



# **VIDHYA SAGAR WOMEN'S COLLEGE**

(Affiliated to University of Madras)

**Accredited at 'A' Grade by NAAC**

## **DEPARTMENT OF MATHEMATICS**

### **PROGRAMME OUTCOME:**

This Mission of the Mathematics Degree program is to equip students with analytic and problem-solving skills for career and Graduate work. Classes develop student's abilities and aptitude to apply mathematical methods and ideas not only to program in mathematics and related fields such as computer science and Statistics.

### **PROGRAMME OUTCOME:**

**PO1:** This program helps the students to define mathematical concepts, calculate quantities, estimate solutions, solve problems.

**PO2:** This program helps to think in a critical manner.

**PO3:** This program helps to know when there is a need for information to be able to identify, locate, evaluate, and effectively use that information for the issue or problem at hand.

**PO4:** This program helps the Students to Acquire good knowledge and understanding in advanced areas of Mathematics and Statistics.

### **PROGRAMME SPECIFIC OUTCOME:**

**PSO1:** To develop the knowledge to undertake further studies related to mathematics.

**PSO2:** To gain knowledge in foundational areas of mathematics

**PSO3:** To communicate mathematics accurately, precisely and effectively

**PSO4:** Students will be able to solve mathematical problems using technology and develop mathematical thinking.

### **COURSE OUTCOME:**

**CO1: ALGEBRA** - To understand the concepts of basic ideas on theory of equation, Matrices and theory of numbers. To gain the knowledge to solve theoretical and applied problems.

**CO2: DIFFERENTIAL CALCULUS** – To understand the knowledge of differentiation and its applications and also study the notion of curvature, evolutes and polar co-ordinates.

**CO3: TRIGONOMETRY** - To learn the expansion of Trigonometric Function, Hyperbolic Function and sum of Trigonometric Series

**CO4: INTEGRAL CALCULUS** – To gain the knowledge about Integration and its geometrical applications, double, triple integrals and improper.

**CO5: ANALYTICAL GEOMETRY** - To analyse characteristics and properties of two- and three-dimensional geometric shapes and also develop mathematical arguments about geometric relationships and its applications in real world.

**CO6: DIFFERENTIAL EQUATION** - A student will be able to: Solve problems in ordinary differential equations, dynamical systems, stability theory, and a number of applications to scientific and engineering problems, demonstrate their ability to write coherent mathematical proofs and scientific arguments needed to communicate the results obtained from differential equation models,

**CO7: TRANSFORM TECHNIQUES** - To apply Laplace transform in solving Ordinary Differential equations with constant coefficients, simultaneous Ordinary Differential Equations.

**CO8: STATICS** - To learn the body in rest under the given forces, equilibrium of a particle and centre of mass of various bodies.

**CO9: CALCULUS OF FINITE DIFFERENCES AND NUMERICAL ANALYSIS** - To gain the knowledge of Numerical techniques used as powerful tools in scientific computing.

**CO10: LINEAR ALGEBRA** - Students will be able to set up and solve linear systems/linear inequalities graphically/geometrically and algebraically (using matrices).

**CO11: REAL ANALYSIS** - Students will be able to formulate problems in the language of sets and perform set operations, and will be able apply the Fundamental Principle of Counting, Multiplication Principle.

**CO12: DYNAMIC** –To gain the knowledge of Rectilinear motion of particles, Projectiles, Impact and Moment of Inertia of Particles.

**CO13: DISCRETE MATHEMATICS** - To Demonstrate a working knowledge of set notation and elementary set theory, recognize the connection between set operations and logic, prove elementary results involving sets, and explain Russell's paradox, Apply the different properties of injections, surjections, bijections, compositions, and inverse functions,

**CO14: NUMBER THEORY** -Apply the Law of Quadratic Reciprocity and other methods to classify numbers as primitive roots, quadratic residues, and quadratic non-residues, Formulate and prove conjectures about numeric patterns, and Produce rigorous arguments (proofs) centred on the material of number theory, most notably in the use of Mathematical Induction and/or the Well Ordering Principal in the proof of theorems.

**CO15: COMPLEX ANALYSIS-** Represent complex numbers algebraically and geometrically, Define and analyze limits and continuity for complex functions as well as consequences of continuity, Apply the concept and consequences of analyticity and the Cauchy-Riemann equations and of results on harmonic and entire functions including the fundamental theorem of algebra, Analyze sequences and series of analytic functions and types of convergence

**CO16: LINEAR PROGRAMMING AND OPERATIONS RESEARCH** - Formulate and model a linear programming problem from a word problem and solve them graphically in 2 and 3 dimensions, while employing some convex analysis, Place a Primal linear programming problem into standard form and use the Simplex Method or Revised Simplex Method to solve it, Find the dual, and identify and interpret the solution of the Dual Problem from the final tableau of the Primal problem, Be able to modify a Primal Problem, and use the Fundamental Insight of Linear Programming to identify the new solution, or use the Dual Simplex Method to restore feasibility, Interpret the dual variables and perform sensitivity analysis in the context of economics problems as shadow prices, imputed values, marginal values, or replacement values.

**CO17: TOPOLOGY-**Define and illustrate the concept of topological spaces and continuous functions, Define and illustrate the concept of product topology and quotient topology, Prove a selection of theorems concerning topological spaces, continuous functions, product topologies, and quotient topologies, Define and illustrate the concepts of the separation axioms, Define connectedness and compactness, and prove a selection of related theorems, and Describe different examples distinguishing general, geometric, and algebraic topology.

**CO18: PROBABILITY AND APPLIED STATISTICS-**Recognize the role of and application of probability theory, descriptive and inferential statistics in many different fields, Define, illustrate, and apply the concepts of probability and conditional probability, Define, illustrate, and apply the concepts of discrete and continuous random variables, Define, illustrate, and apply the concept of expectation to the mean, variance, and covariance of random variables, Identify and demonstrate appropriate sampling and data collection processes, classification of variables, and graphical summaries, Apply parametric testing techniques including single and multi-sample tests for mean and proportion and regression, and Use statistical software for probability simulations and data analysis.

**CO19: PARTIAL DIFFERENTIAL EQUATIONS-**Be familiar with the modelling assumptions and derivations that lead to PDEs, Recognize the major classification of PDEs and the qualitative differences between the classes of equations, and Be competent in solving linear PDEs using classical solution methods.

**CO20: GRAPH THEORY-** Students will be able to model and solve real-world problems using graphs and trees, both quantitatively and qualitatively.

**CO21: VALUE EDUCATION-** Students learn the importance of values which acts as guiding factor in their routine life. Students will be understood Salient values for life like Truth, commitment, honesty and integrity, forgiveness and love, empathy and ability to sacrifice, care, unity etc. Analyze the role of media in value building and Gain awareness about social evils and how to overcome from that.

**CO22: TAMIL-I-** The course focuses on culture and traditional way of living, proverbs and folk songs. In addition to verbal literature, life style of ancient people and their culture, society and tradition were also been focussed. Finally, the subject motivates the students for creative writing, poetry making, and learning grammar are also included.

**CO23: TAMIL-II** – The course focuses on anthropology, reign of kings, ancient literature, prose, poetry, mystery and contemporary literature. After completing the students can develop their nobility and humanity.

**CO24: TAMIL-III** – The course mainly focuses on the importance of Religion and religious people. It spreads love, affection and self-confidence to all the people. It also focuses on life and life style of the ancient people like Kannagi, Madhavi and many epic stories.

**CO25: TAMIL –IV:** Ancient literature folks of inner and outer activities of the country are focussed in this course. It also focuses on noble culture, tradition and discipline spread among the students through the historical plays. Students are also learning climate, seasons, atmosphere, agriculture and generosity. It also focuses on ancient moral and mythical values.

**CO26: ENGLISH I** – At the end of the course the students are able to read, interpret, and write about a diverse range of texts in English, for example prose, poetry, and drama. On the basis of careful and close reading, the students understand the text analytically and critically. The students can participate clearly and appropriately through spoken and written forms. Further, students develop abilities in grammar, oral skills, reading, writing and study skills.

**CO27: ENGLISH II** – After successful completion of this course the students develop their skills in the areas of academic reading, writing, speaking, and listening. The students can apply reading and listening strategies to comprehend and evaluate a range of academic texts and talks. Identify relevant information from academic texts and talks, and utilise effective summarising techniques.

**CO28: ENGLISH III** - After successful completion of this course the students develop their skills in the areas of academic reading, writing, speaking, and listening. The students can demonstrate and understand which helps an ability to produce the structure, conventions and characteristics of a range of short academic essays. Deliver structured academic oral and written presentations.

**CO29: ENGLISH IV** – This course develops English language skills in listening, speaking, reading and writing by having learners engage in a range of communicative tasks and activities. Further the course expands the learner's use of grammatically correct and appropriate language in speaking and writing for effective communication in a variety of interpersonal and academic situations.

**CO30: NME** - It help the students to face all the competitive exam and also develop mathematical thinking and gain knowledge in foundation areas of mathematics.

**CO31: PERSONALITY ENRICHMENT** – The main objective is to develop the concept of self- disclosure and self-awareness techniques. To enhance with VCR3 and SQ3R study methods to increase the quotient in goal setting, time management and to overcome procrastination.