

MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI
UG COURSES – AFFILIATED COLLEGES

B.Sc. Mathematics

(Choice Based Credit System)

(with effect from the academic year 2020-2021 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	Communicative English	6	4	25	75	100	30	40
	III	3	Core -1	Calculus and Classical Algebra	6	4	25	75	100	30	40
		4	Add on major (Mandatory)	Professional English for Physical sciences -I	4	4	25	75	100	30	40
		5	Allied-I (For Maths Students)	Statistics-I	6	3	25	75	100	30	40
				Physics With Practicals/ Chemistry With Practicals/ Computer Science	6	4	25	75	100	30	40
	Allied-I (For Science Students)	Algebra and Differential Equations	6	4	25	75	100	30	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-2	Differential Equations and Analytical Geometry of Three Dimensions	6	4	25	75	100	30	40
		10	Add on major (Mandatory)	Professional English for physical sciences II	4	4	25	75	100	30	40
		11	Allied-II (For Maths Students)	Statistics -II OR	6	3	25	75	100	30	40
				Physics With Practicals/ Chemistry With Practicals /Computer Science	6	4	25	75	100	30	40
	Allied – II (For Science Students)	Vector Calculus & Fourier Series	6	4	25	75	100	30	40		
IV	12	Common	Value Based Education	2	2	25	75	100	30	40	

CALCULUS & CLASSICAL ALGEBRA(90 Hours)

- Unit I:** Curvature, Radius of Curvature and Centre of curvature in Cartesian and polar Co-ordinates-
Pedalequation–Involute and Evolute
- UnitII** Double and Triple Integrals - Changing the order of integration - Jacobians and change of variables
- UnitIII** Beta and Gamma functions – Application of Beta and Gamma Functions in evaluation of Double and Triple Integrals.
- UnitIV** Theory of Equations – Formation of equations – Relation between roots and coefficients – symmetric function of the roots. Sum of the powers of the roots of an equation – Newton’s theorem
- Unit V** Reciprocal equation-Transformation of equations- Descarte’s rule of signs

Text Book:

- Narayanan S and T.K. Manickavasagam Pillai –Calculus Volume I (2004), Volume II (2004), S. Viswanathan Printer Pvt.Ltd.
- 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., Volume II – 2004, S. Chand & Co., New Delhi.
- Apostol T.M. - Calculus, Vol. I (4th edition) John Wiley and Sons, Inc., New York 1991.
- Apostol T.M. - Calculus, Vol. II (2nd edition) John Wiley and Sons, Inc., New York 1969)
- Stewart, J - Single Variable Calculus (4th edition) Brooks / Cole, Cengage Learning 2010.
- 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.

Dublin University Press, 1954.

- Burnside, W.S. and A.W. Panton - The Theory of Equations,
- MacDuffee, C.C. - Theory of Equations, John Wiley & Sons Inc., 1954.

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 develop the concept Probability distributions

- UnitI** Moments, Skewness and Kurtosis - Curve fitting - method of least squares – Fitting lines – Parabolic, Exponential and Logarithmic curves. **16L**
- UnitII** Correlation and Regression – Scatter Diagram – Karl Pearson's coefficient of correlation – Properties – Lines of Regression – Coefficient of Regression and properties – Rank Correlation. **16L**
- UnitIII** Association of Attributes – Consistency of data – criteria for independence – Yule's coefficient of Association. **14L**
- UnitIV** 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**
- UnitV** 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

Allied Mathematics (Semester I/III)

(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 $Pp + Qq = R$.
UNIT V	Laplace transformation – Inverse Laplace transform.

Text Book:

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

DIFFERENTIAL EQUATIONS & ANALYTICAL GEOMETRY OF THREE DIMENSIONS

(90 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 $x^n f(x)$ - Linear equations of second order with variable coefficients
- Unit III** Analytical Geometry of 3D Co-ordinate system, direction cosines, direction ratios- Equation of plane in different forms - angle between planes- Length of perpendicular-angle bisection.
- Unit IV** 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 V** Sphere – Tangent plane – circle of intersections – Tangency of Spheres – Orthogonal Spheres.

Text Book:

- Narayanan .S and T.K. Manickavachagam Pillai – Differential equations and its applications, 2003 - S. Viswanathan Printers.
- T.K.Manicavachagom Pillay and T.Natarajan-A text book of Analytical Geometry - Part-II Three Dimensions- S.Viswanathan(Printers&Publishers)PvtLtd(2012)

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 York1983)
- Boyce .W.E and R.C. Diprima – Elementary differentialequations and Boundary value Problems (VII editions) - John Wiley and Sons, Inc, New York2001.
- Sankaranarayan and Manguldoss – DifferentialEquations.
- 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. NewDelhi.
- Loney .S.L. - The Elements of Coordinate Geometry - Mcmillanand CompanyLondon.
- B. StephenJohn- Analytical Geometry of 3D and vector differentiation : IDEALpublication.

SEMESTER – II / IV

Statistics

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(For Mathematics Students) Paper – II (90Hours)

Objectives:

- To know the concept of index numbers
- To study the distribution functions
- To understand the Analysis of variance

UnitI 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**

UnitII 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**

UnitIII 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**

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

UnitV 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) – MaragathamPublications
- DC Sancheti & Kapoor –Statistics
- M.L. Khanna –Statistics
- S. Arumugam & others –Statistics

**Allied Mathematics (Semester II/IV)
(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)