

ALAGAPPA UNIVERSITY, KARAİKUDI
NEW SYLLABUS UNDER CBCS PATTERN (w.e.f.2014-15)

B.Sc., MATHEMATICS – PROGRAMME STRUCTURE

Sem	Course			Cr.	Hrs./ Week	Marks		Total	
	Part	Subject Code	Name			Int.	Ext.		
I	I	411T	Tamil/other languages – I	3	6	25	75	100	
	II	412E	English – I	3	6	25	75	100	
	III		4BMA1C1	Core – I – Differential Calculus and Trigonometry	4	6	25	75	100
			4BMA1C2	Core – II – Theory of Equations, Theory of Numbers and Inequalities	4	6	25	75	100
			Allied – I(Theory only) (or) Allied – I(Theory cum Practical)	5	5	25	75	100	
				4	3	15	60	75	
	Allied Practical - I	--	2*	--	--	--			
	IV	4NME1A / 4NME1B / 4NME1C	(1) Non-Major Elective – I – (a)jkpo; nkhopapd; mbg;gilfs;/ (b) ,f;fhy ,yf;fpak; / (c) Communicative English	2	1	25	75	100	
				Total (Allied Theory Only)	21	30	--	--	600
				Total(Allied Theory cum Practical)	20				575
II	I	421T	Tamil/other languages – II	3	6	25	75	100	
	II	422E	English – II	3	6	25	75	100	
	III		4BMA2C1	Core – III – Integral Calculus and Fourier Series	4	6	25	75	100
			4BMA2C2	Core – IV – Analytical Geometry of 3D and Vector Calculus	4	5	25	75	100
			Allied– II(Theory) (or) Allied –II(Theory cum Practical)	5	5	25	75	100	
				4	3	15	60	75	
	Allied Practical - I	2	2	20	30	50			
	IV	4BES2	(3) Environmental Studies	2	2	25	75	100	
			Total (Allied Theory Only)	21	30	--	--	600	
			Total(Allied Theory cum Practical)	22				625	
III	I	431T	Tamil /other languages – III	3	6	25	75	100	
	II	432E	English – III	3	6	25	75	100	
	III		4BMA3C1	Core – V – Modern Algebra	4	5	25	75	100
			4BMA3C2	Core – VI – Differential Equations and its Applications	4	5	25	75	100
			Allied – III (Theory only) (or) Allied–III(Theory cum Practical)	5	5	25	75	100	
				4	3	15	60	75	
			Allied Practical - II	--	2*	--	--	--	

	IV	4NME3A / 4NME3B / 4NME3C	(1) Non-major Elective – II – (a) ,yf;fpaKk; nkhopg; gad;ghLk;/ (b) goe;jkpo; ,yf;fpaq;fSk; ,yf;fpa tuyhWk; / (c)Effective Employability Skills	2	1	25	75	100
		4SBS3A1/ 4SBS3A2	(2) Skill Based Subjects – I	2	2	25	75	100
	V	4BEA3	Extension activities	1	--	100	--	100
			Total (Allied Theory Only)	24	30	--	--	800
			Total(Allied Theory cum Practical)	23				775
IV	I	441T	Tamil /other language – IV	3	6	25	75	100
	II	442E	English – IV	3	6	25	75	100
	III	4BMA4C1	Core –VII – Sequences and Series	4	5	25	75	100
		4BMA4C2	Core – VIII –Linear Algebra	4	4	25	75	100
			Allied – III (Theory only) (or) Allied–III(Theory cum Practical)	5	5	25	75	100
			Allied Practical - II	4	3	15	60	75
	IV	4SBS4B1/ 4SBS4B2	(2) Skill Based Subjects – II	2	2	25	75	100
		4BVE4/ 4BMY4/ 4BWS4	(4) Value Education / Manavalakalai Yoga / Women’s Studies	2	2	25	75	100
			Total (Allied Theory Only)	23	30	--	--	700
			Total(Allied Theory cum Practical)	24				725
V	III	4BMA5C1	Core – IX – Modern Analysis	4	6	25	75	100
		4BMA5C2	Core – X – Mathematical Statistics	4	5	25	75	100
		4BMA5C3	Core – XI – Statics	4	5	25	75	100
		4BMA5C4	Core –XII– Linear Programming	4	5	25	75	100
		4BMAE1A/ 4BMAE1B	Elective – I – Graph Theory (or) Programming in C with Lab	5	5	25	75	100
	IV	4SBS5A3/ 4SBS5A4/ 4SBS5A5	(2) Skill Based Subjects – I	2	2	25	75	100
			(2) Skill Based Subjects – I	2	2	25	75	100
			Total	25	30	--	--	700
VI	III	4BMA6C1	Core – XIII – Complex Analysis	4	6	25	75	100
		4BMA6C2	Core –XIV– Operations Research	4	5	25	75	100
		4BMA6C3	Core –XV- Dynamics	4	5	25	75	100
		4BMAE2A/ 4BMAE2B	Elective – II – Discrete Mathematics (or) Fuzzy Algebra	5	5	25	75	100
		4BMAE3A/ 4BMAE3B	Elective – III – Numerical Analysis (or) M.S.Office with Lab	5	5	25	75	100
		IV	4SBS6B3/ 4SBS6B4/ 4SBS6B5	(2) Skill Based Subjects – II	2	2	25	75
			(2) Skill Based Subjects – II	2	2	25	75	100
				Total	26	30	--	--
			Grand Total	140	180	--	--	4100

* University Examinations will be held in the Even Semesters.

**I YEAR – I SEMESTER
COURSE CODE: 4BMA1C1**

CORE COURSE – I – DIFFERENTIAL CALCULUS AND TRIGONOMETRY

Unit I

Successive differentiation – Expansion of functions Leibnitz formula – max and min of function of two variables.

Unit II

Sub tangent and subnormal – Polar coordinates angle between the tangents -slope of the tangent – Angle of intersection of two curves – polar sub tangent and polar – subnormal – Length of arc – Asymptotes.

Unit III

Envelopes – curvature – circle, radius and centre of curvature – Evolutes – radius of curvature in polar co-ordinates – polar equations.

Unit IV

Application of De Moivre's Theorem – Expansions of $\sin n\theta$, $\cos n\theta$, $\tan n\theta$. Expansions of $\sin\theta$ and $\cos\theta$ in ascending powers of θ – Expansions of $\sin^n\theta$ and $\cos^n\theta$ in terms of multiple angles

Unit V

Hyperbolic functions – inverse hyperbolic functions.

Text Books

1. Calculus Vol. 1 by Narayanan and Manickavasagam pillai
2. Trigonometry by Narayanan and Manickavasagam Pillai

Reference Books

1. Advanced Calculus Vol.I by S. Arumugam and others



**I YEAR – I SEMESTER
COURSE CODE: 4BMA1C2**

**CORE COURSE II – THEORY OF EQUATIONS, THEORY OF NUMBERS AND
INEQUALITIES**

Unit I

Relation between the roots and coefficients of equations – Symmetric functions of the roots of the equation $f(x) = 0$ – sum of the powers of the roots of an equation – Newton's method of finding S_r – Transformation of equations – Roots multiplied by a given number – Standard forms to increase and decrease the roots of a given equation by a given quantity – Removal of terms – the general transformations.

Unit II

Reciprocal equations – Location and nature of the roots of an equation – Descartes' rule of signs – Rolle's Theorem – Deductions from Rolle's theorem – Multiple roots – Sturm's Theorem (proof not needed) – Newton's method of finding integral roots of an equation – Horner's method.

Unit III

Theory of Numbers – Divisibility in \mathbb{Z} – Division algorithm – Euclidean Algorithm – Prime and composite numbers – Properties of Prime numbers – Unique factorization theorem – Divisors of a given number N – Euler's ϕ – function – Value of $\phi(N)$ – integral part of a real number – simple problems – product of r consecutive integers is divisible by $r!$.

Unit IV

Congruences: Properties of congruences – criteria of divisibility of a number – simple problems – Numbers in Arithmetic Progression – Residue Classes – linear congruences – simultaneous congruences – Chinese Remainder Theorem – Fermat's theorem – Wilson's Theorem .

Unit V

Inequalities – Theorem: Arithmetic Mean $>$ Geometric Mean – simple problems – extension of the theorem $AM > GM$ – mean of the m^{th} powers of two quantities – General case – Weirstrass Inequalities – Schwartz's inequality – simple problems.

Text Book

1. Set theory and theory of equations by S.Arumugam and Issac.
2. Algebra by Narayanan and T.K. Manickavasagam Pillai.

Reference Book

Theory of Equations, Theory of Numbers and Inequalities by Dr. M.K. Venkataraman and Mrs.Manaroma Sridhar



**I YEAR – II SEMESTER
COURSE CODE: 4BMA2C1**

CORE COURSE III – INTEGRAL CALCULUS AND FOURIER SERIES

Unit I

Definite Integrals and their properties

Unit II

Reduction formula for $\sin^n x$, $\cos^n x$, $\tan^n x$, $\sin^m x \cos^n x$ – Bernoulli's formula

Unit III

Double integrals – change of variables – Jacobian – Triple integrals

Unit IV

Beta and Gamma Integrals – Properties and Problems

Unit V

Fourier series – Expansion of even and odd functions – half range series

Text Book

1. Calculus: Volume 2 by Narayanan and Manicka vasagampillai
2. Calculus Vol.3 (2004) by Narayanan and Manickavsagam pillai

Reference Book

Fourier Series by S.Arumugam and Issac.



**I YEAR – II SEMESTER
COURSE CODE: 4BMA2C2**

CORE COURSE IV – ANALYTICAL GEOMETRY OF 3D AND VECTOR CALCULUS

Unit I

Review of DCS of a line. Angle between lines.

Planes: Various forms of equation of a plane – Angle between planes – Bisector planes – Perpendicular distance from a point to a plane – Problems. Equation of straight line in various forms – Image of a line on a plane

Unit II

Intersection of two lines, coplanar lines – Angle between a line and a plane, length of perpendicular from a point to a line – Shortest distance, distance between two skew lines

Unit III

Sphere: Equation of a sphere in various forms – Tangent line and tangent plane, section of a sphere problems.

Cone: Equation of a cone in various forms, simple problems. Cylinder: Equation of right circular cylinder, simple problems.

Unit IV

Vector differentiation – gradient, curl, divergence, vector identities, problems.

Unit V

Vector integration – Line integral – surface integral, volume integral. Green's Theorem, Stokes theorem, Gauss's Theorem. Statements and verification only.

Text Books

1. Analytical Geometry 3D and Vector Calculus by T.K. Manickavasagampillai and others.
2. Analytical Geometry 3D and Vector Calculus by Dr.S.Arumugam & Issac

Reference Books

Analytical Geometry 3D and Vector Calculus by M.K. Venkataraman & Manorama Sridhar



**II YEAR – III SEMESTER
COURSE CODE: 4BMA3C1**

CORE COURSE V – MODERN ALGEBRA

Unit I

Subgroups – definitions and examples – center – Normalizer – Intersection and Union of subgroups. Permutations – Cycles and transpositions – permutations as a product of disjoint cycles and Transpositions – even and odd permutations – S_n and A_n . Cyclic groups – definitions and examples – Cyclic groups are abelian – A group is cyclic if its order is equal to the order of one of its elements – subgroups of cyclic groups are cyclic – theorem on the number of generators of cyclic groups.

Unit II

Cosets and their properties – congruence relation modulo a subgroup – Lagrange's Theorem and its consequences – The order of an element of finite group divides the order of the group. A group of prime order is cyclic – group has not proper subgroup if it is a cyclic group of prime order – Euler's theorem – Fermat's theorem.

Unit III

Normal subgroups – equivalent conditions for a subgroup to be normal – any subgroup of an abelian group is normal – a subgroup of index 2 is normal intersection of two normal subgroup – center is a normal subgroup If a subgroup has exactly one subgroup of given order then it is normal– Quotient group.

Unit IV

Homomorphism – types of homomorphism – homomorphism with reference to identity, inverse and order of an element – its properties – Kernel of a homomorphism – homomorphic image of an abelian group is abelian and that of a cyclic group is cyclic. Isomorphism: Isomorphism is an equivalence relation among groups – any infinite cyclic is isomorphic to the group of integers – any finite cyclic group of order n is isomorphic to Z_n – Cayley's theorem – the fundamental theorem of homomorphism

Unit V

Rings definitions and examples – elementary properties of rings Division of rings and fields – zero divisors of a ring – zero divisors of Z_n integral domain – a finite integral domain is a field– characteristics of ring – characteristic of an integral domain is either zero or a prime number – Field of quotients of an integral domain – every integral domain can be, embedded a field.

Text Book

Modern Algebra by Arumugam & others.



II YEAR – III SEMESTER

COURSE CODE: 4BMA3C2

CORE COURSE VI – DIFFERENTIAL EQUATIONS AND ITS APPLICATIONS

Unit I

Equations of the first order and of the first degree – Preliminaries (not included for the examination) – Exact differential equations – Conditions for the equation to be exact – working rule for solving it – problems – Equations of the first order and of a degree higher than the first – Equations solvable for x , y and dy/dx – Clairaut's equation – Second and higher order linear Differential equations with constant Coefficients.

Unit II

Homogeneous linear Equations with variable coefficients – equations reducible to the homogeneous linear form – Simultaneous Equations – Linear Equations of the second order with variable coefficients

Unit III

Method of reduction of order – Method of variation of parameters – Equations that do not contain y directly – Equations that do not contain x directly – Total Differential equations – Necessary and Sufficient condition of integrability of $Pdx + Qdy + Rdz = 0$ – Rules for solving it.

Unit IV

Partial Differential Equations – Formation of P.D.E. by the elimination of constants – Formation of P.D.E by the elimination of arbitrary functions – General, particular and complete integrals of P.D.E – Solution of first order P.D.E standard forms – Lagrange's method – Charpit's method.

Unit V

Laplace Transforms – theorems – evaluation of integrals – Inverse Laplace Transforms – Solving ordinary differential equation with constant coefficients and variable coefficients and simultaneous Linear equations using Laplace Transforms.

Text Book

Differential Equations by T.K.Manivasagam and Narayanan

Reference Book

Differential Equations and Laplace Transforms by Dr. M.K. Venkataraman & Mrs. Manorama Sridhar



II YEAR – IV SEMESTER

COURSE CODE: 4BMA4C1

CORE COURSE VII – SEQUENCES AND SERIES

Unit I

Sequences: Definition and examples for: Sequences, Convergence, divergence. Oscillation, Monotonic and bounded sequences, subsequence and cauchy sequence.

Theorems: Limit of convergence is unique. Theorems on algebra of limits.

Unit II

Theorems on Monotonic sequence – Theorem on Cauchy sequence Cauchy general principle of convergence, Behaviour of Geometric sequence.

Unit III

Infinite series: Series of positive terms cauchy's general principle of convergence, comparison test – Harmonic series $\sum 1/n^p$

Unit IV

Kummer's test – Raabe's test – D' Alembert's ratio test – cauchy's root test – Gauss test – Problems

Unit V

Cauchy condensation test – cauchy's integral test Alternating series – Absolute convergence – conditionally convergence (Theorems) Leibnitz's test – Problems

Text Book

Sequences and Series by S.Arumugam and Issac.

Reference Book

Algebra Vol.1 by T.K.Manikavasagampillai and Others.



II YEAR – IV SEMESTER

COURSE CODE: 4BMA4C2

CORE COURSE VIII – LINEAR ALGEBRA

Unit I

Vector Spaces – elementary' properties – subspaces – quotient spaces – Direct sum –Linear span of a set – linear dependence and independence

Unit II

Basis, dimension, any two bases of a finite dimensional vector space have the same number of elements– theorems on dimension

$$\dim(A+B) = \dim A + \dim B - \dim(A \cap B)$$

Unit III

Linear transformations – vector space of linear transformations – rank and nullity theorem – matrix of a linear transformation

Unit IV

Characteristic equation of a matrix – eigen values and eigen vectors – related simple problems – Cayley–Hamilton theorem and simple problems – consistency of a system of simultaneous linear equations – solution of simultaneous equations using matrices.

Unit V

Inner product spaces – Norm – Schwartz inequality – triangular inequality – Gramschmidt orthogonalisation process.

Text Book

Algebra by S. Arumugam and Issac.

Reference Book

Modern Algebra by T.K. Manicavachagom Pillay and Narayanan



III YEAR – V SEMESTER

COURSE CODE: 4BMA5C1

CORE COURSE IX – MODERN ANALYSIS

Unit I

Introduction – Countable and uncountable sets – Inequalities of Holder Minkowski – Metric space – Definitions and examples – open sets – Equivalent metric space – Subspace – closed sets.

Unit II

Completeness – Definition and Examples – Cantor intersection theorem – Baire Category theorem

Unit III

Continuity – Definition and Examples – Uniform continuity – Homeomorphism.

Unit IV

Connectedness – definition and examples – connected subsets of R connectedness and continuity– Intermediate value theorem.

Unit V

Compactness – definition and examples – compact subset of R . Equivalent characterization for compactness – continuity and compactness.

Text Book

Modern Analysis by S. Arumugam and Issac

Reference Book

Modern Analysis by A.R.Vasishta



III YEAR – V SEMESTER

COURSE CODE: 4BMA5C2

CORE COURSE X – MATHEMATICAL STATISTICS

Unit I

Probability density function, Mathematical expectation moment generating Function

Unit II

Probability distribution, Binomial, Poisson, Normal distribution

Unit III

Test of significance (Large Samples)

Unit IV

Test of Significance (Small Samples)

Unit V

Test based on X^2 –distributions, Analysis of Variance: One way classification, two way classification and Latin square design.

Text Book

Statistics by Arumugam and Issac



III YEAR – V SEMESTER

COURSE CODE: 4BMA5C3
CORE COURSE XI - STATICS

Unit – I

Law of parallelogram of forces-Lami's theorem-Resolution of forces.

Unit – II

Like Parallel forces-Unlike Parallel forces-Moments-Varignon's theorem of Moments-Generalized theorem of Moments-Couples-Definition equilibrium of couples-resultant of coplanar couples.

Unit – III

Equilibrium of three forces acting on a rigid body-three coplanar forces-conditions of equilibrium-Coplanar forces-Reduction of coplanar forces-Equation to the line of action of the resultant.

Unit – IV

Forces of Friction-Laws of Friction-Limiting Friction-Limiting equilibrium-Cone of Friction-Angle of Friction.

Unit – V

Equation to Common Catenary-Tension at any point-Geometrical properties of Common Catenary.

Text Book:

Venkataraman M.K, Statics, Agasthiar Publishers, Eleventh

Chapter 2 Sections 1-4 & 6-12 Pages: 9 to 16 & 17 to 51
Chapter 3 Sections 1-13; Chapter 4 Sections 1-10 Pages: 52-78 & 84-97
Chapter 5 Sections 1-6; Chapter 6 Sections 1-9 Pages: 98 to 122 & 143-167
Chapter 7 Sections 1-13 Pages: 206-234
Chapter 11 Sections 1-6 Pages: 375-391



III YEAR – V SEMESTER

COURSE CODE: 4BMA5C4

CORE COURSE XII - LINEAR PROGRAMMING

Unit I

Linear Programming problem: Introduction - Mathematical formulation - Graphical solution method - General linear programming problem - canonical and standard forms of L.P.P. Simplex method: Solution - feasible solution - basic solution - basic feasible solution- Degenerate basic feasible solution - optimal solution. Improved basic solution, unbounded solution, condition of optimality, convex combination of K-different optimum solutions to L.P.P is again an optimum solution.

Unit II

Simplex Algorithm use of artificial variables. Two phase method, Big-M-method. Solution of simultaneous linear equations. Inventing a matrix using simplex method.

Unit III

Duality: General primal-dual pair. Formulation of dual problem for a given L.P.P. Duality theorems: Dual of dual is primal. Weak duality theorem, fundamental theorem of duality. Duality and simplex method. Dual simplex method.

Unit IV

Transportation problem: Definition of a transportation problem, mathematical formulation, obtaining initial solution by

1. Northwest Corner method
2. Least cost method
3. V.A method (Vogel's Approximation method)
4. Obtaining optimum solution: Modi method
5. Unbalanced T.P. and its solution, maximization T.P

Unit V

Assignment problem: Definition, mathematical formulation and Hungarian method. Unbalanced assignment problem. Traveling Salesman problem, Sequencing problem: For n jobs on 2 machines. For n jobs on k machines, For 2 jobs on k machines.

Text Book

Operations Research by Kanti Swarup, P.K. Gupta & Man Mohan

Reference Books

1. Operations Research by Hamdy A. Taha
2. Linear Programming by M.K. Venkataraman



III YEAR – V SEMESTER

COURSE CODE: 4BMAE1A

ELECTIVE COURSE I (A) – GRAPH THEORY

Unit I

Definition examples – sub graphs – isomorphism – Ramsey Numbers – Independent sets – coverings Intersection graphs – line graph, Matrices – degree sequences – Graphic sequences

Unit II

Walks, trails, paths – connectedness and components "A graph is bipartite if and only if all its cycles are of even length" – cut point – bridge. Trees – characterization of trees – center of a tree.

Unit III

Planarity – Euler's formula – deductions Kuratowski graphs are non planar

Unit IV

Colourability: Chromatic number – chromatic Index – Five colour theorem – Four colour problem, chromatic polynomials and their properties.

Unit V

Directed graphs – connectivity in digraph, strong orientation graphs – tournaments (S.A.Choudam Book only)

Text Books

1. Invitation to graph Theory: Dr. S Arumugam and others
2. A first course in Graph Theory: S.A. Choudam. (For directed graph)

Reference

Graph Theory – Bondy Mur



III YEAR – V SEMESTER

COURSE CODE: 4BMAE1B

ELELCTIVE COURSE I (B) – PROGRAMMING IN C WITH LAB

Unit I

Constants, variables and datatypes, operators and expressions, managing input and output operations,

Unit II

Decision making and branching decision making and looping

Unit III

Arrays, handling of character strings.

Unit IV

User – defined functions, structures and unions

Unit V

Pointers

Text Books

1. Programming in ANSI C by E, Balagurusamy, second edition, Tata McGraw – Hill publishing company Limited, New Delhi Chapter 2, 3, 4, 5, 6, 7, 8, 9, 10, 12 & 13
2. C and Data Structures by P. Radha Ganesan, Scitech Publications (INDIA) Pvt. Ltd.
3. Let us C by Yashawanth Kanetkar

Reference Book

Programming with C by Byron Gottfhed (second edition) (Tata McGraw Hill)

PRACTICAL – PROGRAMMING IN C

1. Write a program to calculate the simple interest for various rate of interest.
2. Write a program to calculate the salesman commission.

Amount of Sales	Commission
10,000	5%
15,000	8%
More than 15,000	10%

3. Write a program to find the sum of digits of a given number.
4. Check whether the given number is prime or not.
5. Write a program to find the roots of the quadratic equation.
6. Write a program to reverse the given string and checking palindrome.
7. Write a program to calculate successive Fibonacci Numbers.
8. Write a program to find the nCr value, using functions.
9. Write a program to sort the numbers (ascending and descending)
10. Write a program to multiply the given two matrices.
11. Write a program to maintain the employee details using structures.
12. Write a program to arrange names alphabetically using pointers.
13. Write a program to count number of words and characters in the given text.



III YEAR – VI SEMESTER

COURSE CODE: 4BMA6C1

CORE COURSE XIII – COMPLEX ANALYSIS

Unit I

Complex numbers: Modulus amplitude and product of complex numbers – Equations of straight line, circle – Reflection points, concyclic point, inverse point, meaning of

$$\text{Mod } \left(\frac{Z-Z_1}{Z-Z_2} \right) \text{ and amp } \left(\frac{Z-Z_1}{Z-Z_2} \right)$$

Unit II

Analytic function – C.R equations – C.R. equations in Polar forms – Harmonic functions.

Unit III

Bilinear transformation Cross ratio fixed points–Transformations which map real axis to real axis – unit circle to unit circle and real axis to unit circle. $W=Z^2$, $W =Z^{1/2}$, $w = e^z$
 $w= 1/z$, $w = \sin z$, $w = 1/2(z+ 1/z)$.

Unit IV

Complex integration Cauchy integral theorem – Cauchy Integral formula Derivatives of analytic function Moreras theorem, Cauchy's inequality, Liouvilles theorem – fundamental theorem of Algebra – Taylor's theorem – Taylor Laurentz series

Unit V

Singular points – argument principle Rouché's theorem – Calculus of Residue – Residue theorem – Evaluation of definite integrals.

Text Book

Complex Analysis by S. Arumugam & Issac

Reference Book

1. Complex Analysis by Dr. N. Sridharan
2. Complex Analysis by S.Narayanan & T.K.Manickavasagam Pillai



III YEAR – VI SEMESTER

COURSE CODE: 4BMA6C2

CORE COURSE XIV – OPERATIONS RESEARCH

Unit I

Nature and features of Operations Research, Modelling in Operations Research. Classification of models, General solution methods for O.R. models. Methodology of operations research. Replacement problem: Replacement of equipment/ asset that deteriorates gradually, replacement of equipment that fails suddenly.

Unit II

Inventory control: The inventory decisions costs associated with inventories

1. Deterministic inventory problems with no shortages
2. Production problem, problem with finite replenishment
3. Deterministic inventory problems with shortages
 - (a) Purchasing model
 - (b) Production model (finite replenishment)

EOQ problems with Price breaks, Probabilistic inventory problems: Single period problem without set up-cost, two models

1. The demand is uniform
2. The demand is not uniform

Unit III

Queuing Theory: Queue characteristics, Probability distribution of queuing system, pure birth process, distribution of interarrival times, distributions of departures, transient and steady states, Kendal notation solution of queue models

1. (M/M/1): (α /FIFO), (M/M/1): (α / ISRO)
2. (M/M/1): (N/FIFO)

Unit IV

Network scheduling by PERT/CPM, Network and basic components – drawing networks, critical path analysis. PERT Analysis

Unit V

Game Theory: Two person zero sum games, The maximin – minimax principle, Games without saddle points – mixed strategies, graphical solution of $2 \times n$ and $m \times 2$ games, General solution of $m \times n$ rectangular games (L.P.P. method)

Text Book

Operations Research by

1. Kanti Swarup, P.K.Gupta & Man mohan
2. Sultan Chand & Sons, New Delhi, Ninth Edition Chapters 1,17, 18,19, 20 and 21

Reference Books

1. Hamdy A Taha: Operations Research
2. Sundaresan & others Operations Research



III YEAR – VI SEMESTER

COURSE CODE: 4BMA6C3

CORE COURSE XV – DYNAMICS

Unit – I

Motion in a plane without air resistance-path of a projectile – Time of flight-Horizontal range –Motion of a projectile up an inclined plane.

Unit – II

Fundamental laws of impact – Impact of a smooth sphere on a fixed smooth plane – Direct impact of smooth elastic spheres – oblique impact of smooth elastic spheres.

Unit – III

Definition – Geometrical representation of S.H.M. – Composition of S.H.M.'S of the same period and in the same line - Composition of S.H.M.'S of the same period and in two perpendicular directions.

Unit – IV

Radial and transverse components of velocity and acceleration – Differential equation of a central orbit – Given the orbit to find the law of force – Given the law of force to find the orbit.

Unit – V

Kinetic Energy – Angular momentum – Equation of motion – Conservation of angular momentum – Principle of energy – Compound pendulum – Centers of suspension and oscillation.

Text Book

M.K.Venkataraman, Dynamics, Agasthiar Publications.

Chapter 6 Sections 6.1 to 6.10,6.12 to 6.16

Chapter 8 Sections 8.1 to 8.11

Chapter 10 Sections 10.1 to 10.8

Chapter 11 Sections 11.1 to 11.13

Chapter 13 Sections 13.1 to 13.8



III YEAR – VI SEMESTER

COURSE CODE: 4BMAE2A

ELECTIVE COURSE II (A) – DISCRETE MATHEMATICS

Unit I

TF statements – Connectives – Truth table of a formula – Tautology – Implications and Equivalence of formula – Replacement process. Normal forms – principal Normal forms. Theory of Inference.

Unit II

Relations – Representation of a relation. Equivalence relation Lattices – modular and Distributive lattices – Boolean Algebra Boolean Polynomials.

Unit III

Coding Theory – Introduction – Hamming distance – encoding a ménage – Group codes Decoding and error correction.

Unit IV

Finite Automata – Representation – Acceptability of a string – Non-deterministic – Equivalence of FA and NFA.

Unit V

Phase Structure grammars – Chomsky Hierarchy of Languages – Finite Automata and regular Languages.

Text Book

Discrete Mathematics by M.K. Venkataraman, N.Sridaran & N.Chandra sekar

Chapter 9	–	Sec. 1 to 13	Chapter 8	–	Sec. 1 to 6
Chapter 2	–	Sec. 1, 2, 5	Chapter 12	–	Sec. 1 to 9
Chapter 10	–	Sec. 1 to 6	Chapter 12	–	Sec. 16 to 18

Reference Book

1. Discrete Mathematical Structures by Tremblay Manohar, Tata McGraw Hill Publishing company, New Delhi.
2. Discrete Mathematical Structures by C.L. Liu McGraw Hill Book Company.



**III YEAR – VI SEMESTER
COURSE CODE: 4BMAE2B**

ELELCTIVE COURSE II (B) – FUZZY ALGEBRA

Unit – I

Fuzzy sets – Basic types – Basic concepts – α -cuts – Additional properties of α -cuts –Extension principle for Fuzzy sets.

Unit – II

Operations on Fuzzy sets –Types of operations – Fuzzy complements - t-Norms – Fuzzy Unions.

Unit – III

Combinations of operations - Fuzzy Arithmetic – Fuzzy numbers.

Unit – IV

Arithmetic operations on intervals – Arithmetic operations on Fuzzy numbers – Fuzzy relations – Binary fuzzy relations – Fuzzy equivalence relations – Fuzzy compatibility relations.

Unit – V

Fuzzy ordering relations – fuzzy morphisms

Text Book

1. George J.Klir and Bo Yuan, Fuzzy Sets and Fuzzy Logic, Prentice Hall of India, New Delhi, 2004.

References

1. H.J. Zimmermann, Fuzzy Set Theory and its Applications, Allied Publishers Limited, New Delhi, 1991



**III YEAR – VI SEMESTER
COURSE CODE: 4BMAE3A**

ELECTIVE COURSE III (A) – NUMERICAL ANALYSIS

Unit I

Basic concepts of operators Δ, ∇ and E - their basic properties – factorial polynomial – difference of polynomial – simple problems.

Unit II

Interpolation – Newton's forward and backward formula – divided differences and their properties– Newton's divided difference formula – Gauss's formula – Stirling formula Lagrange's formula – simple problems – Inverse interpolation using Lagrange's formula – Successive approximation – simple problems.

Unit III

Numerical differentiation – upto second order – maxima and minima. Numerical integration – quadrature formula – Trapezoidal rule – Simpson's – 1/3 rule, 3/8 rule – Weddle's rule – Gregory's formula – Euler Maclaurin's formula – Newton cote's formula.

Unit IV

Summation of series using finite difference techniques – Euler Maclaurin's summation problems– simple problem – Differential equation – solution of first and second order equation with constant coefficient.

Unit V

Solution of ordinary differential equation of first order by Euler, Taylor and Runge – Kutta methods of second and fourth order

Text Book

Numerical Analysis – S.Arumugam & Issac

Reference

Numerical methods in Science and Engineering – M.K.Venkatraman



**III YEAR – VI SEMESTER
COURSE CODE: 4BMAE3B**

ELECTIVE COURSE III (B) – MS OFFICE WITH LAB

Unit I

MS Word introduction, word for windows – creating a document changing the format text – cut, copy, paste, Advanced format (borders, tables, pictures) Define document and tool, saving your work, setting your page, preview the document.

Unit II

MS Word's master document, find and replace, define template, Styles, toolbars, setting headers and footers, spelling check, grammar check, Hyphenation auto correct, bullets and numbering, table creation, mail merge.

Unit III

MS Excel Introduction – Explanations for excel page (row, column, and cells) how to enter data, usage of formula and functions and creating excel chart (Area, bar, column, doughnut, line, pie, Radar and 3-D Charts)

Unit IV

Data Manipulation – setting printer range – resize the margin – various types of functions (Statistical mathematical string, Logical date and time) – Data query, fill, table

Unit V

What is power point – why – use – define presentation and wizard – Power Point slide changer – adding Slide message – slide show. What is Access – What is database – what are tables, Queries, forms – creating a table using wizard – creating a form using a wizard.

Text Book

Inside Microsoft Office Professional

Chapter: 1, 2, 3, 8, 9, 10, 12, 16, 17, 19, and 20

MS OFFICE – PRACTICALS

MS-Word

Design a document using a MS-Word with the following options

1. Bold, underline, italics, different styles
2. Tables
3. Header and footer
4. Mail Merge

Using MS-Excel

5. To perform mathematical functions
6. To perform string functions
7. To perform logical functions
8. To perform date & time functions
9. To create different types of chart for some data

Using Power Point

10. Create a slide show

Using Access

11. Create a database Access
12. Executing simple queries

