

MEENAKSHI COLLEGE FOR WOMEN

DEPARTMENT OF MATHEMATICS

B.Sc. MATHEMATICS

COURSE PATTERN

SEMESTER - I

PART I

S.No.	Subject Code	Title	Credits
		LANGUAGE PAPER I	03

PART II

	1GE1	GENERAL ENGLISH PAPER I	03
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PART III

1.	1MM01b	ALGEBRA & ANALYTICAL GEOMETRY – 2D	05
2.	1MM02	DIFFERENTIAL CALCULUS	05
3.	1ANM1a	ALLIED NUMERICAL ANALYSIS I	04

PART IV

1.	OVE	VALUE EDUCATION	02
2.		NON MAJOR ELECTIVE	02

SEMESTER - II

PART I

S.No.	Subject Code	Title	Credits
		LANGUAGE PAPER II	03

PART II

	2GE2	GENERAL ENGLISH PAPER II	03
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PART III

1.	2MM03b	TRIGONOMETRY & SOLID GEOMETRY	05
2.	2MM04	INTEGRAL CALCULUS	05
3.	2ANM2a	ALLIED NUMERICAL ANALYSIS II	04
4.	2MMP1	MAIN PRACTICAL I	05

PART IV

1.	OEST	ENVIRONMENTAL STUDIES (Theory)	01
2.	OESPV	ENVIRONMENTAL STUDIES (Project & Viva-Voce)	01
3.		NON MAJOR ELECTIVE	02

SEMESTER - III

PART I

S.No.	Subject Code	Title	Credits
		LANGUAGE PAPER III	03

PART II

	3GE3	GENERAL ENGLISH PAPER III	03
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PART III

1.	3MM05a	DIFFERENTIAL EQUATIONS	05
2.	3MM06	DISCRETE MATHEMATICS	05
3.	3ASM1a	ALLIED MATHEMATICAL STATISTICS I	04

PART IV

1.	SFM	FUNCTIONAL MATHEMATICS	02
2.	OECT1	ENGLISH COMMUNICATION SKILLS I (Theory)	01
3.	OECPI	ENGLISH COMMUNICATION SKILLS I (Practical)	01
4.	SAR1	ANALYTICAL REASONING I	02

SEMESTER - IV**PART I**

S.No.	Subject Code	Title	Credits
		LANGUAGE PAPER IV	03

PART III

1.	4MM07b	VECTORS & FOURIER TRANSFORMS	05
2.	4MM08c	MATHEMATICAL ANALYSIS I	05
3.	4MM09a	PROGRAMMING IN C	05
4.	4ASM2a	ALLIED MATHEMATICAL STATISTICS II	04
5.	4MMP2	MAIN PRACTICAL II	05
6.	4MMP3	MAIN PRACTICAL III	05
7.	4ASMPV	ALLIED PROJECT & VIVA-VOCE	04

PART IV

1.	OGK	GENERAL KNOWLEDGE	02
2.	SAR2	ANALYTICAL REASONING II	02

SEMESTER - V**PART III**

1.	5MM10	ALGEBRAIC STRUCTURES	05
2.	5MM11c	MATHEMATICAL ANALYSIS II	05
3.	5MM12	STATICS	05
4.	5MM13a	DATA STRUCTURES & ALGORITHMS	05
5.	5EM01a	NUMBER THEORY	05
6.	5EM02	LINEAR PROGRAMMING	05

PART IV

1.	OECT2	ENGLISH COMMUNICATION SKILLS II (Theory)	01
2.	OCEP2	ENGLISH COMMUNICATION SKILLS II (Practical)	01
3.	SAR3	ANALYTICAL REASONING III	02

SEMESTER - VI**PART II**

S.No.	Subject Code	Title	Credits
	6GE4	ENGLISH FOR COMPETITIVE EXAMINATIONS	03

PART III

1.	6MM14a	LINEAR ALGEBRA	05
2.	6MM15	COMPLEX VARIABLES	05
3.	6MM16	DYNAMICS	05
4.	6EM03	OPTIMISATION TECHNIQUES	05
5.	6EM04a	GRAPH THEORY	05
6.	6MMPR	PROJECT WORK (Optional)	05
7.	6MMPV	PROJECT VIVA-VOCE (Optional)	05

PART IV

1.	OQCC	QUALITY CONTROL CIRCLES (Theory)	01
2.	OQCCP	QUALITY CONTROL CIRCLES (Presentation)	01

PART V

	EXT	EXTENSION SERVICES	02
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B.Sc. MATHEMATICS
SEMESTER –I
MAIN PAPER: 1
ALGEBRA & ANALYTICAL GEOMETRY -2D
SUBJECT CODE: 1MM01b

Unit I:

Theory of equations: Polynomial equations - Imaginary & irrational roots, simple problems on relations between the roots and coefficients of equations up to third degree only, simple problems on symmetric functions of roots of equations up to third degree only, Reciprocal equations, transformations of equations into another having roots with signs changed, roots multiplied by a given number, roots increased or decreased by a given quantity, solutions of equations by removal of a specified term, (General transfer motions not included.)

Unit II:

Binomial, exponential & logarithmic series Theorems without proof, summation of infinite series using the above series.

Matrices: Definition of symmetric, skew symmetric, Hermitian & skew Hermitian, Orthogonal & unitary matrices, Eigen values & Eigen vectors, Cayley Hamilton theorem (no proof) -finding the inverse of a matrix using Cayley Hamilton theorem.

Unit III:

Coordinate geometry: Pole, polar for all conics (in Cartesian form only), conjugate points & conjugate lines, chord having a given point as its midpoint, pair of tangents from a point (in Cartesian form only), simple locus problems only.

Unit IV:

Diameters Diameters for all conics, conjugate diameter of ellipse, eccentric angles at the ends of a pair of conjugate semi-diameters of an ellipse, equi-conjugate diameters, conjugate diameters of a hyperbola.

UNIT V:

Polar Coordinates: Equation of a circle, equation of a chord of a circle, equation of a conic, equation of a chord of a conic, condition for the line $\frac{l}{r} = A \cos \theta + B \sin \theta$ to touch the conic $\frac{l}{r} = 1 + e \cos \theta$, simple problems only.

Contents and Treatment as in

1. T.K. Manicavachagam Pillay, T. Natarajan. K.S. Ganapathy, *Algebra*, Volume I, S.Viswanathan (Printers and Publishers) Pvt Ltd, 1992.
2. T.K.Manicavachagam Pillay, T.Natarajan. K.S.Ganapathy, *Algebra*, Volume II, S.Viswanathan (Printers and Publishers) Pvt Ltd, 1992.
3. K.C.Mathews, S. Veeraraghavan, T. Raghavan, *A Textbook of Co-ordinate Geometry of Two Dimensions and Three Dimensions*, S. Chand and Company Ltd 1980.

Unit I: Algebra Volume I- Ch 6, pp244-pp259, pp268-pp284

Unit II: Algebra Volume I-Ch3, pp124-pp129,pp167-pp175,pp190-pp192.
Algebra Volume II Ch2- Sec16.1 - 16.3

Unit III: A Textbook of Co-ordinate Geometry of Two Dimensions and Three Dimensions-Ch 7-Sec7.8 – 7.11, Sec7.18-Sec7.25.

Unit IV: A Textbook of Co-ordinate Geometry of Two Dimensions and Three Dimensions-Ch 10—Sec10.1- Sec10.3,Sec10.7-Sec10.9.

Unit V: A Textbook of Co-ordinate Geometry of Two Dimensions and Three Dimensions-Ch 12—Sec12.6- -Sec12.10.

Note: As there is a practical exam in this paper, only simple problems in the specified method may be asked from all the units in the main theory paper

B.Sc. MATHEMATICS
SEMESTER – I
MAIN PAPER – 2
DIFFERENTIAL CALCULUS
SUBJECT CODE: 1MM02

Unit I:

Successive differentiation- Leibnitz theorem (without proof) & application- partial differentiation & total differential coefficient- Euler's theorem- partial derivative of function of two variables

Unit II:

Maxima & minima of functions of two, three variables- Lagrange's method- simple problems

Unit III:

Polar coordinates- angles between radius vector & tangent, angle of intersection of two curves – pedal equation of a curve

Unit IV:

Curvature, radius of curvature,- in Cartesian, polar & parametric form, center of curvature- evolutes

Unit V:

Envelopes , asymptotes, method of finding asymptotes to a rational algebraic curve with special cases (without proof) ,asymptotes parallel to axes

Contents and Treatment as in

S.Narayanan & T.K.M Pillai, *Calculus, Volume I-Differential Calculus*, S. Viswanathan (Pvt), Ltd ,2007

Unit I: Chapter III : § 1.1 -§ 1.6; Exercises 13,14,§ 2.1, Exercise 15, Chapter VIII : § 1.1 -§ 1.7; Exercises 32 ,33

Unit II: Chapter VIII: § 4, § 5, Exercises 35

Unit III: Chapter IX: § 4.1- § 4.5, Exercises 41

Unit IV: Chapter X: § 2.1- § 2.8, Exercises 43, 44, 45.

Unit V: Chapter X: § 1.1 , Exercises 42, Chapter XI: § 1- § 7, Exercises 46, 47.

Books for Reference

1. P.R Vittal & V. Malini, *Calculus*.
2. R. Kandasamy & K.Thilakavathy, *Mathematics*, Volume I & Volume II, Chand & Co.

SEMESTER – I
ALLIED PAPER – I
NUMERICAL ANALYSIS – I
SUBJECT CODE: 1ANM1a

Unit I:

Finite Differences: Introduction, differences, factorial notation, the operators Δ , ∇ , E, D, Relation between the operators, simple problems.

Unit II:

Interpolation: The problem of interpolation-Newton's forward and backward formula for interpolation-Newton's divided difference formula-Lagrange's formula for interpolation-Sterling's, Bessel formula-simple problems.

Unit III:

Inverse Interpolation: Concept of inverse interpolation-inverse interpolation by using (i) Lagrange's formula inversely (ii) Successive approximation method or iteration-simple problems.

Unit IV:

Numerical differentiation: Numerical differentiation using Newton Gregory formula, Sterling's formula, Bessel's formula and Newton's divided difference formula.

Unit V:

Numerical Integration: General quadrature formula for equidistant ordinates based Newton's forward formula-Trapezoidal rule, Simpson's one-third rule, Simpson's three eighth rule-Euler Maclaurin's formula for numerical integration-simple problems.

Contents and Treatment as in

H.C. Saxena, *Finite Differences and Numerical Analysis*, S. Chand & Co.

Unit I: Chapter 1 (Omit § 1.4)

Unit II: Chapter 1 (Omit § 1.9, 1.9.1, 1.9.2, 1.9.3, 1.10.2, 1.10.3)

Chapter 2 (Omit § 2.2)

Chapter 3 (Omit § 3.2, 3.3, 3.6)

Unit III: Chapter 4 (Omit § 4.2.4)

Unit IV: Chapter 5 (Omit § 5.3, 5.5)

Unit V : Chapter 6 (Omit § 6.3.4, 6.5, 6.7)

Books for Reference

1. Dr. P. Balasubramanian, *Numerical Mathematics*.
2. B.D. Gupta, *Numerical Analysis*, Konark Publishers.

B.Sc MATHEMATICS
SEMESTER – II: CORE COURSE: MAIN PAPER 3
TRIGONOMETRY & SOLID GEOMETRY
SUBJECT CODE: 2MM03b

Unit I:

Expansions: Expansions for $\sin n\theta$ and $\cos n\theta$ (n being a positive integer), expansion for $\tan n\theta$, expansions for $\tan(\theta_1 + \theta_2 + \theta_3 + \dots + \theta_n)$, expressions for $\cos^n \theta$ and $\sin^n \theta$ in terms of multiple angles of θ , expansions of $\sin \theta$ and $\cos \theta$ in ascending powers of θ . Hyperbolic and inverse hyperbolic functions- Simple problems.

Unit II:

Logarithm of a complex number. Summation of series: The sum of a series of sines of angles in A.P, the sum of a series of cosines of angles in A.P, summation of trigonometric series which can be expressed in the form of $C + iS$:- Types (1) Geometric series (2) Binomial series (3) Exponential series (4) Logarithmic series.

Unit III:

Plane: General equation, plane perpendicular to a given direction, plane parallel to a given direction, plane parallel to given lines and through given points, plane of the form $P + \lambda P' = 0$. Condition for second degree homogeneous equation to represent a pair of planes, coplanarity of lines through a point, perpendicular from a given point to a plane.

Unit IV:

Straight line: Equation of a straight line- Symmetrical form, conditions for various situations of a line, coplanarity of two lines- angle between a plane and a line, perpendicular drawn to a line, shortest distance between two skew lines.

Unit V:

Sphere, cone, cylinder: Equations of a sphere, results based on properties of a sphere, tangent plane to a sphere, equations of a circle, radical plane, equations $S + \lambda P = 0$ and $S + \lambda S' = 0$. Equation of a cone, cone with vertex at origin, equation of a cylinder, right circular cylinder.

Content and Treatment as in

1. Dr.S.Sudha, '*Algebra, Analytical Geometry (2D) and Trigonometry*' for Units I and II.
2. P.Duraipandian, Laxmi Duraipandian and D.Muhilan- '*Analytical Geometry- 3 Dimension*', for

Units III, IV & V.

Unit I: Chapter I- Sections 1 to 8- Pages 1 to 19.

Chapter II:- Sections 1 to 3, 5- Pages 20 to 25, 27 to 34.

Unit II: Chapter III- Section 1 to 4- Pages 35 to 40.

Chapter IV- Sections 1, 2, 4- pages 48 to 64(omit Method of Differences).

Unit III: Sections 3.1 to 3.8 (only scalar form)

Unit IV: Sections 4.1 to 4.3, 4.5, 4.6(only scalar form)

Unit V: Sections 5.1 to 5.7, 6.1 to 6.3, 6.6, 6.7(only scalar form)

Books for Reference

1. Narayanan and Manicavachagom Pillay, *Trigonometry*.
2. P.R.Vittal, *Trigonometry*.
3. K.C. Mathews, S.Veeraraghavan & T.Raghavan, *A textbook of Coordinate Geometry* of two and three dimensions, Part.
4. S.L.Loney, II - *Three dimensions, Plane Trigonometry*.

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COURSE: B.Sc., MATHEMATICS
SEMESTER – II
MAIN PAPER 4
INTEGRAL CALCULUS
SUBJECT CODE: 2MM04

Unit I:

Properties of definite Integral- Integration by parts – reduction formulae

Unit II :

Double Integral in Cartesian & polar coordinates, triple integrals

Unit III:

Application of multiple integrals- area, volume of solids of revolutions- center of mass- area of curved surfaces

Unit IV:

Definition of Fourier series- Fourier coefficients, Fourier series for odd & even functions – half range series

Unit V:

Laplace transforms: definitions- properties- standard theorem on Laplace transform- simple problems– inverse Laplace transform

Content and Treatment as in

- 1) S.Narayanan & T.K.M Pillai, *Calculus*, volume II, Unit I,Unit II,Unit III
- 2) S.Sankarappan, G. Arulmozhi, *Fourier Series & Fourier Transforms*, Unit IV.
- 3) S.Narayanan and T.K.Manicavachagom Pillay, *Differential Equations and its Applications*, Edition 2005
Unit V.

Unit I: Chapter 1:§11, Ex 16, §12, Ex17,§13,Ex18,Ex19, §14,Ex 20,Ex21

Unit II: Chapter 5, §2.1, §2.2,Ex 39, §3.1,Ex40,§4,Ex41

Unit III: Chapter5, §5, Ex42, §6,Ex43, §7,Ex44.

Unit IV: Chapter 2 fully.

Unit V: Chapter IX§2, §3, ExXXIV, §4, §5, Ex XXV§6,§7, Ex XXVI,
§8, §9, Ex XXVII(Problems pertaining to these types only)

Books for Reference

- 1) P.R. Vittal, *Calculus*
- 2) M.K. Venkataraman, *Engineering Mathematics*, volume III

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Course : B.Sc Mathematics
SEMESTER II
Allied Numerical Analysis II
SUBJECT CODE: 2ANM2a

Unit I: Summation of Series: To find the sum to n terms of the series whose general term is the first difference of a function.

Summation of series in which the general term is of the form $U_x = \varphi(x) + ar^x$

Summation by parts-simple problems.

Unit II: Difference Equations: Definitions-methods of solutions-first order linear difference equations with constant and variable coefficients-second order linear difference equations with constant coefficients-homogenous and non-homogenous equation-particular integrals of the type (i) a^x (ii) x^m (iii) $x^m a^x$ (iv) $\sin ax$ or $\cos ax$ (a & m Constants)- Simple problem.

Unit III: Numerical solutions of polynomial and transcendental equations in one variable (i) method of iteration (ii) Newton-Raphson method-simple problems.

Unit IV: Numerical solutions of simultaneous linear equations in three variables by (i) Gauss-elimination method, (ii) Gauss Seidal method-simple problems.

Unit V: Numerical solutions of ordinary differential equations of first order (i) Euler's method and modified Euler's method, (ii) Runge-kutta method of order four-simple problems.

Content and Treatment as in

H.C.Saxena, *Finite differences and Numerical Analysis*, S.Chand and Co.,

Unit I: Chapter 7:7.1-7.5

Unit II: Chapter 8:8.1-8.10(excluding 8.3.2)

Unit III: Chapter 13: 13.4,13.4.5, 13.4.6

Unit IV: Chapter 14: 14b, 14f

Unit V: Chapter 15: 15.1, 15.2.1, 15.2.2, 15.2.4 (c)

Books for Reference

1.B.D.Gupta, *Numerical analysis*, Konark Publishers.

2.Dr.P.Balasubramanian, *Numerical Mathematics*

B.Sc MATHEMATICS
SEMESTER – III
MAIN PAPER – 5
DIFFERENTIAL EQUATIONS
SUBJECT CODE: 3MM05a

Unit I:

Differential equations of first order but not of first degree- Solvable for p , x , y ; Clairauts form- Simple problems- Second order differential equations with variable coefficients- Method of variation of parameters.

Unit II:

Exact differential equations- Necessary and sufficient condition for linear differential equations to be exact (without proof). Solving exact equations - Rules for finding integrating factors- Problems

Unit III:

Partial differential equations - Complete and singular integrals- Formation of partial differential equations by eliminating constants- Eliminating arbitrary functions- Four standard types- Lagrange's equations (Charpits and reducible to standard forms not included)

Unit IV:

Applications of first order differential equations- Growth, decay and chemical reactions. Simple electric circuits.

Unit V:

Application of partial differential equations- Solving by method of separation of variables - Transverse vibration of strings. (Lateral vibrations not included)

Content and treatment as in

Narayanan, T.K. Manikavachagam Pillay, *Differential equations and its applications*, S.Viswanathan, Pvt Ltd, Chennai.

Unit I : Chapter IV: §1, §2, §3, §4; Chapter V: §5 , §6 (substitution method not included), Chapter VIII: § 4.

Unit II: Chapter II:§ 6.1, 6.2, 6.3, 6.4.

Unit III: Chapter XII: § 1, 2, 3, 3.1, 3.2, 4, 5.1, 5.2, 5.3, 5.4.

Unit IV: Chapter III: § 1, § 6 Ex: XI

Unit V: Chapter XIII: §2, § 4, ex: XXXXI

Books for Reference

- 1) M.K.Venkataraman, *Engineering Mathematics*, Vol.II, 4th Edition, 1993.
- 2) Dr.Kandaswamy & others, *Engineering Mathematics*.
- 3) F.B. Hilderbrand, *Advanced Calculus with Applications*, II Edition, 1979, IMH.
- 4) Louis Pipes, *Mathematics for Engineers and Physicists*.

COURSE: B.Sc., MATHEMATICS
SEMESTER – III
MAIN PAPER 6
DISCRETE MATHEMATICS
SUBJECT CODE: 3MM06

Unit I:

Mathematical Logic: Concept, simple and compound statements – connectives, negation, conjunction and disjunction, conditional and biconditional-equivalence and implication of statement formulae-truth tables construction, functionally complete and other connectives, principal forms-their representation.

Unit II:

Mathematical Logic: Validity of conclusion from premises: By truth tables – direct, indirect methods – automatic theorem proving – predicate calculus definition – examples – properties - inference theory of statement and predicate calculus and problems.

Unit III:

Graph Theory: Definition of graphs – undirected and directed graphs, degree simple and multiple graphs, parallel edges, isomorphism of graphs. Paths, circuits – simple and elementary paths, connectedness: weak, strong, unilateral. Trees: simple properties and binary trees. Reachability.

Unit IV:

Relations and Ordering: Definition of relations, properties of binary relations in a set, relation matrix and graph, partition and covering, equivalence relation, compatibility relation, composition of binary relations, partial ordering, representation of partially ordered set and Hasse diagram.

Unit V:

Functions, Semi groups and Monoids: Functions-Definition, one-one, onto functions, composition of functions, inverse functions, definition of semi groups and monoids, examples, homomorphism of semi groups and monoids, sub semi groups and submonoids.

Content and Treatment as in

J.P. Tremblay & R. Manohar, *Discrete Mathematical Structures with Applications to Computer Science*

Unit I: § 1.1, 1.2, 1.3 deleting 1.2.15 and 1.3.6

Unit II: § 1.4, 1.5, 1.6

Unit III: § 5.1.1, 5.1.2, 5.1.4

Unit IV: § 2.3 (Full)

Unit V: § 2.4.1, 2.4.2, 2.4.3, 3.2

COURSE: B.Sc MATHEMATICS
SEMESTER –III
ALLIED PAPER: 1
MATHEMATICAL STATISTICS - I
SUBJECT CODE: 3ASM1a

Unit I:

Concept of sample space –Events, definition of probability (classical, statistical, & axiomatic) .Addition and multiplication laws of probability (for 2 events and n events.)- Independence of two events- Conditional probability – Boole’s inequality- Baye’s theorem- simple problems.

Unit II:

Random variables (discrete and continuous)- Distribution function –Expectation, variance, moments and moment generating function, definition and properties.

Unit III:

Concept of bivariate distribution –Correlation and Regression- definition and properties –Rank correlation coefficient –concepts of partial and multiple correlation coefficients 3 variables- simple problems.

Unit IV :

Characteristic function – uniqueness and inversion theorems (statements and applications only) ,Chebychev’s inequality, Bernoulli’s law of large numbers, weak law of large numbers,- simple problems.

Unit V:

Standard distributions –Binomial, Poisson, Normal and uniform distributions.-Properties and simple problems. Exponential ,Gamma and Beta distributions –concept and simple problems.

Content and Treatment as in

S.C.Gupta and V.K. Kapoor, *Fundamentals of Mathematical Statistics*, (eighth edition), Sultan Chand & Sons.

Unit I : Chapter 4: - 4.3 , 4.5, 4.6,4.9

Unit II: Chapter 5: - 5.1 , 5.2,5.3 5.4,5.5, 6.1,6.2,6.3,6.4,6.10

Unit III: Chapter 10: - 10.1,10.2,10.3,10.4,10.6, 10.7

Unit IV: Chapter6:- 6.12,6.13, 6.15

Unit V: Chapter7: 7.2,7.3, Chapter8:8.1 to 8.6

Books for Reference

1. Hogg R.V. & Craig A.T., *Introduction to Mathematical Statistics*, Macmillan.
2. Mood and Graybill F.A. Boes, D.G., *Introduction to Theory of Statistics*, McGraw Hill .
3. Hoel P.G. (1971) *Introduction to Mathematical Statistics*, Wiley.

COURSE: B.Sc MATHEMATICS
SEMESTER – IV
MAIN PAPER – 7
VECTORS & FOURIER TRANSFORMS
SUBJECT CODE: 4MM07b

Unit I:

Vector differentiation – properties- problems. Vector differential operator-gradient-directional derivatives-normal vector to a surface-equation of tangent planes and normal.

Unit II:

Divergence, curl, Solenoidal and irrotational vectors, expansion formulae for ∇^2 and simple problems.

Unit III:

Vector integration-line, surface and volume integrals-Green's, Stokes' and Gauss' theorem(without proof)-problems verifying these theorems.

Unit IV:

Fourier Integral theorem-Fourier transform complex form of a Fourier integral formula (No derivation) infinite Fourier Sine and cosine integral simple problems.

Unit V:

Simple properties of Fourier transforms, convolution theorem of Fourier transforms (No proof)- Parsevals identity-problems.

Content and Treatment as in

1,P. Laxmi Duraipandian, Durai Pandian, *Vector Analysis*, Emerald Publications.

UNIT I: § 1.1-1.5; 2.1-2.5 .

UNIT II: § 2.6-2.8.

UNIT III: § 3.1-3.8; 4.1-4.8 .

and

2.S. Singaravelu, *Engineering Mathematics*, for IV Semester (ed. 1997)

UNIT IV: Chapter 6 – 6.1 – 6.43.

UNIT V: Chapter 6 – 6.43 –6.68.

Books for Reference:

1. Vectors Calculus, Fourier Series And Fourier Transforms – Dr. S .Bala – ARS Publications Chennai.

2. Differential Equations, Fourier Series and Laplace Transforms – A.Singaravelu.

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COURSE: B.Sc MATHEMATICS
SEMESTER IV
MAIN PAPER VIII
MATHEMATICAL ANALYSIS-I
SUBJECT CODE: 4MM08c

Unit I:

Real valued functions – equivalence – countability – real numbers – least upper bounds – definition of sequence and subsequence – limit of a sequence – convergent sequences – divergent sequences – bounded sequences – monotone sequences.

Unit II:

Operations on convergent sequences – operations on divergent sequences – limit superior and limit inferior – Cauchy sequences – convergence and divergence – series with nonnegative terms – alternating series – conditional convergence and absolute convergence – tests for absolute convergence (only results, no proof and no problems) – the class l^2 .

Unit III:

Limit of a function on the real line – metric spaces – limit in metric spaces – functions continuous at a point on the real line – reformulation – functions continuous on a metric space.

Unit IV:

Open sets – closed sets – discontinuous functions on \mathbb{R}^1 – more about open sets.

Unit V:

Connected sets – bounded sets and totally bounded sets – complete metric spaces.

Content and treatment as in

R.Goldberg, *Methods of Real Analysis*, Oxford & IBH Publishing Co. New Delhi.

Unit I: 1.4-1.7, 2.1-2.6.

Unit II: 2.7-2.10, 3.1-3.4, 3.6, 3.10

UNIT III: 4.1-4.3, 5.1-5.3

UNIT IV: 5.4-5.6, 6.1

UNIT V: 6.2-6.4

Books for Reference

1. Tom. M. Apostol, *Mathematical Analysis*, Second Edition, Addison Wesley, New York.
2. Bartle .R.G. and Shebert (1996), *Real Analysis*, John Wiley and Sons Inc., New York.
3. Malik. S.C. and Savita Arora (1991), *Mathematical Analysis*, Wiley Eastern Limited, New Delhi.
4. Sanjay Arora and Bansilal (1991), *Introduction to Real Analysis*, Satya Prakashan, New Delhi.

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COURSE: B.Sc. MATHEMATICS
SEMESTER IV
MAIN PAPER 9: PROGRAMMING IN C
SUBJECT CODE: 4MM09a

UNIT – I:

Introduction – Constants – Variables – Data types – Operators – Precedence of operators – Library function – Input statements – Output statements – Escape sequence – Formatted outputs – Storage classes – Command arguments – Preprocessor directives.

UNIT – II:

Control statements – if statement – if else statement – Nested if statement – switch case statement – Conditional operator – go to statement – while statement – do while statement – for statement – Nested for – continue – exit – break.

UNIT – III:

Arrays – One dimensional arrays – Declaration – Initialization of arrays – Two dimensional arrays – Multidimensional arrays – Pointers – Functions – Function definition – Function declaration – Calling a function – Call by reference – Call by value.

UNIT – IV:

Categories of functions – Nesting of functions – Recursion – Function with arrays – Strings – Arithmetic operations on characters – Comparing strings – String handling functions.

UNIT – V:

Structure – Structure definition – Structure initialization – Union – Enumerations – User defined data types (typedef) – Files – open – close – input – output – Operation on files.

Content and Treatment as in

Balaguruswamy.E, *Programming in C*.

Unit I: Chapter 2, 3, 4 (full), Chapter 13.1

Unit II: Chapter 5, 6(full)

Unit III: Chapter 7(full), Chapter 9 - 9.1, 9.4 - 9.6, 9.8 - 9.10, Chapter 11 - 11.1, 11.3 - 11.6, 11.8

Unit IV: Chapter 8 – 8.1 – 8.8, Chapter 9 – 9.7, 9.13, 9.14

Unit V: Chapter 10- 10.1 - 10.4, 10.10, Chapter 12(full)

Books for Reference

1. Venugopal, *Programming in C*.
2. Gottfried.B.S, *Programming with C*, Schaum's Outline Series, TMH 2001.

COURSE: B.Sc MATHEMATICS
SEMESTER –IV
CORE COURSE: ALLIED PAPER 2
ALLIED MATHEMATICAL STATISTICS- II
SUBJECT CODE : 4ASM2a

Unit I

Theory of sampling- sampling distribution- standard error of statistics- large samples- exact sampling distributions- t, chi square and F.

Unit II

Theory of estimation- point and interval estimation- interval estimate of mean, difference of means, variance- properties of estimation- unbiasedness consistency, efficiency sufficiency. Statement of Fisher- Neyman factorization theorem, and Rao-Blackwell Theorem, Cramer- Rao inequality- Simple problems- best linear unbiased estimates- method of estimation, method of maximum likelihood- Method of moments

Unit III

Test of significance based on normal, t and F distributions, test for mean, difference of means, difference of variances, significance of correlation coefficient, difference of correlation coefficients.

Unit IV

Tests of significance based on chi-square distribution, testing goodness of fit, 2x2 contingency table, mxn contingency table- independence of attributes. Analysis of variance- one way and two way classification concept only.

Unit V

Testing of hypothesis- simple, composite, null, alternative hypothesis, most powerful test, uniformly most powerful test, unbiased test- Neymann Pearson lemma.

Content and Treatment as in

Fundamentals of Mathematical Statistics (8th edition, Sultan Chand & Sons).

S.C.Gupta and V.K.Kapoor

Unit I : 9.1; 9.1.1, 9.1.2, 9.1.4; 9.3, 12.1, 12.3.1; 12.3.2 ; 13.1 -13.3; 13.3.3, 13.3.4, 13.5, 14.2, 14.2.1-14.2.4, 14.2.7; 14.5-14.5.7

Unit II: 15.1, 15.2, 15.2.1-15.2.3; 15.2.5, 15.2.6, 15.3.1, 15.3.3

Unit III : 16.7.1 – 16.7.5

Unit IV: 13.7.1 -13.7.3

Unit V: 16.1 – 16.6

BOOKS FOR REFERENCE

1. Statistical and Numerical Methods- P.R. Vittal, V.Malini
2. Statistical Methods- S.P.Gupta

B.Sc MATHEMATICS
SEMESTER – V
MAIN PAPER 10
ALGEBRAIC STRUCTURES
SUBJECT CODE: 5MM10

Unit I:

Groups-definition, examples, some preliminary lemmas and subgroups, counting principle.

Unit II:

Normal subgroups and quotient groups, homomorphisms, automorphisms.

Unit III:

Cayley's Theorem, permutation groups-ring theory, definition and examples-some special classes of rings.

Unit IV:

Homomorphism, isomorphisms-ideals and quotient rings-principal, maximal and prime ideals.

Unit V:

Integral domains and fields-definition and examples. A field of quotients of an integral domain- Euclidean rings.

Contents and Treatment as in

I.N. Herstein, *Topics in Algebra* (II Edition), Wiley Eastern Limited, New Delhi.

Unit I: Chapter II: §2.1-2.5

Unit II: Chapter II: § 2.6-2.8. Omit Applications in §2.7.

Unit III: Chapter II: § 2.9-2.10 and in § 2.9 only Cayley's Theorem is included.
Chapter III: 3,1-3.2

Unit IV: Chapter III: § 3.3-3.5.

Unit V: Chapter III: §3.6-3.7.

Books for Reference

1. N.S. Gopalakrishnan, *University Algebra*, Wiley Eastern Ltd.
2. John B. Fraleigh, *A First Course in Algebra*, 2nd Edition, Addison Wesley.
3. R. Balakrishnan & N. Ramabadrán, *Textbook of Algebra*, Vikas Publishing Co.
4. S. Arumugam, *Algebra*, New Gama Publishing House.

COURSE: B.Sc MATHEMATICS
SEMESTER – V
MAIN PAPER – 11
MATHEMATICAL ANALYSIS – II
SUBJECT CODE : 5MM11c

Unit I:

Compact metric spaces – continuous functions on compact metric spaces – continuity of the inverse function – uniform continuity.

Unit II:

Sets of measure zero – definition of the Riemann integral – existence of the Riemann integral – properties of the Riemann integral– derivatives.

Unit III:

Rolle's theorem – the law of the mean – fundamental theorems of calculus – improper integrals – improper integrals (continued).

Unit IV:

Taylor's theorem – the binomial theorem - L'Hospital's rule .

Unit V:

Pointwise convergence of sequences of functions - uniform convergence of sequences functions – consequences of uniform convergence.

Contents and treatment as in

R.Goldberg, *Methods of Real Analysis*, Oxford & IBH Publishing Co. New Delhi.

Unit I: § 6.5 – 6.8.

Unit II: § 7.1 – 7.5.

Unit III: § 7.6 – 7.10.

Unit IV: § 8.5 – 8.7.

Unit V: § 9.1 – 9.3.

Books for Reference

1. Tom. M. Apostol, *Mathematical Analysis*, Second Edition, Addison Wesley, New York.
2. Bartle.R.G. and Shebert (1996), *Real Analysis*, John Wiley and Sons Inc., New York.
3. Malik.S.C. and Savita Arora (1991), *Mathematical Analysis*, Wiley Eastern Limited, New Delhi.
4. Sanjay Arora and Bansilal (1991), *Introduction to Real Analysis*, Satya Prakashan, New Delhi.

B.Sc. MATHEMATICS
SEMESTER – V
CORE COURSE: MAIN PAPER 12: STATICS
SUBJECT CODE: 5MM12

Unit I:

Equilibrium of a particle – Equilibrium of a particle acted on by three forces: The triangle law of forces, converse of triangle law of forces, Lami's Theorem, Resultant of parallel forces, Definition of parallel forces. To find the resultant of 2 parallel forces acting on a rigid body. Definition of couple, moment of couple problems.

Unit II:

Forces acting on a rigid body – Three coplanar forces on a rigid body, Equation of line of action of resultant, Equilibrium of a rigid body under three coplanar forces.

Unit III:

Friction – Forces of friction, law of friction, limiting friction, limiting equilibrium, cone of friction, angle of friction, equilibrium of a particle on a rough inclined plane under any force. Problems involving frictional force. [Problems involving tilting of bodies not included]

Unit IV:

Center of mass – Definition of center of mass, center of mass of triangular lamina, lamina in the form of trapezium, solid tetrahedron, lamina in the form of sector of a circle, lamina in the form of quadrant of an ellipse, solid hemisphere of radius a , solid right circular cone of height h , Hemispherical shell, Hollow right circular cone of height h [Mass center of non – homogeneous solid not included]

Unit V:

Hanging strings – Equilibrium of uniform homogeneous string, Equation to the common catenary, Cartesian equation properties suspension bridge.

Contents and Treatment as in

P. Duraipandian & Laxmi Duraipandian, Muthamizh Jayapragasam, Mechanics. 4th edition

Unit I: Sec 6.1,7.4,7.5 (Arm and axis excluded)

Unit II: Sec 7.10,7.11,7.12

Unit III: Sec 6.3,8.3

Unit IV: Sec 9.1,9.2

Unit V: Sec 11.1,11.2,11.3

B.SC MATHEMATICS
SEMESTER – V
MAIN PAPER – 13
DATA STRUCTURES & ALGORITHMS
SUBJECT CODE: 5MM13a

Unit I:

What is an algorithm- algorithm specifications- pseudocode conventions- elementary data structures- stacks & queues [chapter I, sections 1.1, 1.2.1. chapter 2- section 2.1 only)

Unit II:

Trees- terminology- binary trees- dictionaries- binary search trees- searching a binary search tree- insertion into a binary search tree- deletion from a binary search tree [chapter II- sections 2.2, 2.3 omitting 2.3.2]

Unit III:

Priority queues: examples- heaps- insertion into a heap- deletion from a heap- A sorting of algorithm- creating a heap out of n arbitrary elements- heap sort- sets & disjoint set union- possible tree representation of sets-union & find operations- simple algorithm for union & find [chapter II sections 2.4& 2.5 upto lemma 2.3]

Unit IV:

Divide & conquer: binary search- recursive and iterative binary search- finding the maximum & minimum [chapter III sections 3.1, 3.2, 3.3 only]

Unit V:

Strassian matrix multiplication- Greedy method- general method minimum cost spanning trees- Prim's algorithm- Prim's minimum cost spanning trees- minimum cost spanning tree algorithms due to Kruskal [chapter III- section 3.7 chapter IV sections 4.1 & 4.5 only (omitting 4.5.3) .

Contents and treatment as in

1. E. Horowitz & S. Sahni, *Fundamentals of computer algorithms*

Unit I: Sections 1.1, 1.2.1, 2.1 only

Unit II: Sections 2.2, 2.3 omitting 2.3.2

Unit III: Sections 2.4, 2.5 upto lemma 2.3

Unit IV: Sections 3.1, 3.2, 3.3 only

Unit V: Sections 3.7, 4.1, 4.5 omitting 4.5.3

COURSE: B.Sc. MATHEMATICS
SEMESTER – V
ELECTIVE PAPER-I-NUMBER THEORY
SUBJECT CODE: 5EM01a

UNIT – I

Introduction – divisibility – primes – The Binominal theorem

Chapter -1 Sections – 1.1 to 1.4

UNIT – II

Congruences, Solution of Congruences, Chinese Remainder Theorem – primitive roots and power Residues – Number theory from an Algebraic view point – groups, rings and fields.

Chapter – 2 Sections – 2.1 to 2.3, 2.8(cor 2.42, Th 2.43 and cor 2.44 are omitted) - 2.10 – 2.11

UNIT – III

Quadratic Residues, Quadratic reciprocity, The Jacobi symbol

Chapter – 3 Sections – 3.1 to 3.3

UNIT – IV

Greatest Integer Function, Arithmetic function, The Mobius Inversion formula

Combinational Number Theory

Chapter – 4 Sections 4.1 to 4.3 and 4.5

UNIT – V

The equation $ax + by = c$, Simultaneous Linear Equation, Pythagorean Triangle, Assorted examples.

Chapter – 5 Sections 5.1 to 5.4

Content and treatment as in – An introduction to the Theory of Numbers (Vth edition) by Ivan Niven, Herbert S. Zuckerman and Hugh L. Montgomery John Wiley & Sons, Inc.2001.

Reference Books:

1. Elementary theory of numbers, CY. Hsiung, Allied publishers, 1995.
2. Elementary Number Theory, Allyn and Bacon Inc., Boston, 1980.
3. Introduction to Analytic Number Theory, Tom, M. Apostol, Narosa Publishing House, New Delhi, 1989.

COURSE: B.Sc MATHEMATICS
SEMESTER – V
APPLICATION ORIENTED SUBJECT
LINEAR PROGRAMMING
SUBJECT CODE: 5EM02

Unit I:

Formulation of L.P.P. Graphical solution method, general L.P.P. Canonical and standard forms of L.P.P. – simplex method – introduction fundamental properties of solutions. The computational procedure. Artificial variable technique ,problem of degeneracy.

Unit II:

Duality in linear programming – concept – formulation of primal dual pairs – duality theorems – complimentary slackness theorem ,duality and simplex method, dual simplex method.

Unit III:

Revised simplex method – computational procedure – revised versus usual simplex method – bounded variable technique.

Unit IV:

Transportation problem - formulation initial basic feasible solution – north-west corner rule – VAM – least cost method – optimal solution – degeneracy – unbalanced transportation problems.

Unit V:

Assignment problems – problem of sequencing – problems with n jobs and two machines - problems with two jobs and k machines.

Contents and Treatment as in

Kanti Swarup, Man Mohan & P.K. Gupta, *Operations Research – SULTAN CHAND & SONS(9th Edition Reprint 2002)*

Unit I : Chapter 2: §2.1,2.2

Chapter3,Chapter4: :§ 4.1-4.4

Unit II: Chapter 5:§ 5.1-5.9

Unit III: Chapter9: §9.1-9.3

Unit IV: Chapter10 : § 10.1-10.3 , 10.6-10.11

Unit V: Chapter11, Chapter12 : 12.1-12.6

Books for Reference

P.K . Gupta & D.S .Hira, *Introduction to Operations Research*

COURSE: B.Sc MATHEMATICS
SEMESTER VI
MAIN PAPER 14: LINEAR ALGEBRA
SUBJECT CODE: 6MM14a

Unit I:

Vector spaces-definitions and examples, subspaces, homomorphism, span of a set.

Unit II:

Linear dependence and independence, bases and dimensions, dual spaces and annihilator.

Unit III:

Inner product spaces- definitions and examples- orthogonality- orthogonal complement.

Unit IV:

Linear transformations and characteristic roots, minimal polynomial.

Unit V:

Matrix of a linear transformation and canonical forms- triangular form. Trace and transpose.

Contents and treatment as in

I.N. Herstein, *Topics in Algebra*,(II Edition),Wiley Eastern Limited, New Delhi.

Unit I: Chapter IV- Section 4.1

Unit II: Chapter IV- Section 4.2 , 4.3

Unit III: Chapter IV- Section 4.4

Unit IV: Chapter VI- Section 6.1 , 6.2

Unit V: Chapter VI- Section 6.3, 6.4

Books for Reference

1. John B.Fraleigh, *A First Course in Abstract Algebra*.
2. R.Balakrishnan, *A textbook of Modern Algebra*.
3. M.L.Santiago, *Modern Algebra*.
4. Arumugam and Isaac, *Modern Algebra*.
5. Shanthi Narayan, *A textbook of Modern Abstract Algebra*.
6. Surjeet Singh and Qazi Zameeruddin, *Modern Algebra*.
7. Lloyd R.Jaisingh and Frank Ayres Jr., *Abstract Algebra* (second edition).

COURSE: B.Sc MATHEMATICS
SEMESTER VI
MAIN PAPER 15
COMPLEX VARIABLES
SUBJECT CODE: 6MM15

Unit I:

Complex numbers: polar form- exponential form (only definitions) - regions in the complex plane (only definitions). *Analytic Functions:* functions of a complex variable – mappings – limits – theorems on limits (without proof) – limits involving point at infinity – continuity – derivatives – differentiation formulas – C.R. equations – sufficient conditions – polar coordinates – analytic functions – harmonic functions.

Unit II:

Integrals: complex valued functions – contours – contour integral – Cauchy Goursat theorem (without proof) – simply and multiply connected domains (only definitions) – theorems (without proof) – Cauchy integral formula – derivatives of analytic functions (without proof) – Morera's theorem.

Unit III:

Series: convergence of sequences and series – Taylor series – Laurent series (without proof)

Unit IV:

Residues and poles: residues – residue theorem – principal part of a function – residues at poles, zeroes and poles of order m .

Unit V:

Mapping by Elementary Functions: linear functions – function $1/z$ – linear fractional transformations – definition – mappings of upper half plane: $\text{Im } z \geq 0$ onto $|w| \leq 1$.

Content and Treatment as in

R.V. Churchill and James Ward Brown, *Complex Variable and Applications, Fifth edition.*

Unit I: § 1.5, 1.6, 1.8, 2.9, 2.2.1

Unit II: § 4.30, 4.33, 4.35, 4.38-4.41

Unit III: § 5.44-5.48

Unit IV: § 6.53-6.57

Unit V: § 7.64, 7.67

Books for Reference

1.K.S.V.S. Narasimhan and K.S. Ramachandran, *Complex Analysis*, K.C.S. Desikan and Co

2.P. Duraipandian, *Complex Analysis*, Emerald Publishers.

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B.Sc. MATHEMATICS
SEMESTER – VI
CORE COURSE: MAIN PAPER 16: DYNAMICS
SUBJECT CODE: 6MM16

Unit I:

IMPACT: Impulsive force – impulse – principle of conservation of linear momentum – impact of two smooth spheres – direct impact of two smooth spheres – impact of a smooth sphere on a fixed smooth plane – oblique impact between two smooth spheres.

Unit II:

MOTION OF A PROJECTILE UNDER GRAVITY: Motion of a projectile – nature of a trajectory – results pertaining to the motion of a projectile – maximum horizontal range – speed of a projectile – range of an inclined plane – maximum range on the inclined plane.

Unit III:

CENTRAL ORBIT: Components of acceleration of a particle in the tangential and normal direction – components of acceleration of a particle in the radial and transverse direction – central force – central orbit – equation of central orbit – differential equation of central orbit in p-r co-ordinates – determination of the orbit when the law of force is given – determination of central force when the orbit is given.

Unit IV:

SIMPLE HARMONIC MOTION:–Simple harmonic motion - orthogonal projection of a uniform circular motion – composition of two simple harmonic motions of same period – motion under gravity in a resisting medium.

Unit V:

MOMENT OF INERTIA AND TWO DIMENSIONAL MOTION OF A RIGID BODY: Moment of inertia-definition-moment of circular ring, hollow right circular cylinder, circular lamina, solid right circular cone, elliptic lamina-parallel axes theorem- perpendicular axes theorem- compound pendulum- Centre of suspension- simple equivalent pendulum- Centre of oscillation- interchangeability of center of suspension and center of oscillation

Content and Treatment as in

P. Duraipandian, Laxmi Duraipandian, and Muthamizh Jayapragasam, *Mechanics*, 4th edition

Unit I: 12.1,12.2,12.3,12.4,12.5,12.6,12.7,12.8

(problems not to be asked from section 12.1-12.3)

Unit II: 13.1,13.2,13.3,13.4,13.5,13.6,13.7,13.8

Unit III: 1.10,15.1,15.2,15.3,15.4

Unit IV: 5.1,5.2,5.3,5.4

Unit V: 16.1,16.2,16.3,17.3 (simple problems in two dimensional motion).

Books for reference:

1. Dynamics –A.V.Dharmapadam

2. Dynamics-Dr.P.R.Vittal & V.Anantha Narayanan- Margham Publications

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COURSE: B.Sc MATHEMATICS
SEMESTER –VI
CORE COURSE: APPLICATION ORIENTED SUBJECT
SUBJECT TITLE: OPTIMISATION TECHNIQUES
SUBJECT CODE: 6EM03

UNIT I:

Games and Strategies: Introduction, two person zero sum game- the maximin-minimax principle-games without saddle points –mixed strategies-solution of two by two regular games-Graphical method-dominance property, arithmetic method for $n \times n$ games- the L.P .method

UNIT II:

Inventory control- Introduction-types of inventory-Economic order quantity-the Inventory decisions- Deterministic inventory problems-EOQ problem with price break- inventory problem uncertain demand- systems of inventory control-probabilistic inventory problem-Single period problem without setup cost.

UNIT III:

Queueing theory-basic elements of the queueing model –roles of Poisson and exponential. Arrival process – departure process queues with combined arrivals and departure $(M/ M/1) : (GD/ \infty / \infty)$, $(M/ M/ 1):(GD/ N/ \infty)$ and $(M/ M/ C) : (GD/ \infty / \infty)$, $(M/M/C):(GD/N/\infty)$

UNIT IV:

Integer programming problem: introduction Gomory’s All -I.P.P. method-Gomory’s mixed integer method-branch and bound method

UNIT V:

Project scheduling by PERT /CPM –introduction- network and basic components, rules of network construction- time calculation in networks- critical path method –PERT –PERT calculations-project cost-time cost optimization.

Content and treatment as in:

1. Kanti Swarup, Manmohan and P.K. Gupta, *Operations Research*.

Unit I : Chapter 17:sections 17.1-17.8

Unit II: Chapter19: sections 19.1-19.12

UnitIII: Chapter 20 : Sections 20.1 -20.8

Unit IV: Chapter 7 :Sections 7.1-7.6

UnitV : Chapter21 : Sections 21.1-21.7

Books for reference:

1. Operations Research ,Resource Management Techniques- P.R. Vittal , V.Malini

2. H.A.Taha, *Operations Research*.

3. Resource Management Techniques(Operations Research) – Prof. V. Sundaresan, K.S. Ganapathy Subramanian , K. Ganesan.

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COURSE: B.Sc.MATHEMATICS
SEMESTER VI
APPLICATION ORIENTED SUBJECT
SUBJECT: GRAPH THEORY
SUBJECT CODE: 6EM04a

Unit I:

Graphs and subgraphs: introduction-definition and examples degrees-subgraphs Isomorphism-ramsey numbers Independent sets and coverings examples.

Unit II:

Intersection graphs and line graphs.matrices-operations on graphs-degree sequences: introduction, degree sequences, graphic sequences.

Unit III:

Connectedness: Introduction to walks, trails and paths.Connectedness and components. Blocks, connectivity-examples.

Unit IV:

Eulerian and hamiltonian graphs: Introduction-eulerian graph.Hamiltonian graphs-definition-theorem(dirac).Theorem(Chavatal)examples

Unit V:

Trees: Introduction characterisation of trees.Matching in bipartite graphs-personnel assignment problem.The marriage problem.

Content and treatment as in

Dr. S. Arumugham and Dr.S.Ramachandran, *Invitation to Graph theory*.

Unit I: 2.0 to 2.6

Unit II: 2.7 to 3.2

Unit III: 4.0 to 4.4

Unit IV: 5.0 to 5.2

Unit V: 6.0, 6.1, 7.0 to 7.2

Books for reference

1. Harary, *Graph Theory*
2. Narsing Deo, *Graph Theory with Applications to Engineering and Computer science*.

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