



MANONMANIAM SUNDARANAR UNIVERSITY -TIRUNELVELI
UG PROGRAMMES



OPEN AND DISTANCE LEARNING(ODL) PROGRAMMES

(FOR THOSE WHO JOINED THE PROGRAMMES FROM THE ACADEMIC YEAR 2023–2024)

B.Sc. Mathematics

Semester	Course	Title of the Course	Course Code	Course Type
I	Part I –Languages (Tamil)	Pothu Tamil-I-Tamil Ilakkiya Varalaru-I	J1TL11	Theory
	Part II – Languages (English)	General English–I	J2EN11	Theory
	Core I	Algebra & Trigonometry	JMMA11	Theory
	Core II	Differential Calculus	JMMA12	Theory
	Elective I	Allied Physics	JEPH11	Theory
		Practical	JEPHP1	Practical
	Skill Enhancement Course - I	Mathematics for Competitive Examination I	JSMA11	Theory
Foundation Course	Bridge Mathematics	JFMA11	Theory	

3. ALGEBRA & TRIGONOMETRY

UNIT	CONTENTS
I	Reciprocal Equations - Standard form – Increasing or decreasing the roots of a given equation - Approximate solutions of roots of polynomials by Horner’s method – related problems.
II	Summation of Series: Binomial – Exponential – Logarithmic series (Theorems without proof) – Approximations - related problems.
III	Characteristic equation – Eigen values and Eigen Vectors - Similar matrices - Cayley – Hamilton Theorem (Statement only) -Finding powers of square matrix, Inverse of a square matrix up to order 3 - related problems.
IV	Expansions of $\sin n\theta$, $\cos n\theta$ in powers of $\sin\theta$, $\cos\theta$ -Expansion of $\tan n\theta$ in terms of $\tan \theta$, Expansions of $\cos^n\theta$, $\sin^n\theta$, $\cos^m\theta\sin^n\theta$ –Expansions of $\tan(\theta_1+\theta_2+\dots+\theta_n)$ - related problems.
V	Hyperbolic functions – Relation between circular and hyperbolic functions Inverse hyperbolic functions, Logarithm of complex quantities – related problems.
Recommended Text	
1	T.K. Manicavachagom Pillar. I. Natarajan and K S. Ganapathy, Algebra, Vol 1, S. Viswanathan (Printers & Publication) PVT. LID 2015
2	S. Arumugam and A. Thangapandi Issac, Theory of Equations and Trigonometry, New Gamma Publishing House, Palayamkottai. 2006

4. DIFFERENTIAL CALCULUS

UNIT	CONTENTS
I	Successive Differentiation: Introduction (Review of basic concepts) – The n th derivative – Standard results – Trigonometrical transformation – Formation of equations involving derivatives – Leibnitz formula for the n th derivative of a Product.
II	Partial Differentiation: Partial derivatives – Successive partial derivatives – Function of a function rule – Total differential coefficient .
III	Partial Differentiation (Continued): Homogeneous functions – Partial derivatives of a function of two variables - Lagrange's method of undetermined multipliers.
IV	Envelope: Method of finding the envelope – Another definition of envelope – Envelope of family of curves which are quadratic in the parameter.
V	Curvature: Definition of Curvature – Circle, Radius and Centre of Curvature – Evolutes and Involutives – Radius of Curvature in Polar Co-ordinates.
Recommended Text	
1	S. Narayanan and T K. Manicavachagom Pillax, Calculus, Vol 1,
2	S. Viswanathan (Printers & Publication) PVT. LID. 2015.
3	S. Armugam and A. Thangapandi Issac, Calculus, New Gamma Publishing House, Palayamkottai 2011

5. ALLIED PHYSICS-I

UNIT	CONTENTS
I	WAVES, OSCILLATIONS AND ULTRASONICS : Simple Harmonic Motion (SHM) – Composition of two SHMs at right angles (periods in the ratio 1:1) – Lissajous figures – Uses – Laws of transverse vibrations of strings – Determination of AC frequency using sonometer (steel and brass wires) – Ultrasound – Production – Piezoelectric method – Application of Ultrasonics: Medical field.
II	PROPERTIES OF MATTER: Elasticity :Elastic constants –Bending of beam–Theory of non-uniform bending – Determination of Young’s modulus by non-uniform bending. Viscosity: Streamline and turbulent motion– Critical velocity – Coefficient of viscosity – Poiseuille’s formula. Surface tension: definition–Molecular theory–Droplets formation–shape, size and lifetime – COVID transmission through droplets.
III	HEAT AND THERMODYNAMICS: Joule-Kelvin effect – Joule-Thomson porous plug experiment – theory– Temperature of inversion –Liquefaction of Oxygen–Linde’s process of liquefaction of air –Thermodynamic system – Thermodynamic equilibrium – Laws of thermodynamics – Heat engine – Carnot’s cycle – Efficiency.
IV	ELECTRICITY AND MAGNETISM: Potentiometer – Principle – Measurement of thermo emf using potentiometer –Magnetic field due to a current carrying conductor – Biot-Savart’s law – Field along the axis of the coil carrying current – Peak, average and RMS values of ac current and voltage – Power factor and current values in an AC circuit.
V	DIGITAL ELECTRONICS AND DIGITAL INDIA : Logic gates, OR, AND, NOT, NAND, NOR, EXOR logic gates – Universal building blocks – Boolean algebra – De Morgan’s theorem – Verification – Overview of Government initiatives: Software technological parks under MeitY.
VI	PROFESSIONAL COMPONENTS : Expert lectures – Seminars – Webinars – Industry inputs – Social accountability – Patriotism
Recommended Text	
1	R. Murugesan (2001), Allied Physics, S.Chand and Co, New Delhi.
2	Brijlal and N.Subramanyam (1994), Waves and Oscillations, Vikas Publishing House, New Delhi.
3	Brijlal and N.Subramaniam (1994), Properties of Matter, S.Chand and Co., New Delhi.
4	J.B.Rajam and C.L.Arora (1976) .Heat and Thermodynamics (8 th edition), S.Chand and Co., New Delhi.
5	R. Murugesan (2005), Optics and Spectroscopy, S.Chand and Co, New Delhi.
6	A. Subramaniyam, Applied Electronics 2 nd Edn., National Publishing Co., Chennai.

5A. ALLIED PRACTICAL-I

Minimum of Eight Experiments from the list:

1. Young's modulus by non-uniform bending using pin and microscope
2. Young's modulus by non-uniform bending using optic lever, scale and telescope
3. Determination of g by Compound Pendulum
4. Rigidity modulus by static torsion method.
5. Rigidity modulus by torsional oscillations without mass
6. Surface tension and interfacial Surface tension – drop weight method
7. Comparison of viscosities of two liquids – burette method
8. Specific heat capacity of a liquid–half time correction
9. Verification of laws of transverse vibrations using sonometer
10. Calibration of low range voltmeter using potentiometer
11. Determination of thermoemf using potentiometer
12. Verification of truth tables of basic logic gates using ICs
13. Verification of De Morgan's theorems using logic gate ICs.
14. Use of NAND as universal building block.

Note: Use of digital balance permitted

6. MATHEMATICS FOR COMPETITIVE EXAMINATION - I

UNIT	CONTENTS
I	Simplification, averages.
II	Ratio and proportion.
III	Partnership-percentages.
IV	Profit and Loss
V	Problems on numbers.
Recommended Text	
1	R.S. Agarwal - Objective arithmetic, Published by S.Chand & CoLtd. Edition 2018

7. Bridge Mathematics

UNIT	CONTENTS
I	Algebra: Binomial theorem, General term, middle term, problems based on these concepts
II	Sequences and series (Progressions). Fundamental principle of counting. Factorial n.
III	Permutations and combinations, Derivation of formulae and their connections, simple applications, combinations with repetitions, arrangements within groups, formation of groups.
IV	Trigonometry: Introduction to trigonometric ratios, proof of $\sin(A+B)$, $\cos(A+B)$, $\tan(A+B)$ formulae, multiple and sub multiple angles, $\sin(2A)$, $\cos(2A)$, $\tan(2A)$ etc., transformations sum into product and product into sum formulae, inverse trigonometric functions, sine rule and cosine rule
V	Calculus: Limits, standard formulae and problems, differentiation, first principle, uv rule, u/v rule, methods of differentiation, application of derivatives, integration - product rule and substitution method.
Recommended Text	
1	NCERT class XI and XII text books.
2	Any State Board Mathematics text books of class XI and XII