

# J.J. College of Arts & Science (Autonomous), Pudukkottai

## Department of Mathematics

### Course Outcomes

#### B.Sc. Mathematics – USMT

<b>Course Name - Differential Calculus and Trigonometry</b>		<b>Course Code - U1R1MTCC1</b>
<b>Upon Completion of the course students would be able to</b>		
<b>CO 1</b>	Solve problems on successive differentiation and Leibnitz theorem.	
<b>CO 2</b>	Understand and apply the concepts on envelopes using Cartesian formula for radius of curvature.	
<b>CO 3</b>	Find partial derivative of a function of two functions and realize the maxima and minima of function of two variables.	
<b>CO 4</b>	Expand $\cos^n\theta, \sin^n\theta, \cos^m\theta\sin^n\theta$ for different values of n and m .	
<b>CO 5</b>	Obtain and use Hyperbolic function identities.	
<b>Course Name - Mathematical Statistics – I</b>		<b>Course Code - U1R1STAC1</b>
<b>Upon Completion of the course students would be able to</b>		
<b>CO 1</b>	Calculate and apply measures of location and measures of dispersion for grouped & ungrouped data.	
<b>CO 2</b>	Calculate and apply the measures of Averages and Dispersion.	
<b>CO 3</b>	Compute Correlation coefficients and to estimate Regression Analysis.	
<b>CO 4</b>	Deals with consistency of data and independence of Attributes.	
<b>CO 5</b>	Use the variation in Time series.	
<b>Course Name – Probability And Statistics</b>		<b>Course Code – U2R1MTCC2</b>
<b>Upon Completion of the course students would be able to</b>		
<b>CO 1</b>	Appreciate the importance of probability and statistics in computing.	
<b>CO 2</b>	Use appropriate statistical methods in Random variables.	
<b>CO 3</b>	Calculate mathematical expectation and derive the Moment Generating Function.	
<b>CO 4</b>	Derive mathematical expectation, binomial, poisson distribution.	
<b>CO 5</b>	Use continuous distribution develop the Normal distribution and Exponential distribution.	

<b>Course Name - Analytical Geometry (3D) And Integral Calculus</b>		<b>Course Code – U2R1MTCC3</b>
<b>Upon Completion of the course students would be able to</b>		
<b>CO 1</b>	<b>Apply the fundamental concepts of two and three dimensional.</b>	
<b>CO 2</b>	<b>Get the knowledge in the areas of Integral Calculus.</b>	
<b>CO 3</b>	<b>Know the concepts of Bernoulli's formula.</b>	
<b>CO 4</b>	<b>Find the area of curved surfaces, Change the variables and integrate.</b>	
<b>CO 5</b>	<b>Understand Beta and Gamma functions and derive their properties.</b>	
<b>Course Name - SPSS – Practical</b>		<b>Course Code – U2R1STAC2P</b>
<b>Upon Completion of the course students would be able to</b>		
<b>CO 1</b>	<b>Analyze statistical data using measures of central tendency, dispersion and location.</b>	
<b>CO 2</b>	<b>Analyze statistical data using frequency distributions and cumulative frequency distributions</b>	
<b>CO 3</b>	<b>Calculate and interpret the correlation between two variables.</b>	
<b>CO 4</b>	<b>Know the association between the attributes.</b>	
<b>CO 5</b>	<b>Interpret results of analysis of variance tests.</b>	
<b>CO 6</b>	<b>Analyze statistical data using SPSS.</b>	
<b>Course Name – Mathematical Statistics – II</b>		<b>Course Code – U2R1STAC3</b>
<b>Upon Completion of the course students would be able to</b>		
<b>CO 1</b>	<b>Acquire the knowledge of index numbers.</b>	
<b>CO 2</b>	<b>Identify the characteristics of continuous distribution.</b>	
<b>CO 3</b>	<b>Develop the skills pertinent to practice Theory of estimation.</b>	
<b>CO 4</b>	<b>Understand the concepts of testing of hypothesis.</b>	
<b>CO 5</b>	<b>Collect and analyze data using ANOVA.</b>	

<b>Course Name - Number Theory</b>		<b>Course Code – U3R1MTCC4</b>
<b>Upon Completion of the course students would be able to</b>		
<b>CO 1</b>	Prove results involving divisibility and greatest common divisors	
<b>CO 2</b>	Solve systems of linear congruences.	
<b>CO 3</b>	Apply Euler-Fermat's Theorem to prove relations involving prime numbers	
<b>CO 4</b>	Find integral solutions to specified linear Diophantine Equations	
<b>CO 5</b>	Identify how number theory is related to and used in Cryptography.	
<b>Course Name - Sequences And Series</b>		<b>Course Code – U3R1MTCC5</b>
<b>Upon Completion of the course students would be able to</b>		
<b>CO 1</b>	Know the properties of convergent and divergent sequence.	
<b>CO 2</b>	Understand and apply test for convergency of series.	
<b>CO 3</b>	Understand and to apply the method of difference to sum the finite series and to extend its use to infinite series.	
<b>CO 4</b>	Know how to use Binomial, Exponential and Logarithmic series.	
<b>CO 5</b>	Acquire the knowledge of the generating function.	
<b>Course Name – Allied Physics – I</b>		<b>Course Code – U3R1PHAC4</b>
<b>Upon Completion of the course students would be able to</b>		
<b>CO 1</b>	Proficient with basic concepts in elastic properties of materials and importance of elasticity in beams and girders.	
<b>CO 2</b>	Study of viscous properties of fluids provides knowledge in industrial product development (dyes, paints, food products).	
<b>CO 3</b>	understand the concept of good and bad conductor	
<b>CO 4</b>	acquired the ideas of applications of ultrasonic waves in diverse fields	
<b>CO 5</b>	acquired the basic knowledge of optics and optical fiber communication	

<b>Course Name - Vector Calculus And Fourier Series</b>		<b>Course Code – U4R1MTCC6</b>
<b>Upon Completion of the course students would be able to</b>		
<b>CO 1</b>	<b>Acquire the knowledge of Vector Differentiation and Integration.</b>	
<b>CO 2</b>	<b>Use the vector identities, directional derivatives and divergence of a vector point function are evaluated easily.</b>	
<b>CO 3</b>	<b>Find the line integral, surface integral and volume integrals.</b>	
<b>CO 4</b>	<b>Evaluate integrals by using Green's, Gauss's &amp; Stoke's theorem.</b>	
<b>CO 5</b>	<b>Apply Fourier series techniques in Electrical Engineering, Vibration Analysis, Optics, Signal and Image Processing etc.</b>	
<b>Course Name - Differential Equations And Laplace Transforms</b>		<b>Course Code – U4R1MTCC7</b>
<b>Upon Completion of the course students would be able to</b>		
<b>CO 1</b>	<b>Extract the solution of differential of first order ODE by Homogeneous methods.</b>	
<b>CO 2</b>	<b>Solve the second order ODE by using special method.</b>	
<b>CO 3</b>	<b>Apply the Laplace Transform to solve ODE with constant coefficients.</b>	
<b>CO 4</b>	<b>Form partial differential equations.</b>	
<b>CO 5</b>	<b>Use Differential equations as a powerful tool in solving problems in physical and social science.</b>	
<b>Course Name - Allied Physics – II</b>		<b>Course Code – U4R1PHAC5P</b>
<b>Upon Completion of the course students would be able to</b>		
<b>CO 1</b>	<b>Be able to understand the concepts of mechanics, properties of matter and sound through different experiments.</b>	
<b>CO 2</b>	<b>Acquire the basic trouble shooting skills and appreciate physics concepts through experiments.</b>	
<b>CO 3</b>	<b>Understand the concepts and significance of the various physical phenomena.</b>	
<b>CO 4</b>	<b>Carry out experiments to understand the laws and concept of physics.</b>	
<b>CO 5</b>	<b>Apply the theories learnt and skills acquired to solve real time problems.</b>	

<b>Course Name - Allied Physics – III</b>		<b>Course Code - U4R1PHAC6</b>
<b>Upon Completion of the course students would be able to</b>		
<b>CO 1</b>	<b>Apply knowledge of electricity and magnetism to explain natural physical processes and related technological advances.</b>	
<b>CO 2</b>	<b>Apply Gauss’s law of electrostatics to solve a variety of problems.</b>	
<b>CO 3</b>	<b>Ability to determine and describe static and dynamic electric and magnetic fields .</b>	
<b>CO 4</b>	<b>Atomic physics studies about the atoms which isolates the system of electrons and an atomic nucleus.</b>	
<b>CO 5</b>	<b>Understand the structure of various number system and basic logic gates.</b>	
<b>Course Name - Mechanics</b>		<b>Course Code - U5R1MTCC8</b>
<b>Upon Completion of the course students would be able to</b>		
<b>CO 1</b>	<b>Understand the conditions of equilibrium of three coplanar forces.</b>	
<b>CO 2</b>	<b>Study the Geometrical representation of moment of a force.</b>	
<b>CO 3</b>	<b>Understand the problems of the friction.</b>	
<b>CO 4</b>	<b>Study the concept of projectile on an inclined plane.</b>	
<b>CO 5</b>	<b>Acquire the knowledge of composition of simple harmonic motion.</b>	
<b>Course Name - Modern Algebra</b>		<b>Course Code - U5R1MTCC9</b>
<b>Upon Completion of the course students would be able to</b>		
<b>CO 1</b>	<b>Recognize technical terms groups, permutation groups and cyclic groups.</b>	
<b>CO 2</b>	<b>Acquire the knowledge of normal subgroups.</b>	
<b>CO 3</b>	<b>Understand the elementary properties of rings.</b>	
<b>CO 4</b>	<b>Formulate and develop unique factorization domain.</b>	
<b>CO 5</b>	<b>Describe the properties of polynomial rings.</b>	

<b>Course Name - Real Analysis</b>		<b>Course Code - U5R1MTCC10</b>
<b>Upon Completion of the course students would be able to</b>		
<b>CO 1</b>	<b>Emphasize the proofs development defines the counting of a function and uniform continuity of a function.</b>	
<b>CO 2</b>	<b>Understand the knowledge of types of discontinuities.</b>	
<b>CO 3</b>	<b>Acquire the knowledge of Daurboux's theorem on derivative.</b>	
<b>CO 4</b>	<b>Use results and techniques involving mean value theorems to solve a variety of problems.</b>	
<b>CO 5</b>	<b>Understand the concepts of fundamental theorem of integral calculus.</b>	
<b>Course Name - Numerical Methods</b>		<b>Course Code - U5R1MTCC11</b>
<b>Upon Completion of the course students would be able to</b>		
<b>CO 1</b>	<b>Acquire the knowledge of Algebraic and Transcendental Equations.</b>	
<b>CO 2</b>	<b>Implement the Numerical methods for computing Interpolation.</b>	
<b>CO 3</b>	<b>Derive Simpson's 1/3, 3/8 rules by using Trapezoidal rule.</b>	
<b>CO 4</b>	<b>Solve the ODE by using Taylor's, Picard's &amp; Euler's Methods</b>	
<b>CO 5</b>	<b>Understand the concepts of Relaxation or SOR method.</b>	
<b>Course Name - Numerical Methods With MATLAB</b>		<b>Course Code - U6R1MTCC12P</b>
<b>Upon Completion of the course students would be able to</b>		
<b>CO 1</b>	<b>Express programming &amp; simulation for engineering problems.</b>	
<b>CO 2</b>	<b>Find importance of this software for lab experimentation.</b>	
<b>CO 3</b>	<b>Determine better and more accurate solution.</b>	
<b>CO 4</b>	<b>Develop program skills for various methods of Numerical Problems.</b>	
<b>CO 5</b>	<b>Acquire knowledge on MATLAB Software.</b>	

<b>Course Name - Complex Analysis</b>		<b>Course Code - U6R1MTCC13</b>
<b>Upon Completion of the course students would be able to</b>		
<b>CO 1</b>	<b>Give an account of the concepts of Analytic functions and Harmonic functions with the role of the C-R equations.</b>	
<b>CO 2</b>	<b>Learn about elementary transformations concepts in complex variables.</b>	
<b>CO 3</b>	<b>Acquire the knowledge of Cauchy's theorems on Derivatives.</b>	
<b>CO 4</b>	<b>Represent the functions as Taylor's and Laurent Power series method.</b>	
<b>CO 5</b>	<b>Understand the singularity concepts and Residues, Solving definite integrals using the Residue concepts.</b>	
<b>Course Name - Linear Algebra</b>		<b>Course Code - U6R1MTCC14</b>
<b>Upon Completion of the course students would be able to</b>		
<b>CO 1</b>	<b>Know and recall core knowledge of Vector Spaces</b>	
<b>CO 2</b>	<b>Understand basic concepts in linear independence of vectors, subspaces bases and dimension of vector spaces.</b>	
<b>CO 3</b>	<b>Analyze the problems and apply the appropriate concept of Determinants.</b>	
<b>CO 4</b>	<b>Apply core concepts in single linear operators.</b>	
<b>CO 5</b>	<b>Acquire the knowledge of Adjoint operator in Inner product spaces.</b>	
<b>Course Name - Operations Research</b>		<b>Course Code - U5R1MTMBE1</b>
<b>Upon Completion of the course students would be able to</b>		
<b>CO 1</b>	<b>Acquire the basic concepts of the Operations Research.</b>	
<b>CO 2</b>	<b>Understand and solve the LPP.</b>	
<b>CO 3</b>	<b>Apply the Transportation Problem in marketing.</b>	
<b>CO 4</b>	<b>Understand the concepts of Assignment problems.</b>	
<b>CO 5</b>	<b>Analyze and apply the Network Problems.</b>	
<b>Course Name - Fuzzy Logic</b>		<b>Course Code - U5R1MTMBE2</b>
<b>Upon Completion of the course students would be able to</b>		

<b>CO 1</b>	Gain the knowledge of fuzzy sets.
<b>CO 2</b>	Discuss the types of operations on fuzzy sets and fuzzy arithmetic.
<b>CO 3</b>	Identify fuzzy relations, binary fuzzy relations & fuzzy equivalence relations.
<b>CO 4</b>	Apply the fuzzy models to natural science and technical fields.
<b>CO 5</b>	Acquire the Knowledge of Comparison and evaluation of defuzzification methods
<b>Course Name - Graph Theory</b>	
<b>Course Code - U6R1MTMBE1</b>	
<b>Upon Completion of the course students would be able to</b>	
<b>CO 1</b>	Acquire the knowledge of graph theory and its applications.
<b>CO 2</b>	Understand the techniques of Trees and Fundamental circuits in Graph Theory.
<b>CO 3</b>	Study advanced methods from structural graph theory.
<b>CO 4</b>	Study the relationship between Fundamental Circuit Matrix and rank of the circuit matrix
<b>CO 5</b>	Analyze the concepts of Colorings and Partitioning.
<b>Course Name - Astronomy</b>	
<b>Course Code - U6R1MTMBE2</b>	
<b>Upon Completion of the course students would be able to</b>	
<b>CO 1</b>	Understand the basic terms used in Astronomy.
<b>CO 2</b>	Study the different position on Earth.
<b>CO 3</b>	Apply the Knowledge of Kepler's Laws and Equations of Time.
<b>CO 4</b>	Understand the concepts different kinds of Years and Calendar
<b>CO 5</b>	Acquire the Knowledge about Eclipses and Phases of moon.
<b>Course Name - Discrete Mathematics</b>	
<b>Course Code - U6R1MTMBE3</b>	
<b>Upon Completion of the course students would be able to</b>	
<b>CO 1</b>	Learn core idea in Logic, Permutations and Combinations counting Principles.
<b>CO 2</b>	Understand and apply the concepts of Theory of Inference.
<b>CO 3</b>	Acquire the knowledge of basics of Boolean Algebra.



<b>CO 4</b>	Use Generating functions to solve a variety of combinatorial problems.
<b>CO 5</b>	Apply the mathematical ideas for solving the problems by using Recurrence relations.
<b>Course Name - Theory of Games and Decision Theory</b>	
<b>Course Code - U4R1MTSBE1</b>	
<b>Upon Completion of the course students would be able to</b>	
<b>CO 1</b>	Understand the Methods for solving game with and without Saddle point
<b>CO 2</b>	Acquire the knowledge of Graphical methods.
<b>CO 3</b>	Know about the applications of game theory by using the method of Approximation.
<b>CO 4</b>	Gain knowledge in Decision Analysis
<b>CO 5</b>	Understand the concept of EMV
<b>Course Name - A Prime on Divisibility and Number Sequences</b>	
<b>Course Code - U5R1MTSBE2</b>	
<b>Upon Completion of the course students would be able to</b>	
<b>CO 1</b>	Acquire the knowledge of Number theory and Congruence.
<b>CO 2</b>	Understand general results of Divisibility's.
<b>CO 3</b>	Develop problem solving skills and to gain self assess knowledge of method of differences.
<b>CO 4</b>	Know about the knowledge of mixed sequences.
<b>CO 5</b>	Understand the concept of square root.
<b>Course Name - Quantitative Mathematics For Competitive Examination</b>	
<b>Course Code - U6R1MTSBE1</b>	
<b>Upon Completion of the course students would be able to</b>	
<b>CO 1</b>	Equip in a relative sense as for as preparation for entrance examinations involving placement opportunities.
<b>CO 2</b>	Understood the concept of Mathematics with emphasis on analytical ability.
<b>CO 3</b>	Learn the techniques for solving aptitude problems.
<b>CO 4</b>	Identify and classify the Ratio and Proportion.
<b>CO 5</b>	Gain the knowledge on conversion of units.
<b>Course Name - Foundation Mathematics For Competitive Examination</b>	
<b>Course Code - U6R1MTSBE2</b>	

<b>Upon Completion of the course students would be able to</b>	
<b>CO 1</b>	<b>Guess &amp; Check the Problems quickly.</b>
<b>CO 2</b>	<b>Understand the relation between time and distance.</b>
<b>CO 3</b>	<b>Prepare for Competitive &amp; Entrance Examinations in various fields.</b>
<b>CO 4</b>	<b>Know the application of Volume and Surface Area.</b>
<b>CO 5</b>	<b>Acquire the knowledge of Discount.</b>
<b>Course Name - Mathematical Modeling</b>	<b>Course Code - U6R1MTSBE3</b>
<b>Upon Completion of the course students would be able to</b>	
<b>CO 1</b>	<b>Use the method of variation of parameters to find particular solutions of second order, linear homogeneous equations.</b>
<b>CO 2</b>	<b>Appreciate the fundamental principles and to understand the different concepts and methods in Mathematical modeling.</b>
<b>CO 3</b>	<b>Utilize them in solving problems.</b>
<b>CO 4</b>	<b>Understand the applications of mathematical modelling.</b>
<b>CO 5</b>	<b>Acquire the knowledge of Situations can be Modeled through Graphs</b>