Don Bosco College of Arts and Science,

Keela Eral

Department of mathematics

Syllabus-2017-2018 onwards

MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI

UG COURSES – AFFILIATED COLLEGES

B.Sc. Mathematics

(Choice Based Credit System)

(with effect from the academic year 2017-2018 onwards)

Sem	Part	Sub. No	Subject Status	Subject title	Hrs / Week	Cre-dits	Marks				
							Maximum			Passing minimum	
							Int.	Ext.	Tot.	Ext.	Tot.
I	I	1	Language	Tamil/Other Languages	6	4	25	75	100	30	40
	II	2	Language	English	6	4	25	75	100	30	40
	III	3	Core -1	Calculus	5	4	25	75	100	30	40
		4	Core-2	Classical Algebra	5	4	25	75	100	30	40
		5	Allied-I	Statistics-I OR Physics/ Chemistry/ Computer Science With Practicals	6 6	3 4	25 25	75 75	100 100	30 30	40 40
	IV	6	Common	Environmental Studies	2	2	25	75	100	30	40
II	I	7	Language	Tamil/Other Languages	6	4	25	75	100	30	40
	II	8	Language	English	6	4	25	75	100	30	40
	III	9	Core-3	Analytical Geometry of Three Dimensions	5	4	25	75	100	30	40
		10	Core-4	Differential Equations	5	4	25	75	100	30	40
		11	Allied-I	Statistics -II OR Physics/ Chemistry/ Computer Science With Practicals	6 6	3 4	25 25	75 75	100 100	30 30	40 40
	IV	12	Common	Value Based Education/	2	2	25	75	100	30	40

				Social Harmony							
III	I	13	Language	Tamil/Other Languages	6	4	25	75	100	30	40
	II	14	Language	English	6	4	25	75	100	30	40
	III	15	Core-5	Real Analysis-I	6	4	25	75	100	30	40
		16	Allied-II	Statistics-I OR Physics /Chemistry With Practicals	6 6	3 4	25 25	75 75	100 100	30 30	40 40
		17	Skilled Based core	Vector Calculus	4	4	25	75	100	30	40
	IV	18	Non-major Elective	Any one of the following 1.1) Mathematics for Competitive Examinations I 1.2) Fundementals of Statistics I	2	2	25	75	100	30	40
IV	I	19	Language	Tamil/Other Languages	6	4	25	75	100	30	40
	II	20	Language	English	6	4	25	75	100	30	40
	III	21	Core-6	Abstract Algebra I	5	4	25	75	100	30	40
		22	Allied-II	Statistics II OR Physics/ Chemistry with Practicals	6 6	3 4	25 25	75 75	100 100	30 30	40 40
	IV	23	Non-major Elective	Any one of the following 2.1) Mathematics for Competitive Examinations II 2.2) Fundementals of Statistics II	2	2	25	75	100	30	40
		24	Common	Personality Development and Yoga	4	4	25	75	100	30	40
	V		Extension Activities	NCC/NSS/YRC/YWF	-	1	-	-	-	-	-

V	III	25	Core-7	Abstract Algebra II	5	4	25	75	100	30	40
		26	Core-8	Real Analysis II	6	4	25	75	100	30	40
		27	Core-9	Mechanics	5	4	25	75	100	30	40
		28	Major Elective -I	Any one of the following 1.1. Astronomy -I 1.2.Discrete Mathematics 1.3.Programming in C	4	4	25	75	100	30	40
		29	Major Elective-II	Any one of the following 2.1.Operations Research - I 2.2.Combinatorial Mathematics 2.3.Numerical Methods	4	4	25	75	100	30	40
	III	30	Skilled Based Major	Trigonometry , Fourier series and Laplace transforms	4	4	25	75	100	30	40
	IV	31	Skilled Based Common	Computers for Digital Era	2	2	25	75	100	30	40
VI	III	32	Core-11	Complex Analysis	5	4	25	75	100	30	40
		33	Core-12	Number Theory	4	4	25	75	100	30	40
		34	Core-13	Graph Theory	5	4	25	75	100	30	40
		35	Major Elective-III	Any one of the following 3.1 Astronomy II 3.2Fuzzy Mathematics 3.3 Mathematical Modeling	4	4	25	75	100	30	40
		36	Major Elective-IV	Any one of the following 4.1 Operations Research II 4.2 Coding Theory 4.3 LaTex	4	4	25	75	100	30	40
		37	Major Project	Group Project	8	8	25	75	100	30	40

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc. Mathematics) / Semester – I / Core-1

CALCULUS (75 Hours)

Unit I : Curvature,Radius of Curvature and Centre of curvature in Cartesian and polar Co-ordinates

Unit II Pedal Equation-Involute and evolute-Asymptotes

Unit III Singular Points(Node,cusp,conjugate points)-Tracing of curves (cartesian only)

Unit IV Double and Triple Integrals - Changing the order of integration - Jacobians and change of variables

Unit V Beta and Gamma functions – Application of Beta and Gamma Functions in evaluation of Double and Triple Integrals, Improper Integrals.

Text Book:

Narayanan S and T.K. Manickavasagam Pillai - Calculus Volume I (2004), Volume II (2004), S. Viswanathan Printer Pvt.Ltd.

Books for Reference :

- Kandasamy P and K. Thilagavathi - Mathematics for B.Sc., Volume II – 2004, S. Chand & Co., New Delhi.
- Apostaol T.M. - Calculus, Vol. I (4^{th} edition) John Wiley and Sons, Inc., Newyork 1991.
- Apostaol T.M. - Calculus, Vol. II (2^{nd} edition) John Wiley and Sons, Inc., New York 1969)
- Stewart, J - Single Variable Calculus (4^{th} edition) Brooks / Cole, Cengage Learning 2010.

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc. Mathematics) / Semester – I / Core - 2

CLASSICAL ALGEBRA (75 Hours)

Unit I Theory of Equations – Formation of equations – Relation between roots and coefficients – symmetric function of the roots.

Unit II Sum of the powers of the roots of an equation – Newton's theorem, Reciprocal Equations.

Unit III Transformation of equations, Descarte's rule of signs – Rolle's theorem

Unit IV Multiple roots, Sturm's Theorem, solving appropriate solution of equations using Newton's and Horner's method.

Unit V Biquadratic equations – solution by Ferrari's method – cubic equations – solutions by Cardon's method.

Text Book:

Manickavasagam Pillai .T.K and S. Narayanan - Algebra – Viswanathan Publishers and Printers Pvt. Ltd., - 2004.

Books for Reference :

- Kandasamy P and K. Thilagavathi - Mathematics for B.Sc., - 2004, Volume I and Volume IV, S. Chand & Co., New Delhi.
- Arumugam .S, Thangapandi Issac – Classical Algebra, New Gamma Publishing House, Palayamkottai.
- Burnside, W.S. and A.W. Panton - The Theory of Equations, Dublin University Press, 1954.
- MacDuffee, C.C. - Theory of Equations, John Wiley & Sons Inc., 1954.

SEMESTER – I/III

Statistics

(For Mathematics Students)

Paper – I (90 Hours)

Unit I Moments, Skewness and Kurtosis - Curve fitting - method of least squares – Fitting lines – Parabolic, Exponential and Logarithmic curves.

Unit II Correlation and Regression – Scatter Diagram – Karl Pearson's coefficient of correlation – Properties – Lines of Regression – Coefficient of Regression and properties – Rank Correlation.

Unit III Association of Attributes – Consistency of data – criteria for independence – Yule's coefficient of Association.

Unit IV Random variable – Distribution function – properties of Distribution function – Mathematical Expectation – Addition theorem of Expectation – Multiplication theorem of Expectation – Moment generating function – cumulants – characteristic function – Properties of characteristic function.

Unit V Discrete and continuous Probability Distributions - Binomial and Poisson Distribution and their moments, Generating function, characteristic function, properties and simple applications. Normal Distribution – Standard normal distribution and their properties – simple problems.

Text Book:

Gupta .S.C and V.K. Kapoor – Fundamentals of Mathematical Statistics – (2002) Sultan Chand & Sons, New Delhi.

Books for Reference :

- Vittal, V.R. – Mathematical Statistics (2004) Maragatham Publications
- D.C. Sancheti & Kapoor – Statistics
- M.L. Khanna – Statistics
- S. Arumugam & others – Statistics

SEMESTER – I/III

Allied Mathematics

(For Science Students)

Paper – I

Algebra and Differential Equations (90 Hours)

Unit I Theory of Equations – Formation of Equations – Relation between roots and coefficients – Reciprocal equations.

Unit II Transformation of Equations – Approximate solutions to equations – Newton's method and Horner's method.

Unit III Matrices – Characteristic equation of a matrix – Eigen values and Eigen vectors – Cayley Hamilton theorem and simple problems.

Unit IV Differential equation of first order but of higher degree – Equations solvable for p, *x*, y – Partial differential equations – formations – solutions – Standard form $P_p + Q_q = R$.

Unit V Laplace transformation – Inverse Laplace transform.

Text book:

- Dr. S. Arumugam & others – Allied Mathematics – I

ANALYTICAL GEOMETRY OF THREE DIMENSIONS: (75 Hours)

Unit I Analytical Geometry of 3D Co-ordinate system, direction cosines, direction ratios

Unit II Equation of plane in different forms - angle between planes-Length of perpendicular-angle bisection.

Unit III - Equation of a line in different forms - image of a point – image of a line-The plane and the straight line-angle between plane and line-Coplanar lines-Shortest distance between two lines

Unit IV Sphere – Tangent plane – circle of intersections – Tangency of Spheres – coaxial system of spheres - Radical Planes – Orthogonal Spheres.

Unit V Equation of a cone-cone with vertex at the orgin –Tangent plane and normal-Quadratic cone with the vertex at orgin – Right circular cone – Cylinder – Right circular cylinder-enveloping cylinder

Text Book:

T.K.Manicavachagom Pillay and T.Natarajan-A text book of Analytical Geometry - Part-II Three Dimensions-S.Viswanathan(Printers&Publishers)Pvt Ltd(2012)

Books for Reference :

- Duraipandian .P. Laxmi Duraipandian and D.Muhilan - Analytical Geometry of Three Dimension - Emerald Publishers.
- Kandasamy .P. and K. Thilagavathi – Mathematics for B.Sc., Vol. IV – 2004 S.Chand and Co. New Delhi.
- Loney .S.L. - The Elements of Coordinate Geometry - Mcmillan and Company London.
- B. Stephen John - Analytical Geometry of 3D and vector differentiation : IDEAL publication.

DIFFERENTIAL EQUATIONS : (75 Hours)

Unit I First order higher degree equations – solvable for x,y,p and Clairaut's form – Simultaneous differential equations of the form $f_1(D)x + g_1(D)y = h_1(t)$, $f_2(D)\,x + g_2(D)y = h_2(t)$

Unit II **(Ordinary differential equation)**
Second order linear differential equations with constant coefficients – Find the P.I for functions of the form $e^{ax}\,f(x)$ and $x^n f(x)$

Unit III Linear equations of second order with variable coefficients – Homogeneous equations – Equation reducible to homogeneous equation.

Unit IV **(Partial differential equations)**
Formation of equations by elimination of arbitrary constants and functions – Definition of general, particular and complete solutions – solving standard forms $f(p,q) = 0$, $f(x, p, q) = 0$, $f(y, p, q) = 0$, $f(z, p, q) = 0$, $f(x, p) = f(y, q)$, $z = px + qy + f(p,q)$ – Lagrange's differential equations $P_p + Q_q = R$

Unit V Application of differential equations – Growth and Decay – chemical reaction - Newton's law of cooling – Brochistocrone problem – simple electric circuits.

Text Book:

Narayanan .S and T.K. Manickavachagam Pillai – Differential equations and its applications, 2003 - S. Viswanathan Printers.

Books for Reference :

- Kandasamy .P and K. Thilagavathi - Mathematics for B.Sc., Vol. III – 2004 – S.Chand and Co., New Delhi.
- Braun .M. - Differential Equations and their applications (III edition) Springer – Verlag, New York 1983)
- Boyce .W.E and R.C. Diprima – Elementary differential equations and Boundary value Problems (VII editions) - John Wiley and Sons, Inc, New York 2001.
- Sankaranarayan and Manguldoss – Differential Equations.

SEMESTER – II / IV

Statistics

(For Mathematics Students)

Paper – II (90 Hours)

Unit I Characteristics of index numbers – Laspeyer's and Paasche's – Fisher's and Bowley's Marshall and Edgeworth's index numbers – Tests – Unit test, Commodity Reversal test, Time Reversal test, circular test.

Unit II Testing of Hypothesis – Null hypothesis and Alternate hypothesis – Type I and Type II errors - Critical Region, Level of significance – Test of significance for large samples – Testing a single proportion – Difference of proportions. Testing a single mean and Difference of means.

Unit III Tests based on t-distribution – single mean and Difference of means – Tests based on F-distribution – Variance Ratio test – Tests based on Chi-square Distribution – Independence – Goodness of fit.

Unit IV Analysis of varience – one way and two way classified data – Basis of experimental design – Randomized Block Design – Latin square – simple problems.

Unit V Statistical Quality control – Definition – Advantages, Process control – Control chart, Mean chart, Range chart, P-chart, Product Control – Sampling Inspection Plans.

Text Book:

- Gupta .S.C & V.K. Kapoor – Fundamentals of Mathematical Statistics – (2002) Sultan Chand & Sons, New Delhi.

Books for Reference :

- Vittal .P.R – Mathematical Statistic (2004) – Maragatham Publications
- DC Sancheti & Kapoor – Statistics
- M.L. Khanna – Statistics
- S. Arumugam & others – Statistics

SEMESTER – II/IV

Allied Mathematics

(For Science Students)

Paper – II

Vector Calculus & Fourier Series (90 Hours)

Unit I Vector differentiation – Gradient – Divergence and curl

Unit II Evaluation of double and triple integrals

Unit III Vector integration – Line, surface and volume integrals

Unit IV Green's, Stokes and Divergence theorems (without proof) – simple problems.

Unit V Fourier series – Even and odd functions – Half range Fourier series.

Text Books:

- Dr. S. Arumugam & others – Vector Calculus
- T.K. Manicavachagom Pillai – Calculus (Vol II)

MANONMANIAM SUNDARANAR UNIVERSITY,
TIRUNELVELI
UG COURSES – AFFILIATED COLLEGES

B.Sc. MATHEMATICS

(Choice Based Credit System)

(with effect from the academic year 2017-2018 onwards)

Sem	Part	Sub. No	Subject Status	Subject title	Hrs / Week	Cre-dits	Mark				
							Maximum			Passing minimum	
							Int.	Ext.	Tot.	Ext.	Tot.
III	I	13	Language	Tamil/Other Languages	6	4	25	75	100	30	40
	II	14	Language	English	6	4	25	75	100	30	40
	III	15	Core-5	Real Analysis-I	6	4	25	75	100	30	40
		16	Allied-II	Statistics-I OR Physics/ Chemistry/Computer With Practicals	6 6	3 4	25 25	75 75	100 100	30 30	40 40
		17	Skill Based core	Vector Calculus	4	4	25	75	100	30	40
	IV	18	Non-major Elective	Any one of the following 1.1) Mathematics for Competitive Examinations- I 1.2) Fundementals of Statistics-I	2	2	25	75	100	30	40
		19	Common	Yoga*	2	2	25	75	100	30	40

IV	I	20	Language	Tamil/Other Languages	6	4	25	75	100	30	40
	II	21	Language	English	6	4	25	75	100	30	40
	III	22	Core-6	Abstract Algebra- I	6	4	25	75	100	30	40
		23	Allied-II	Statistics II OR Physics/ Chemistry/ Computer with Practicals	6 6	3 4	25 25	75 75	100 100	30 30	40 40
		24	Skill Based Core	Trigonometry, Fourier Series and Laplace Tranforms	4	4	25	75	100	30	40
	IV	25	Non-major Elective	Any one of the following2.1) Mathematics for Competitive Examinations- II 2.2) Fundementals of Statistics II	2	2	25	75	100	30	40
		26	Common	Computers for Digital Era*	2	2	25	75	100	30	40
	V		Extension Activities	NCC/NSS/YRC/ YWF/PE	-	1	-	-	-	-	-

V	III	27	Core-7	Abstract Algebra II	5	4	25	75	100	30	40
		28	Core-8	Real Analysis II	5	4	25	75	100	30	40
		29	Core-9	Statics	5	4	25	75	100	30	40
		30	Core-10	Transforms and their Applications	5	4	25	75	100	30	40
		31	Major Elective -I	Any one of the following 1.1. Astronomy -I 1.2.Discrete Mathematics 1.3.Combinatorial Mathematics	4	4	25	75	100	30	40
		32	Major Elective-II	Any one of the following 2.1.Operations Research - I 2.2.Stochastic Process 2.3. MS Office	4	4	25	75	100	30	40
	IV	33	Skill Based Common	Personality Development /Effective Communication / Youth Leadership	2	2	25	75	100	30	40

VI	III	34	Core-11	Complex Analysis	5	4	25	75	100	30	40
		35	Core-12	Number Theory	4	4	25	75	100	30	40
		36	Core-13	Graph Theory	5	4	25	75	100	30	40
		37	Core-14	Dynamics	4	4	25	75	100	30	40
		38	Core-15	Numerical Methods	4	4	25	75	100	30	40
		39	Major Elective-III	Any one of the following 3.1 Astronomy II 3.2Fuzzy Mathematics 3.3 Mathematical Modeling	4	4	25	75	100	30	40
		40	Major Elective-IV	Any one of the following 4.1 Operations Research II 4.2 Coding Theory 4.3 Programming in	4	4	25	75	100	30	40

SEMESTER – III

CORE PAPER –V

REAL ANALYSIS - I (90 Hours) (SMMA31)

L	T	P	C
2	4	0	4

Objectives:

-To lay a god foundation of classical analysis

-To study the behaviour of sequences and series

Unit I **Real number system :**
The field of axioms, the order axioms, the rational numbers, the irrational numbers, upper bounds, maximum element, least upper bound (supremum). The completeness axiom, absolute values, the triangle inequality. Cauchy – schwartz's inequality**.** **11L**

Unit II **Sequences :** Bounded sequences – monotonic sequences – convergent sequences – divergent and oscillating sequences – The algebra of limits. **17L**

Unit III Behaviour of monotonic sequences – Cauchy's first limit theorem – Cauchy's second limit theorem – Cesaro's theorem – subsequences - Cauchy sequence – Cauchy's general principle of convergence**.** **19L**

Unit IV **Series :** Infinite series – n^{th} term test – Comparison test – Kummer's test – D'Alemberls ratio test – Raabe's test - Gauss test – Root test **23L**

Unit V Alternating series – Leibnitz's test - Tests for convergence of series of arbitrary terms – Multiplication of series- Abel's Throrem-Mertens theorem-Power Series-Radius of convergence **20L**

Text Books:

- Arumugam .S and Thengapandi Issac – "sequences and series", New Gamma publishing House, Palayamkottai – 627 002.
- Tom M. Apostol – Mathematical Analysis, II Edition, Narosa Publishing House, New Delhi (unit I)

Book for Reference :

- Goldberg .R – Methods of Real Analysis, Oxford and IBH Publishing Co., New Delhi.

L	T	P	C
0	6	0	3

SEMESTER – I/III

Statistics

(For Mathematics Students)

Paper – I (90 Hours)

Objectives:

-To study the concept of measures of dispersion and measures of central tendencies
-To develope the concept Probability distributions

Unit I Moments, Skewness and Kurtosis - Curve fitting - method of least squares – Fitting lines – Parabolic, Exponential and Logarithmic curves. **16L**

Unit II Correlation and Regression – Scatter Diagram – Karl Pearson's coefficient of correlation – Properties – Lines of Regression – Coefficient of Regression and properties – Rank Correlation. **16L**

Unit III Association of Attributes – Consistency of data – criteria for independence – Yule's coefficient of Association. **14L**

Unit IV Random variable – Distribution function – properties of Distribution function – Mathematical Expectation – Addition theorem of Expectation – Multiplication theorem of Expectation – Moment generating function – cumulants – characteristic function – Properties of characteristic function**.** **22L**

Unit V Discrete and continuous Probability Distributions - Binomial and Poisson Distribution and their moments, Generating function, characteristic function, properties and simple applications. Normal Distribution – Standard normal distribution and their properties – simple problems**.** **22L**

Text Book:

Gupta .S.C and V.K. Kapoor – Fundamentals of Mathematical Statistics – (2002) Sultan Chand & Sons, New Delhi.

Books for Reference :

- Vittal, V.R. – Mathematical Statistics (2004) Maragatham Publications
- D.C. Sancheti & Kapoor – Statistics
- M.L. Khanna – Statistics
- S. Arumugam & others – Statistics

L	T	P	C
0	6	0	3

SEMESTER – I/III

Allied Mathematics

(For Science Students)

Paper – I

Algebra and Differential Equations (90 Hours)

Objectives:

-To know the order and degree of the ODE
-To understand the basic Theory of equations
-To study the concept of Laplace transforms
-To know the theory of matrices

Unit I Theory of Equations – Formation of Equations – Relation between roots and coefficients – Reciprocal equations. **20L**

Unit II Transformation of Equations – Approximate solutions to equations – Newton's method and Horner's method.18L

Unit III Matrices – Characteristic equation of a matrix – Eigen values and Eigen vectors – Cayley Hamilton theorem and simple problems **15L.**

Unit IV Differential equation of first order but of higher degree – Equations solvable for p, *x*, y – Partial differential equations – formations – solutions – Standard form $P_p + Q_q = R$**.** **20L**

Unit V Laplace transformation – Inverse Laplace transform**.** **17L**

Text book:

- Dr. S. Arumugam & others – Allied Mathematics – I

SEMESTER III

Skill Based Core
Paper – I
VECTOR CALCULUS (60 Hours) (SSMA3A)

L	T	P	C
4	0	0	4

Objectives:

-To provide basic knowledge of vector differentiation and vector integration

-To solve problems related to that

Unit I Vector point functions – Scalar point functions – Derivative of a Vector & Derivative of sum of vectors – Derivative of product of a Scalar and Vector point function – The vector operator 'del' – Gradient **13L**

Unit II Divergence – Curl, solenoidal, irrotational vectors – Laplacian operator**.** **12L**

Unit III Integration of point function – Line integral – Surface integral**,** **13L**

Unit IV Volume integral – Gauss divergence theorem (statement only) – Problems. **12L**

Unit V Greens theorem and Stoke's theorem (statements only) – problems. **10L**

Text Book:

- Durai Pandian.P and Laxmi Durai Pandian – Vector Analysis (Revised Edition – Reprint 2005) Emerald Publishers.

Books for Reference :

- Dr. S. Arumugam and others – Vector Calculus, New Gamma Publishing House.
- Susan .J.C - Vector Calculus, (4^{th} Edn.) Pearson Education, Boston 2012.
- Anil Kumar Sharma, - Text book of Vector Calculus, Discovery Publishing House, 1993.

SEMESTER – III

L	T	P	C
2	0	0	2

Non – Major Elective Paper – I

Mathematics for Competitive Examinations -I (30 Hours) (SNMA3A)

Objectives:

-To learn the problems solving techniques for aptitude problems

-To enable the students prepare themselves for various competitive examinations

Unit I	Simplifications, averages	**7L**
Unit II	Ratio and proportion	**5L**
Unit III	Partnership – Percentage	**5L**
Unit IV	Profit and Loss	**6L**
Unit V	Problems on numbers	**7L**

Text Book:

Objective Arithmetic – R.S. Aggarwal – S.Chand & Co

Books for Reference :

- Quantitative Aptitude for Competitive examinations – Abhijit Guha – TMH
- Mathematics for life – M. Immaculate – Nanjil offset Printers

L	T	P	C
2	0	0	2

SEMESTER – III

Non – Major Elective Paper – I

Fundamentals of Statistics - I (30 Hours) (SNMA3B)

Objectives:

-To introduce measures of central tendency to other major students

-To study correlation and regression and solving simple problems

Unit I	Classification of datas – Bar diagram – Pie chart	**7L**
Unit II	Measures of Central tendency : Mean, median, mode (with frequency)	**5L**
Unit III	Measures of dispersion : Range – standard deviation, variance – Quartile deviation **7L.**	
Unit IV	Correlation – rank correlation (Problems only**)**	**6L**
Unit V	Regression equations (Problem only)	**5L**

Text Book:

- Dr. S. Arumugam – Statistics

Books for Reference :

- S.P. Gupta – Statistics
- M.L. Khanna – Statistics
- T.Veerarajan-Fundamentals of Mathematical Statistics

SEMESTER – IV

L	T	P	C
2	4	0	4

CORE PAPER – VI
ABSTRACT ALGEBRA-I (90 Hours) (SSMA41)

Objectives:

-To introduce the concept of Groups ,Ring and Field

-To study the concept of homomorphism

Unit I Groups – definition and Examples – Subgroup – order of an element – centre of a group – Normalizer and centralizer. Product of two subgroups – order of HK – Intersection and union of subgroups. **18L**

Unit II Cyclic groups – generators of a cyclic group – Number of generators of a cyclic groups – Cosets – Partitioning of a group by Cosets – Lagrange's theorem – Euler's theorem – Fermat's theorem **16L**

Unit III **Normal subgroups :** Quotient groups – Group Homomorphis – Canonical homomorphism – kernel of a homomorphism – Isomorphism – Automorphism – Inner automorphism – Permutation groups – Cayley's theorem**.** **20L**

Unit IV **Rings:** Definition and examples – Types of rings – Elementary properties of a ring – Integral domain – Field – Sub rings – Subfields – Ideals – Principal ideal – quotient ring – Maximal and prime ideals - characteristic of a ring – PID – UFD**.** **18L**

Unit V Homomorphism of rings – Isomorphism – kernel of a homomorphism – Fundamental theorem – Field of quotients of an integral domain – polynomial rings – Division algorithm **18L**

Text Book:

- Arumugam .S and Tangapandi Issac .A – "Modern Algebra"scitech publications Pvt. Ltd.

Books for Reference :

- Anton .H and C. Rorres - Elementary Linear Algebra (9^{th} Edn) John Wiley and Sons, Inc., New York 2005.
- Manicavasagam Pillai .T.K and others – Modern Algebra, S. Viswanathan Publishers, Chennai 1993.
- Herstein .I.N – Topics in Algebra, Vikas Publishing Pvt. Ltd. 1975, New Delhi.

L	T	P	C
0	6	0	3

SEMESTER – II / IV

Statistics

(For Mathematics Students)

Paper – II (90 Hours)

Objectives:
-To know the concept of index numbers
-To study the distribution functions
-To understand the Analysis of varience

Unit I Characteristics of index numbers – Laspeyer's and Paasche's – Fisher's and Bowley's Marshall and Edgeworth's index numbers – Tests – Unit test, Commodity Reversal test, Time Reversal test, circular test**.** **12L**

Unit II Testing of Hypothesis – Null hypothesis and Alternate hypothesis – Type I and Type II errors - Critical Region, Level of significance – Test of significance for large samples – Testing a single proportion – Difference of proportions. Testing a single mean and Difference of means. **18L**

Unit III Tests based on t-distribution – single mean and Difference of means – Tests based on F-distribution – Variance Ratio test – Tests based on Chi-square Distribution – Independence – Goodness of fit**.** **16L**

Unit IV Analysis of varience – one way and two way classified data – Basis of experimental design – Randomized Block Design – Latin square – simple problems. **22L**

Unit V Statistical Quality control – Definition – Advantages, Process control – Control chart, Mean chart, Range chart, P-chart, Product Control – Sampling Inspection Plans . **22L**

Text Book:

- Gupta .S.C & V.K. Kapoor – Fundamentals of Mathematical Statistics – (2002) Sultan Chand & Sons, New Delhi.

Books for Reference :

- Vittal .P.R – Mathematical Statistic (2004) – Maragatham Publications
- DC Sancheti & Kapoor – Statistics
- M.L. Khanna – Statistics
- S. Arumugam & others – Statistics

L	T	P	C
0	6	0	3

MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc. Mathematics) / Semester – II / Allied – II

Allied Mathematics

(For Science Students) Paper – II

Vector Calculus & Fourier Series (90 Hours)

Objectives:

-To provide basic knowledge of vector differentiation and integration
-To solve integration problems

Unit I Vector differentiation – Gradient – Divergence and curl **20L**

Unit II Evaluation of double and triple integrals **18L**

Unit III Vector integration – Line, surface and volume integrals **18L**

Unit IV Green's, Stokes and Divergence theorems (without proof) – simple problems **17L**

Unit V Fourier series – Even and odd functions – Half range Fourier series. **17L**

Text Books:

- Dr. S. Arumugam & Issac – Vector Calculus
- T.K. Manicavachagom Pillai – Calculus (Vol II)

SEMESTER – IV

L	T	P	C
4	0	0	4

Skill Based Core
Paper – II
TRIGONOMETRY, LAPLACE TRANSFORMS AND FOURIER SERIES

(60 Hours) (SSMA4A)

Objectives:

-To understand the concept of Trigonometry

-To know the concept of Laplace transform

-To study the concept of Fourier series

Unit I Trigonometry : Expansions of sin nx, cos nx, tan nx and expansions of $\sin^n x$ & $\cos^n x$**.** **10L**

Unit II Hyperbolic functions – Relations between hyperbolic functions and circular functions – Inverse hyperbolic functions – Logarithm of complex numbers – Summation of series by C + iS method. **13L**

Unit III Laplace Transforms – Inverse Laplace Transforms**.** **13L**

Unit IV Solving linear differential equations with constant coefficients and simultaneous equations using Laplace Transforms. **12L**

Unit V Fourier Series – Definition - Finding Fourier coefficients for a given periodic function with period 2π and $2l$ – Odd and even functions – Half range series. **12L**

Text Books:

Arumugam .S and Tangapandi Issac .A -Trigonometry and Fourier Series

Manichavasagam Pillai, T.K., and S. Narayanan-Differential Equations and its Applications

Books for Reference :

- Manichavasagam Pillai, T.K., and S. Narayanan, - Trigonometry, Viswanathan Publishers and Printers Pvt. Ltd.
- Loney - Trigonometry.
- Robert T. Seeley - Fourier Series and Integrals, Dover Publications, New York, 2006.
- Ray Hanna J., - Fourier Series, Transforms and Boundary Value Problems, Dover Publications, New York, 2008.

SEMESTER – IV

L	T	P	C
2	0	0	2

Non – Major Elective Paper – II

Mathematics for Competitive Examinations -II (30 Hours) (SNMA4A)

Objectives:

-To learn the problems solving techniques for aptitude problems

-To enable the students prepare themselves for various competitive examinations

Unit I	Simple Interest – Compound interest	**6L**
Unit II	Time and work	7L
Unit III	Time and distance	**7L**
Unit IV	Chain Rule	**5L**
Unit V	Pipes and Cistern	5L

Text Book:

- Objective Arithmetic – R.S. Aggarwal

Books for Reference :

- Descriptive Mathematics - R.S. Aggarwal, Deepak Aggarwal
- Mathematics for life – M. Immaculate – Nanjil offset Printers

L	T	P	C
2	0	0	2

SEMESTER – IV

Non – Major Elective Paper – II

Fundamentals of Statistics - II (30 Hours) (SNMA4B)

Objectives:

-To introduce measures of central tendency to other major students

-To study index numbers and simple problems

- To know the concepts of attributes

Unit I	Theory of attributes for two attributes (simple problems)	**7L**
Unit II	Characteristics of index numbers – Laspeyer's and Paasche's	**6L**
Unit III	Bowley's – Marshall index numbers	**6L**
Unit IV	Fisher's index number – Time Reversal test (Problems only)	**5L**
Unit V	Fitting a straight line	**6L**

Text Book:

S.Arumugam & Issac -Statistics

Books for Reference :

- S.P. Gupta – Statistics
- M.L. Khanna – Statistics
- T.Veerarajan-Fundamentals of Mathematical Statistics

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)

L	T	P	C
4	0	0	4

SEMESTER – V

Paper – XI
MAJOR ELECTIVE - I
1.1 ASTRONOMY - I (60 Hours) (SMMA5A)

Objectives:

- To introduce the exciting world of Astronomy to students
- To understand the movements of the celestial sphere
- To study the Kepler's laws of motion

Unit I **Spherical Trigonometry**

Spherical triangle – The fundamental formula of Spherical trigonometry, the sine, cosine, four parts and Napier formula (without proof) and simple problems. **13L**

Unit II **The celestial sphere**

Celestial co-ordinates – Diurnal motion – Rising and setting of a star – sidereal time – circumpolar stars – Morning and evening stars - Twilight. **12L**

Unit III Earth – length of a day – Refraction – Tangent formula – Cassini's formula – Effects of refraction **12L**

Unit IV Geocentric parallax – Effects – Heliocentric parallax – Effects **11L**

Unit V Kepler's laws – verification of Kepler's laws – True anomaly, mean anomaly, Eccentic anomaly – Relation between them. **12L**

Text Book:

- Kumaravelu .S and Susheela Kumaravelu – Astronomy for degree classes, Rainbow Printers, Nagercoil (2005)

Book for Reference :

- Ramachandran .G.V – Astonomy

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)

L	T	P	C
4	0	0	4

SEMESTER – V

Paper – XI

MAJOR ELECTIVE - I

1.3 Combinatorial Mathematics (60 Hours) (SMMA5C)

Objectives:

-To know the basic concepts of Pairings

-To understand relations

-To study the concepts of designs

Unit I	Selections and Binomial coefficients – Permutations – Ordered Selections – Unordered Selections – Miscellaneous Problems.	**13L**
Unit II	Pairings Problems - Pairings within a set – Pairings between sets	**12L**
Unit III	Recurrence – Fibonacci – type relations. Using generating functions – Miscellaneous methods.	**12L**
Unit IV	The inclusion – Exclusion Principles	**11L**
Unit V	Block designs – Square Block designs	**11L**

Text Book:

- Ian Andersen – A first course in combinatorial Mathematics – Clarendon Press, Oxford.

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.

L	T	P	C
4	0	0	4

SEMESTER -V

Paper -XII
MAJOR ELECTIVE -II
2.2 STOCHASTIC PROCESS (60 Hours) (SMMA5E)

Objectives:

-To know probability and distribution functions

-To understand the concepts of stochastic process

-To identify Markov chains

Unit I Generating functions-Laplace transform of probability distribution-classification of distribution-Stochastic process-introduction-specification of Stochastic process**.**

12L

Unit II Markov chains-Definition and examples-Higher transition probabilities-Generalisation of Independent Bernoulli Trials-classification of states and chains-Determination of Higher transition probabilities-Stability of Markov systems-Graph theoretic approach.

12L

Unit III Markov chain with Denumerable number states-Reducible chains-Statistical inference for Markov chains-Markov chain with continuous state space-Nonhomogeniouschains **11L**

Unit IV Markov process with discrete state space-Poisson process-
Poisson process and related distributions-Generalisation of Poisson process-Birth and Death process

13L

Unit V Markov process with Discrete state space-Derived Markov chains-Erlang process

12L

Text Book :

Stochastic Proces-J.Medhi-New Age International Publishers (p) Ltd Third Edition

Reference Books:

Applied Stochastic Process-Suddhendu Biswas –New Central Book Agency (P) Ltd Kolkatta

Introduction to Stochastic Process-Hoel Port and Stone-Universal Book Stall, New Delhi

SEMESTER -V

L	T	P	C
4	0	0	4

Paper -XII
MAJOR ELECTIVE -II
2.3 M.S.OFFICE (60 Hours) (SMMA5F)

Objectives:

-To know the basic knowledge of computer

-To study word,excel andpowerpoint

Unit I: MS Word

Creating a document-saving, printing, editing and closing the document -copying, pasting, finding and replacing a text -adding headers and footers**.** **11L**

Unit II:

Formatting a document-Turning Bold on/off, Underline on/off, highlight on/off-changing font size ,page setup-changing margins-bullets and numbering, working with tables-changing the column width and row height-inserting or deleting a row/column-mailmerge**.** **12L**

Unit III: MS Excel

Creating a worksheet-entering, editing, deleting data in cells-saving and previewing the worksheet- entering formulas , working with basic functions SUM,AVERAGE,MAX and MIN -sorting **10L.**

Unit IV :

Formatting a worksheet-inserting ,deleting a row/column changing font size -Graphs and charts-Simple calculations using mathematical, statistical, logical functions. **12L**

Unit V: MS Power point

Creating a simple presentation -adding transition effects to a presentation-adding sound effects to a presentation-creating hyperlinks between slides-changing the background-inserting images on slides. **15L**

Text Book :

Dr.P.Rizwan Ahmed, "Office Automation 2010", Margham Publications 2016.

Reference Books :

1. Stephen . L . Nelson, "Office 2010, Computer Reference", Tata McGraw Hill Publishing company Ltd.
2. Sumner Mary- "Enterprise Resource Planning", Pearson Education, inc. I Edition 2012.

SEMESTER – VI

L	T	P	C
3	2	0	4

CORE -XI
Major Paper – XIII

COMPLEX ANALYSIS (75 Hours) (SMMA61)

Objectives:

-To understand thefunctions of complex variables

-To learn about elementary transformations concepts in complex variables

-To understand the singularity concepts and residues

Unit I **(Analytic functions)**

Functions of a complex variable – Derivatives – Cauchy – Riemann equations – sufficient conditions – Polar form – Analytic functions – Harmonic functions**.** **13L**

Unit II **(Integrals)**

Definite integrals – Contours – Cauchy – Goursat theorem – antiderivatives and independence of path – Cauchy Integral formula – Morera's theorem. **17L**

Unit III **(Series)**

Taylor's series – Examples – Laurent's series – Zeros of analytic functions – Residues – Residue theorem – Principal part of functions – Residues at poles. **16L**

Unit IV **(Evaluation of Integrals)**

Evaluation of improper real integrals – improper integrals involving sines and cosines – Definite integrals involving sines and coines**.** **14L**

Unit V **(Transformations)**

Conformal mappings–basic properties–Bilinear maps – fixed points – Applications 1**5L**

Text Book:

- Arumugam.S and T. Issac – "Complex Analysis" – Scitech Publishing House – Chennai.

Books for Reference :

- Churchill .R.V. and J.W. Brown – "Complex variables and Applications" – IV edition – McGraw Hill International Editions.
- Ponnuswamy .S – "Foundations of Complex Analysis", Narosa Publication House, New Delhi, II edition 2005.
- Duraipandian .P and Lakshmi Duraipandian – "Complex Analysis" – Emerald Publications, Chennai (2001)

SEMESTER – VI

L	T	P	C
4	0	0	4

CORE -XII
Major Paper – XIV

NUMBER THEORY (60 Hours) (SMMA62)

Objectives:

-To highlight the beauties in the world of numbers

-Toprepare the students for coding through cogruences

Unit I Peano's Axioms – Mathematical Induction – The Binomial Theorem – Early NumberTheory. **11L**

Unit II Division Algorithm – GCD – Euclidean Algorithm – The Diaphantine Equation ax+by=c. **12L**

Unit III The fundamental Theorem of Arithmetic – The Sieve of Eratosthenes – The Goldbach conjecture. **13L**

Unit IV Basis properties of congruences – Linear congruence and the Chinese Remainder Theorem. **11L**

Unit V Fermat's Theorem – Wilson's Theorem – The Fermat – Kraitchik Factorization Method. **13L**

Text Book:

- David .M. Burton - Elementary Number Theory (Sixth Edition) Tata McGraw Hill Education Pvt. Ltd.

Books for Reference :

- Ivan Niven and H, Zuckerman - An Introduction to Theory of Numbers.
- Kumaravelu .S, and Susheela Kumaravelu - Elements Theory - Nagercoil, 2002.

SEMESTER – VI

L	T	P	C
3	2	0	4

CORE -XIII
Major Paper – XV
GRAPH THEORY (75 Hours) (SMMA63)

Objectives:

-To introduce the notion of graph theory and its applications

-To learn the techniques of combinatorics in graph theory

Unit I: Definition and examples of graphs – degrees – subgraphs – isomorphism – independent sets and coverings – matrices – operation on graphs.
18L

Unit II: Degree sequences – graphic sequences – walks – trails and paths – connectedness and components – connectivity. **18L**

Unit III: Eulerian graphs – Hamiltonian graphs – characterisation of trees – centre of a tree**.**
13L

Unit IV: Definition and properties of planar graphs – chromatic number and chromatic index
13L.

Unit V: Chromatic polynomials – definition and basic properties of digraphs – paths and connectedness in digraphs**.**
13L

Text book:

Arumugam,S and S. Ramachandran – Invitation to graph Theory, Scitech publications, Chennai.

Books for reference:

- Kumaravelu. S and Susheela Kumaravelu – Graph theory.
- Narasingh Deo – Graph theory with application to engineering and computer science, Prentice – Hall of india pvt. Ltd., New Delhi.

L	T	P	C
4	0	0	4

SEMESTER -VI

CORE -XIV

MAJOR PAPER -XVI

DYNAMICS(60 Hours) (SMMA64)

Objectives:

-To provide a basic knowledge of the behaviour of objects in motion

-To develop a working knowledge to handle practical problems

Unit I : Projectiles- Equation of path – range – maximum height- time of flight- range on an inclined plane-problems. **14L**

Unit II : Collision of elastic bodies- Laws of impact- direct and oblique impact-Problems. **11L**

Unit III : Simple Harmonic Motion (SHM) in a straighrt line- Geometrical representation – composition of SHM's of the same period in the same line and along two perpendicular directions – problems**.** **13L**

Unit IV : Motion under the action of central forces – velocity and acceleration in polar co-ordinates – problems. **10L**

Unit V : DifferentialEquation of central orbit - pedal equation of central orbit – problems to find the law of force towards the pole when the orbit is given. **12L**

Text Book:

Venkatraman, M.K. - A Text Book on Dynamics, Agasthiar Publication, Trichy.

Books for Reference:

1. Narayanan, S- Dynamics, S.Chand & company, 16th Edition,1986, New Delhi.
2. Duraipandiyan, P, Laxmi Duraipandian and Muthamiz Jayaprgasam- Mechanics 2003, S.Chand & Company.

SEMESTER -VI
CORE -XV
MAJOR PAPER -XVII

L	T	P	C
4	0	0	4

NUMERICAL METHODS (60 Hours) (SMMA65)

Objectives:

-To introduce the finite differences

-To solve numerical problems by different methods

Unit I Solution of Numerical algebraic and Transcendental Equations : bisection method – Newton's method. Criterion of order of convergence of Newton's method. Regula False method – Gauss elimination – Gauss Jacobi – Gauss Seidal method **13L**

Unit II **Finite Difference :** First and higher order differences – Forward and backward differences – Properties of Operator – Differences of a polynomial –Factorial Polynomial **11L**

Unit III Interpolation : Newton's Forward – backward, Gauss forward – backward interpolation formula – Bessel's formula. Divided differences – Newton's divided difference formula – Legrange's interpolation formule **11L**

Unit IV Numerical Differentation and Integration : Newtons forward and backward differences for differentiation – Derivatives using Bessel's formula – Trapezoidal rule, simpson's 1/3 rule & 3/8 rule **13L**

Unit V **Difference Equations :** Definition – order and degree of difference equation – Linear difference equation – Finding complementary function – particular Integral –simpleapplications. **12L**

Text Book:

- Venkatraman .M.L - Numerical methods in Science and Engineering National Publishing Company V Edition 1998

Books for Reference :

- Kandasamy .P.K. Thilagavathy and K. Gunavathy 'Numerical Methods' S. Chand & Company Ltd. Edn. 2006.
- B. Stephen John – Numerical Analysis
- Autar Kaw and Egwwn Enc Kalu - Numerical methods with Application Abidet. Autokaw.com 2nd 2011.

L	T	P	C
4	0	0	4

SEMESTER – VI

Paper – XVIII

MAJOR ELECTIVE - III

3.1 Astronomy - II (60 Hours) (SMMA6A)

Objectives:

-To understand the exiting world of Astronomy to the students

-To study the concepts of eclipses

-To facilitate the movements of celestial objects

Unit I Equation of time – Seasons – Convertion of time. **10L**

Unit II Moon – sidereal month, Lunation and relation between them – Phases of moon – Lunar Liberation - surface of moon – metonic cycle – Tides. **14L**

Unit III Eclipses – shadow cone – Minimum and maximum number of eclipses. **12L**

Unit IV Planetary Phenomena – Bode's law – Elongation – Sidereal period, synodic period and the relation between them **14L**

Unit V Phases – Stationary points – solar system**..** **10L**

Text Book:

- S. Kumaravelu and Susheela Kumaravelu – Astronomy Rainbow Printers, Nagercoil (2005)

Book for Reference :

- George - O - Abell – Exploration of the Universe (Second Edition)

L	T	P	C
4	0	0	4

SEMESTER – VI

Paper – XIX

MAJOR ELECTIVE - III

3.2 FUZZY MATHEMATICS (60 Hours) (SMMA6B)

Objectives:

-To introduce fuzzy concepts to students

-To facilitate the students to study fuzzy operations and fuzzy numbers

Unit I **Crisp Sets – Fuzzy Sets –** Basic Types – Basic Concepts – Characteristics and Significance of the Paradigm shift. **11L**

Unit II Additional properties of α-cuts – representations of fuzzy sets – Extension principle for fuzzy sets**.** **13L**

Unit III **Fuzzy set operations –** Fuzzy complements – Fuzzy intersections : t-norms – Fuzzy Unions : t-conorms – Combinations of operations – Aggregation operations. **11L**

Unit IV **Fuzzy Numbers –** Linguistic variables – Arithmetic operations on intervals – Arithmetic operations of fuzzy numbers – Lattice of fuzzy numbers – Fuzzy Equations. **13L**

Unit V Fuzzy Decision Making – Individual Decision Making – Multi-person decision making – Fuzzy linear Programming. **12L**

Text Book:

- George J. Klir and Bo Bo Yuan – Fuzzy sets and Fuzzy Logic Theory Applications, Prentice Hall of India, 2002, New Delhi.

Book for Reference:

- George J. Klir and Tina .A Folger – Fuzzy sets, uncertainty and Informations – Prentice Hall of India, 2003, New Delhi.

SEMESTER – VI

L	T	P	C
4	0	0	4

Paper – XX

MAJOR ELECTIVE - III

3.3 Mathematical Modelling (60 Hours) (SMMA6C)

Objectives:

-To study the mathematical models through ODE and difference equations

-To train the students to develop mathematical models in real life problems

Unit I **(Mathematical modelling through O.D.E (First order))**
Linear growth and Decay models – Non-linear growth and Decay models – Compartment Models – Dynamics Problems – Geometrical Problems**.** **11L**

Unit II Population dynamics – Epidemics – Compartment Models – Economics, Medicine, Arms race, Battles and International Trade. **13L**

Unit III (**Mathematical Modelling through O.D.E. (Second order))**
Planetary motion – circular motion – Motion of satellites – Modelling through linear difference equations of second order. **11L**

Unit IV **(Mathematical Modelling through difference equations)**
Basic theory of difference equation with constant coefficients – Economics and Finance – Population dynamics and genetics – Probability theory. **13L**

Unit V **(Modelling through graphs)**
Solutions that can be modelled through graphs - models in terms of directed graphs, signed graphs – weighted digraphs and unoriented graphs**.** **11L**

Text Book:

- Kapur .J.N – Treatment as in "Mathematical Modelling" – New Age International Publishes, 2004.

Books for Reference :

- Kapur .J.N – Mathematical Modelling in Biology and Medicine – East West Press – 1985.
- Singh – Mathematical Modelling, International Book house – 2003.
- Frank R. Giordano, Maurice D.Weir and William P. Fox, - A first course in mathematical modelling, Thomson Learning, London and New York, 2003.

SEMESTER-VI

L	T	P	C
4	0	0	4

PAPER-XXI
MAJOR ELECTIVE-IV
4.1 OPERATIONS RESEARCH-II (60 Hours) (SMMA6D)

Objectives:

-To introduce Games and strategies

-To understand networking problems

-To make the students solve real life problems in business and management

Unit I **Games and Strategies :** Two Person Zero sum Games – The Maximin – Minimax Principle – Games without Saddle Points – Mixed Strategies – Graphical Solution of2xnandmx2games–DominanceProperty **12L**

Unit II **Replacement** of items that deteriorate with time-replacement age of a machine taking money value into consideration-replacement of items that completely fail suddenyandStaffingProblems **13L**

Unit III **Queing models :**General concept and definitions-characteristics-properties of Poisson process Models(M/M/1: /FCFS), (M/M/1 : N/FCFS),(M/M/S : /FCFS) **11L**

Unit IV **Network scheduling by PERT / CPM :** Network and basic components – Rules of Network Construction – Time Calculation in network – Critical Path Method – PERTCalculation. **13L**

Unit V **Inventory Control :** Introductions – Types of Inventories – Inventory decisions – Deterministic inventory Problem– EOQ problems with shortages**.** **13L**

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

L	T	P	C
4	0	0	4

SEMESTER – VI

PAPER-XXII

MAJOR ELECTIVE - IV

4.2 Coding Theory (60 Hours) (SMMA6E)

Objectives:

-To introduce coding and decoding concepts

-To develop the students in the field of coding theory

Unit I Basic assumptions – Correcting and detecting error patterns – information rate – effects of error correction and detection – finding the most likely code word transmitted. **12L**

Unit II Linear codes – two important – subspaces independence – basic, dimension – matrices – Bases for C and C^+ generating matrices on coding. **12L**

Unit III Parity check matrices – equivalent codes – distance of a linear code – Linear codes – cosets – MLD for linear codes – Reliability of IMLD for linear codes. **11L**

Unit IV Some bounds for codes – perfect codes – hamming codes – extended codes – The extended Golay code – decoding the extended Golay code – Golay code **13L**

Unit V Polynomials and words – introduction to cyclic codes – introduction to cyclic codes – Polynomial encoding and decoding – finding cyclic codes – Dual cyclic codes**.** **12L**

Text Book:

- Coding theory, the essentials – Marcel Dekker, Inc. Madtrison Avenue, Newyork.

SEMESTER – VI

L	T	P	C
4	0	0	4

Paper- XXIII
MAJOR ELECTIVE-IV
4.3 Programming in C (60 Hours) (SMMA6F)

Objective:

-To introduce the exiting world of programming to the students

-To train the students to run simple C programmes

Unit I

C Declarations:- Introduction – Character Set – C tokens – Keywords and Identifiers – Identifiers – Constants – Variables – Data types – Declaration of Variables – Declaration of Storage Class – Assigning Values to Variables – Defining Symbolic Constants – Declaring VariableasConstant**.** **11L**

Unit II

Operators and Expressions:- Introduction – Arithmetic Operators – Relational Operators – Logical Operators – Assignment Operators – Increment and Decrement Operators – Conditional Operator – Bitwise Operators – Special Operators – Arithmetic Expressions – Evaluation of Expressions–PrecedenceofArithmeticExpressions**.**

13L

Unit III

Managing Input and Output Operations:-getchar( ) – putchar( ) – scanf( ) – printf( ). **Decision Making and Branching:-** Introduction – Decision Making with IF Statement – Simple IF statement – The IF…Else Statement – Nesting of IF…Else Statements – The ELSE IF ladder – The Switch Statement – The ?: Operator – The GOTO statement. **Decision Making and Looping:-** Introduction – The WHILE Statement – The DO Statement – The FOR statement – Jumps in Loops. **13L**

Unit IV

Arrays :- Introduction – One-dimensional arrays – Declaration of One-dimensional arrays – Initialization of One-dimensional arrays - Two-dimensional arrays – Initialization of Two-dimensional arrays – Multi-dimensional arrays. **Character Arrays and Strings:-** Introduction – Declaring and Initializing String Variables – Reading Strings from Terminal – Writing Strings to Screen–StringHandlingFunctions

12L

Unit V

User-Defined functions:- Introduction – Need for User-defined functions – Definition of functions – Return Values and their Types – Function Calls – Function Declaration – Category of functions – No Arguments and No return values – Arguments but No return Values – Arguments with return values – No arguments but a return a value – Recursion –The Scope, Visibility and lifetime of a variables. **11L**

Text Book:

Programming in ANSI C – 6th Edition by E Balagurusamy – Tata McGraw Hill Publishing Company Limited.

Reference Books:

- Programming with C, Third Edition, Byron S Gottfried, Tata McGraw Hill Education Private Limited.
- . Programming in C ReemaThareja, Oxford University press.

II B. COM (IV SEMESTER) – UNDER CBCS
PART III – MAJOR CORE -10
BUSINESS MATHEMATICS

L	T	P	C
5	0	0	4

Objectives

1. To provide basic knowledge of mathematical techniques as are applicable to business.
2. To provide logical idea to find out practical solutions for the managerial problems.

Unit I: Number systems and equations- Numbers-natural-whole – rational-irrational – real. Equations – linear-quadratic – solutions of simultaneous linear equations with two or three unknowns – solutions of quadratic equations - nature of the roots – forming quadratic equation. **(15 hours)**

Unit II: Indices – Definition – Positive indices – Laws of indices – Negative indices – Zero and unity indices – Fractional indices. Logarithms – Definition –Properties of logarithms-Laws of logarithms-Common logarithm. **(15 hours)**

Unit III: Analytical geometry- Distance between two points in a plane-slope of a straight line – equation of straight line – point of intersection of two lines – applications (1) demand and supply (2) cost-output (3) break-even analysis. **(15 hours)**

Unit IV: Matrices – meaning – types – algebra of matrices – addition and subtraction – scalar multiplication – Multiplication of matrices-transpose of a matrix –Determinant – minors and co-factors –inverse of a matrix – solving simultaneous linear equations using matrix method **(17 hours)**

Unit V: Commercial arithmetic – Simple interest – Compound interest – Depreciation. Discount – true discount – Discounting a Bill of exchange - Banker's discount – Banker's Gain. **(13 hours)**

(75 hours)

Text Books

1. D.S. Sancheti & V.K. Kapoor, Business Mathematics Sultan Chand and Sons, New Delhi.
2. M. Manoharan & C. Elango, Business Mathematics, Palani Paramount Publications, Palani.

Reference Books

1. G.K. Ranganath, Text book of Business Mathematics, Himalaya Publishing House, Delhi.
2. D.C. Sanchetti & B.M. Agarwal, Business Mathematics, Sultan Chand and Sons, New Delhi.

II B. COM (III SEMESTER) – UNDER CBCS
PART III – MAJOR CORE -6
BUSINESS STATISTICS

L	T	P	C
5	0	0	4

Objectives

1. To provide the basic knowledge of statistical techniques as are applicable to business.
2. To enable the students to apply statistical techniques for quantification of data in business.

Unit I: **Introduction**- Definition of statistics – Importance – Application – Limitations - Statistical survey – Planning and design of survey – Collection of Data – Sources - Primary and secondary data – Techniques – Census method and sampling method–Methods of sampling. Classification and tabulation of data –Diagrammatic and graphic presentation of data. **(6 hours)**

Unit II: **Measures of Central Tendency** – Mean – Median – Mode – Geometric Mean - Harmonic Mean. **(25 hours)**

Unit III: Measures of Dispersion-Range – Quartile Deviation – Mean Deviation - Standard Deviation – Co-efficient of Variation. Skewness - methods of studying Skewness - Karl Pearson's Co-efficient of Skewness – Bowley's co-efficient of Skewness. **(14 hours)**

Unit IV: Correlation – meaning – types-scatter diagram – Karl Pearson's Co-efficient of Correlation- Rank correlation – Concurrent deviation method. Regression analysis – uses-Regression line – Regression equations – least square method - deviations taken from actual mean and assumed mean method. **(10 hours)**

Unit V: Index numbers – meaning – types – its problems – Methods of constructing index numbers – unweighted and weighted indices – Index number tests – Consumer price index numbers. Analysis of time series – Meaning – Importance – Components of time series – Secular trend, seasonal, cyclical and irregular variations – Measurement of trend - Graphic method-Semi average method – Moving average method – Method of least square.

(20 hours)

(75 hours)

Text Books

1. Dr. M. Manoharan, Statistical Methods, Palani Paramount Publications, Palani.
2. R.S.N. Pillai & Bhagavathi, Statistics-Theory and Practice, S.S. Chand & Co.

Reference Books

1. Dr. S.P. Gupta, Statistical Method, Sultan Chand & Sons, New Delhi.
2. M. Wilson, Business Statistics, Himalaya Publishing House, Mumbai.