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.

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)