

SMTA1103	MATHEMATICS FOR ARCHITECTURE	L	T	P	Credits	Total Marks
		2	0	0	2	100

COURSE OBJECTIVES:

- To identify, reflect upon, evaluate and apply different types of information and knowledge to form independent judgments.
- To develop Analytical, logical thinking and conclusions based on quantitative information will be the main objective of learning this subject.

UNIT 1 MATHEMATICS IN DESIGN**10 Hours**

Proportion, Golden ratio and Beauty, Scale, fractal design, Euclidean geometry, Understanding non-parallel surfaces, Symmetry and Anti-symmetry. Algebraic relations and its application in Egyptian pyramids, Fibonacci series. Sacred Geometry, Square root Proportions, Modular Proportions

UNIT 2 MATHEMATICS AND MEASUREMENTS**10 Hours**

Methods to calculate areas and volumes for various geometrical shapes and volumes. SI Metric Units of measurements for angles, time, mass, distance, volume, force, energy, power, current, potential difference, resistance, pressure, frequency, thermodynamic temperature, luminous intensity

UNIT 3 STATISTICS & PROBABILITY**10 Hrs.**

Measures of Central Tendency and Measures of Dispersion. Kurtosis, Curve fitting, Method of Least Squares (Straight Line and Parabola), Correlation and Regression. Elementary concepts of Probability.

UNIT 4 DIFFERENTIAL AND INTEGRAL CALCULUS**10 Hrs.**

Tangent and Normal, Curvature (Cartesian and parametric forms), Taylor's and McLaurin's expansion for one variable. Indeterminate forms, Maxima, Minima for a function of one variable. Reduction Formulae for $\sin^n x$, $\cos^n x$, $\tan^n x$ and $\sin^m x \cos^n x$. Use of double and triple integrals, Calculation of areas using multiple integrals.

UNIT 5 TRIGONOMETRY**5 Hrs.**

Angles of intersection for components of structure using of trigonometry. Length of wall using trigonometry – Tangents - Pythagoras Theorem. Measure of Cube and other Solids – Applications of Trigonometry in Arches, Domes, Support Beams and Suspension bridges.

Max. 45 Hours**COURSE OUTCOME:****On completion of the course the student will be able to**

- CO1** Define Golden ratio, measures, Taylor's and Maclaurins series. Concepts of probability.
- CO2** Explain the measures of central tendencies, dispersion, Golden ratio and Fibonacci series with illustrations. Explain addition and total theorem of probability with examples.
- CO3** Choose appropriate SI metric units for measurements.
- CO4** Distinguish correlation and regression, various types and methods of dispersion. Categorize the regression coefficients. Differentiate correlation and rank correlation. Estimate the maxima and minima of functions of one variable.
- CO5** Evaluate the coefficient of variation and correlation coefficients. Evaluate area using double integral.
- CO6** Produce the solution of integral using reduction formula. Designing architecture using golden ratio, Construct the curve using method of least squares.

TEXT / REFERENCE BOOKS

1. Kreyszig E., Advanced Engineering Mathematics, 8th Edition, John Wiley & Sons, 2001.
2. Grewal B.S., Higher Engineering Mathematics, 36th Edition, Khanna Publishers, 2002,
3. Vittal.P.R., Business Statistics, Margham publications, Chennai, 2008.
4. S.P.Gupta, Business Statistics, Sultan Chand & Sons, New Delhi, 2008.
5. Veerarajan T, Engineering Mathematics for First Year, 2nd Edition, Tata McGrawHill Publications, 2008
6. Kandasamy P & co., Engineering Mathematics for First Year, IX Revised Edition, S.Chand&Co Pub., 2010
7. New Mathematics of Architecture by Jane Burry and Mark Burry.
8. BIPM. (2014). The International System of Units (SI). 8 th Ed. Bureau International des Poids et Mesures.

END SEMESTER EXAM QUESTION PAPER PATTERN**Max. Marks : 100****Exam Duration: 3 Hrs.****PART A : 2 questions each from unit 1 to unit 4, each carrying 5 marks****: 08 x 05 = 40 Marks****PART B : 1 question each from unit 1 to unit 4 with an internal choice, each carrying 15 marks****: 04 x 15 = 60 Marks**