation, Definitions, Special structure of the solution, North-west corner rule, Lowest cost entry method, Vogel's approximation method, Method of finding optimal solution, Optimality in transportation problem, Degeneracy in transportation problems, Resolution of degeneracy, Unbalanced transportation problem, Generalized transportation problem.

Prescribed text book Scope as in "Operations Research" by S.D. Sharma, Kedar Nath Ram Nath & Co, Meerut.

Reference text Book: "Operation Research" by Kanthi Swarup, R.K. Gupta and Manmohan, S. Chand publications, New Delhi.

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MATHEMATICS SYLLABUS B.A./B.Sc ACADEMIC YEAR 2010-11

Mathematics - Paper-IV (Elective - 6) LATTICE THEORY

90 hrs
(3 hrs/ week)

UNIT-I: (20 hours)

PARTIALLY ORDERED SETS

Partially ordered sets, Diagrams, Special subsets of a partially ordered set, Length, Lower and upper bounds, The minimum and maximum condition, The Jordan-Dedekind Chain condition and dimension functions.

UNIT-II: (25 hours) :: **LATTICES** ::

Lattices, The lattice theoretical duality principle, Semi lattices, Lattices as partially ordered sets, Diagrams of lattices, Sublattices, Ideals, Bound elements of a lattice, Atoms and dual atoms, Complements, Relative complements, Semi complements, Irreducible and prime elements of a lattice, The lattice homomorphism, Complete lattices, Compact elements, Compactly generated lattice, Sub algebra lattice of an algebra, Closure operations, Galois connections and Dedekind cuts.

UNIT-III: (25 hours)

DISTRIBUTIVE AND MODULAR LATTICES

Distributive lattices, Infinitely distributive and completely distributive lattice, Modular lattices, Characterization of modular and distributive lattices by their sublattices, Distributive sub lattices of modular lattices, The isomorphism theorem of modular lattices, Covering conditions, Meet representations in modular and distributive lattices.

UNIT-IV: (20 hours)

BOOLEAN ALGEBRAS

Boolean algebras, De Morgan formulae, Complete Boolean algebras, Boolean algebras and Boolean rings, The algebra of relations, The lattice of propositions and valuations of Boolean algebras.

Prescribed Text Book:

“Introduction to Lattice Theory” by G. Szasy, Academic Press, New York, 1963. Chapter I, Section 10 to 20 of Chapter-II, Section 22 to 28 of Chapter III, Chapter IV and Chapter VI.

Reference Books:

1. B.A.Dallery and H.A.Pristley, “Introduction to lattices and order”, Second edition, Cambridge University Press, 2002.
2. G. Gratzer, “General Lattice Theory”, Academic Press, New York

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MATHEMATICS SYLLABUS B.A./B.Sc ACADEMIC YEAR 2010-11

Mathematics: Paper – IV (Elective - 7) MECHANICS

90 hrs
(3 hrs/ week)

Part A: STATICS

Unit-I: (25 hours)

Introduction, Composition and resolution of forces, Parallelogram law of forces, Triangle law of forces, Lamis theorem, Polygon of forces, $\lambda - \mu$ theorem, Resultant of a finite number of coplanar forces acting upon a particle, Conditions of equilibrium, Parallel forces, resultant of two parallel forces acting upon a rigid body, Moments, Moments of a force about a point and about an axis, Generalized theorem of moments.

Unit-II: (20 hours)

Couples, Equilibrium of a rigid body acted on by three coplanar forces, General conditions of equilibrium of a rigid body under coplanar forces, Friction, Laws of friction, Limiting friction, Coefficient of friction and simple problems.

Part B: DYNAMICS

Unit-III: (25 hours)

Velocity, Relative velocity, Acceleration, Parallelogram laws of acceleration, Motion under gravity, Newton's laws of motion and their applications to simple problems. Impulse, Work, Energy. Kinetic and potential energies of a body, Principle of conservation of energy.

Unit-IV: (20 hours)

Projectiles, Range on an inclined plane, Collision of elastic bodies, Newton's experimental law, Impact of sphere on a plane, Direct and oblique impact of two spheres, Loss of kinetic energy by impact, Simple harmonic motion, Examples of simple harmonic motion, Simple pendulum, Simple equivalent pendulum.

Prescribed text books:

1. The elements of Statics and Dynamics, Part-I – Statics by S.L. Loney, Book palace, New Delhi.
2. The elements of Statics and Dynamics, Part-II-Dynamics by S.L.Loney, AITBS Publications and distributions (Regd), Delhi

Reference Book: Mechanics by P. Durai Pandian, Laxmi Durai Pandian, Muthamizh Jaya prakasan, S. Chand and Company limited.

PRACTICAL PAPERS

I, II, III & IV

The curriculum for practicals in each paper consists of a question bank comprising 80 questions, taking 20 questions from each of the 4 units. The respective Universities have to get the question bank prepared for each paper and get it approved by the respective pass Board concerned.

Suggested Changes:

The committee under the Chairmanship of Sri Ch. Venkateswara Rao suggested the following as the syllabus prescribed for Mathematics Paper II & Paper III of B.A./B.Sc. found to be heavy.

1) In unit II of Paper II under the title “Rings” the topics i) Rings of Polynomials ii) Polynomials in an indeterminate form and (iii) the evaluation homomorphism are to be deleted.

2) In unit III of Paper III under the title “Multiple integrals” the topics

i) Length of curves

ii) Surface areas

iii) Integrate expression for the length of a curve, surface and surface areas.