SEMESTER – V

L	T	P	C
3	2	0	4

CORE PAPER – VII

ABSTRACT ALGEBRA II (75 Hours) (SMMA51)

Objectives:

- To facilitate a better understanding of vector space
- To solve problems in matrices

Unit I **Vector Spaces :** Definition and examples – elementary properties – subspaces – linear transformation – fundamental theorem of homomorphism **16L.**

Unit II Span of a set – linear dependence and independence – basis and dimension – theorems **14L**

Unit III Rank and nullity Theorem – matrix of a linear transformation
Inner product space : Definition and examples – orthogonality – orthogonal complement – Gram Schmidt orthognalisation process**.** **15L**

Unit IV **Matrices :** Elementary transformation – inverse – rank -Cayley Hamilton Theorem-Applications of Cayley Hamilton Theorem **15L**

Unit V **E**igen values and Eigen vectors – Properties and problems-Bilinear Forms-Quadratic Forms-Reduction of quadratic form to diagonal form **15L**

Text Book:

Arumugam & Issac – Modern Algebra

Books for Reference :

- Shama .J.N and Vashistha .A.R, "Linear Algebra", Krishna Prakash Nandir, 1981.
- John B. Fraleigh, "A First Course in Abstract Algebra", 7th edition, Pearson, 2002.
- Strang G., "Introduction to Linear Algebra", 4th edition, Wellesly Cambridge Press, Wellesly, 2009.
- Artin M., "Abstract Algebra", 2nd edition, Pearson, 2011

SEMESTER – V

L	T	P	C
3	2	0	4

CORE PAPER – VIII

REAL ANALYSIS - II (75 Hours) (SMMA52)

Objectives:

- To understand the real number of system and metric spaces
- To know the concepts of continuity and Riemann integrals
- To study the concept of connectedness and compactness

Unit I Metric spaces – Examples – bounded sets – open ball – open sets – subspaces – Interior of a set. **13L**

Unit II Closed sets – closure – Limit points – Dense sets – complete metric space – Cantor's intersection theorem – Baire's Category Theorem. **16L**

Unit III Continuous functions on metric spaces : Functions - continuous at a point on the real line – Functions - Continuous – uniform continuous in a metric space – Discontinuous function of R. **15L**

Unit IV Connectedness and compactness : Connectedness – connected subset of R – connectedness and continuity – compact metric spaces – compact subset of R – Heine Borel theorem. **16L**

Unit V **Riemann Integral :**
Sets of measure zero – Existence of the Riemann integral – Derivatives – Rolle's theorem – Fundamental theorem of Calculus – Mean value theorem – Cauchy's mean value theorem – Taylor's theorem. **15L**

Text Books:

Arumugam & Issac – Modern Analysis

- Malic .S.C - Mathematical Analysis, Wiley Eastern Limited, New Delhi.

Books for Reference :

- Tom .M. Apostal – Mathematical Analysis, II Edition, Narosa Publishing House, New Delhi (Unit I) (1997)
- Goldberg .R – Methods of Real Analysis Oxford and IBH Publishing Co. New Delhi (200)
- Viswanath Naik .K – Real Analysis, Emerald Publishers, Chennai.
- Berberian .S.K – First course in Real Analysis, Springer Verlag, New York.

L	T	P	C
3	2	0	4

SEMESTER – V

CORE PAPER – IX

STATICS (75 Hours) (SMMA53)

Objectives:

- To provide the basic knowledge of equilibrium of a particle
- To develop a working knowledge to handle practical problems

Unit I : Forces acting at a point – parallelogram Law f forces – Triangle of forces – Lami's Theorem – Problems. **16L**

Unit II: Parallel forces and moments – resultant of two parallel forces – resultant of two unlike unequal parallel forces – Varignon's Theorem – Problems. **14L**

Unit III : Equlibrium of three forces acting on a regid body – three coplanar forces theorem – problems. **16L**

Unit IV : Friction – Laws of friction – angle of friction – equilibrium of a particle (i) on a rough inclined plane (ii) under a force parallel to the plane (iii) under any force – problems **15L**

Unit V : Equilibrium of strings – equation of the common catenary – tension at any point – Geometrical properties of common catenary – problems. **14L**

Text Book:

Venkatraman, M.K. - Statics, Agasthiar Publications, Trichy.

Books for Reference:

.S – Statics, Emerald Publishers.
3. Duraipandian, P, Laxmi Duraipandian and Muthamizh Jayapragasam- Mechanics, S.Chand & Company.
1. Narayanan, S-Statics, S.Chand & Company, New Delhi.
2. Viswanatha Naik, K and Kasi, M

L	T	P	C
3	2	0	4

SEMESTER-V

CORE PAPER-X

TRANSFORMS AND THEIR APPLIATIONS (75 HOURS) (SMMA54)

Objectives:

- To develop the knowledge of Transformations
- To solve the problems connected

Unit I	Fourier transforms-Properties of Fourier transforms	**13L**
Unit II	Infinite Fourier Cosines and Sine transforms-Properties	**12L**
Unit III	Finite Fourier transforms	**13L**
Unit IV	Z tranforms-Properties	**12L**
Unit V	Inverse Z transforms	**10L**

Text Book:

A.Singaravelu-Engineering Mathematics (Volume III)-Meenakshi Agency,Chennai

Reference Book:

A.Gangatharan-Engineering Mathematics (Volume II)-PHI (2007)

SEMESTER – V

Paper – XI
MAJOR ELECTIVE - I
1.2 DISCRETE MATHEMATICS (60 Hours) (SMMA5B)

L	T	P	C
4	0	0	4

Objectives:
-To study the concept of Mathematical logic
-To understand the basics of Lattices and Boolean Algebra
-To know the number system and codes

Unit I **(Mathematical logic)** Statement and notation – Connectives – Negation – Conjunction – Disjunctions – Statement formula and truth table – conditional and Biconditional – Well defined formulae – Tautologies **12L**

Unit II Normal forms- The theory of inference for the statement calculus- The Predicate- The theory of inference for the Predicate calculus **13L**

Unit III **(Algebraic Structures)**
Groups and Monoids – Simple properties–group codes. **11L**

Unit IV **(Lattices and Boolean algebra)**
Lattices and Posets – Properties of lattices – special lattices – Boolean algebra – Gating networks – Minimal sums of products**.** **12L**

Unit V **(Number system and codes)**
Decimal, Binary, octal, Hexadecimal – Conversion from one to another – Binary addition, subtraction multiplication and division – BCD – weighted excess time – Gray code **12L**

Text Book:

- Tremblay and Manohar – Discrete Mathematical Structures with application to Computer Science, (Tata McGraw Hill, New Delhi) 1997.

Books for Reference :

- Ralph P. Grumaldi Pearson Edelen – Discrete and Combinatorial Mathematics – an applied Introduction (IV edition)
- Maluino .A and Leech – Digital Principles and Application McgraHill.
- Venkataraman .M.K. and others – Discrete mathematics 2000 The National Publishing Company.
- Balaji .G – Discrete Mathematics – Balaji Publishers, Chennai (2013)
- Veerarajan .T – Discrete mathematics – Tata McGraw Hill – (2009)

SEMESTER – V

L	T	P	C
4	0	0	4

Paper – XII

MAJOR ELECTIVE - II

2.1 Operations Research-I (60 Hours) (SMMA5D)

Objectives:

- To introduce the various techniques of operations research
- To make the students solve real life problems in Business Management
- To understand different types of LPP

Unit I **Linear Programming Problem :** Mathematical formulation of LPP –Graphical Method- Simplex Method – Artificial variable technique **13L**

Unit II Concept of Duality – Primal and Dual Problems – Duality – Dual Simplex Method. **12L**

Unit III **Transportation Problem :** North-West Corner Rule – Matrix Minima method – Vogel's Approximation Method – MODI Method – Degeneracy and Unbalanced Transportationproblem. **12L**

Unit IV **Assignment Problem :** Hungarian Method – Unbalance Assignment Problem **11L**

Unit V **Sequencing Problem:** n jobs and 2 machines- n jobs and 3 machines- 2 jobs and m machines **12L**

Text Book :

- KantiSwarup, P.K. Gupta and Manmohan – Operations Research – Sultan Chand & Sons – 2006, 12th edition.

Books for Reference :

- Gupta .P.K and D.S. Hira – Operations Research – S. Chand and Company.
- B.J. Ranganath and A.S.Srikantappa -Operations Research, Yesdee Publishing House,Chennai(2017)
- Hillier, F.S. and G.J. Lieberman - Introduction to Operations Research, 9th Ed., Tata McGrawHill, Singapore, 2009.
- Hamdy A. Taha, - Operations Research, An Introduction, 8th Ed., Prentice – Hall India, 2006.
- Hadley .G. - Linear Programming, Narosa Publishing House, New Delhi, 2002.