



## IDHAYA COLLEGE FOR WOMEN, KUMBAKONAM

### Programme: B.Sc. Mathematics

PO. No.	Programme Outcomes upon Completion of the B.Sc., Mathematics Degree Programme, the Graduates will be able
PO1	To demonstrate information on essential ideas, standards and uses of the particular science discipline.
PO2	To deal with/utilize suitable apparatuses/strategies/gear with a comprehension of the standard working methods, wellbeing perspectives/ impediments.
PO3	To Identify and basically break down appropriate issues in the important order utilizing proper instruments and strategies just as ways to deal with coming to feasible end results/arrangements.
PO4	To Exhibit the possibility to successfully achieve assignments freely and as a part or pioneer in various groups, and in multidisciplinary settings.
PO5	To Communicate successfully in spoken and composed structure just as through electronic media with mainstream researchers just as with society on the loose.

### Semester I

S.No	Course Code	Name of the Course	Course Outcomes
1.	22SCCMM1	Differential Calculus and Trigonometry	<ul style="list-style-type: none"> <li>➤ To know the usage of right triangles to evaluate the six trigonometric functions.</li> <li>➤ To recognize and use the vocabulary of angles.</li> <li>➤ To compute the six trigonometric functions of any angle and use the unit circle to define the six trigonometric functions for all real numbers.</li> </ul>
2.	22SCCMM2	Integral Calculus and Fourier Series	<ul style="list-style-type: none"> <li>➤ To derive reduction formula and thereby evaluate some standard integrals.</li> <li>➤ To identify odd and even functions and determine Fourier series expansion of these given functions.</li> </ul>

			<ul style="list-style-type: none"> <li>➤ To utilize double and triple integral to compute area and volume of a solid.</li> </ul>
3.	22SCACCS1	Programming in C	<ul style="list-style-type: none"> <li>➤ To recall algorithms and flowcharts for computing logic</li> <li>➤ To summarize the basic knowledge to develop C programs</li> <li>➤ To apply and implement programs for solving real world problems</li> </ul>
4.	22UGVED	Value Education	<ul style="list-style-type: none"> <li>➤ To gain deeper understanding about the purpose of their life.</li> <li>➤ To understand and start applying the essential steps to become good leaders.</li> <li>➤ To emerge as responsible citizens with clear conviction to practice values and ethics in life.</li> </ul>

### Semester II

S.No	Course Code	Name of the Course	Course Outcomes
1.	22SCCMM3	Differential Equations	<ul style="list-style-type: none"> <li>➤ To solve higher order differential equations.</li> <li>➤ To solve the Higher order differential equations using methods of variation of parameter.</li> <li>➤ To solve partial differential equations using Lagrange's Method</li> </ul>
2.	22SCCMM4	Analytical Geometry 3D	<ul style="list-style-type: none"> <li>➤ To gain knowledge about the regular geometrical figures and their properties.</li> <li>➤ To analyze condition of tangency and find the tangent plane to the sphere.</li> <li>➤ To examine the condition for the general equation of the cone.</li> </ul>
3.	22SCACCS2	Principles of Information Technology	<ul style="list-style-type: none"> <li>➤ To explore careers in information technology.</li> <li>➤ To work with the Internet and other technologies for information exchange.</li> <li>➤ To handle online security and privacy issues.</li> </ul>

4.	22SCACCS1P	Programming in C Lab (Practical)	<ul style="list-style-type: none"> <li>➤ To understand and trace the execution of programs using arrays.</li> <li>➤ To develop programs with functions and pointers.</li> <li>➤ To compare and contrast structures and unions.</li> </ul>
5.	22PELPS1	Professional English for Physical Sciences - I	<ul style="list-style-type: none"> <li>➤ To read independently unfamiliar texts with comprehension.</li> <li>➤ To understand the importance of writing in academic life.</li> <li>➤ To write simple sentences without committing error of spelling or grammar.</li> </ul>
6.	22UGCES	Environmental Studies	<ul style="list-style-type: none"> <li>➤ To understand the environmental importance including interactions across local to global scales.</li> <li>➤ To update and analyze environmental relationships and interactions of environmental components.</li> <li>➤ To gain knowledge on importance of natural resources in a systematic way.</li> </ul>

### Semester III

S.No	Course Code	Name of the Course	Course Outcomes
1	22SCCMM5	Classical Algebra and Theory of Numbers	<ul style="list-style-type: none"> <li>➤ To understand the basic concept about theory of equations.</li> <li>➤ To know the foundation of theory of equations.</li> <li>➤ To apply the skills to solve problems in algebra.</li> </ul>
2	22SCCMM6	Sequences and Series	<ul style="list-style-type: none"> <li>➤ To determine if an infinite sequence is bounded, monotonic, convergent or divergent.</li> <li>➤ To find the sum of a convergent geometric series.</li> <li>➤ To determine if an infinite series converges absolutely or conditionally.</li> </ul>

3	22SCACMS1	Mathematical Statistics	<ul style="list-style-type: none"> <li>➤ To understand random variables and probability distributions.</li> <li>➤ To know the difference between continuous and random variables.</li> <li>➤ To acquire the knowledge by using Binomial and Poisson Distribution.</li> </ul>
4	22PELPS2	Professional English for Physical Sciences – II	<ul style="list-style-type: none"> <li>➤ To read independently unfamiliar texts with comprehension.</li> <li>➤ To understand the importance of writing in academic life.</li> <li>➤ To write simple sentences without committing error.</li> </ul>
5	22ANMESW1	Human Rights	<ul style="list-style-type: none"> <li>➤ To perceive the basic concepts of Human Rights.</li> <li>➤ To explain the Universal Declaration of Human Rights.</li> <li>➤ To know about the violations of Human Rights.</li> </ul>

**Semester IV**

S.No	Course Code	Name of the Course	Course Outcomes
1	22SCCMM7	Vector Calculus and Laplace Transforms	<ul style="list-style-type: none"> <li>➤ To learn about the basic concepts of Vector differentiation and Vector integration.</li> <li>➤ To solve vector differentiation and integration problems.</li> <li>➤ To solve a differential equation by using Laplace Transforms.</li> </ul>
2	22SCCMM8	Abstract Algebra	<ul style="list-style-type: none"> <li>➤ To demonstrate the abstract structures of algebra.</li> <li>➤ To check irreducibility of polynomial and verify whether a function is an isomorphism or not.</li> <li>➤ To develop examples of groups and rings with specific criterions.</li> </ul>

3	22SCACMS1P	Mathematical Statistics (P)	<ul style="list-style-type: none"> <li>➤ To understand and critically discuss the issues surrounding sampling and significance.</li> <li>➤ To use Karl Pearson Coefficient of correlation.</li> <li>➤ To use Spearman's rank correlation.</li> </ul>
4	22SCACMA3	Mathematical Statistics	<ul style="list-style-type: none"> <li>➤ To understand the meaning of correlation, regression and its properties.</li> <li>➤ To apply the concepts of t, F, z distributions and its applications.</li> <li>➤ To apply concepts of sampling techniques and procedure of testing hypothesis for large samples.</li> </ul>
5	22ANMESW2	Contemporary Social Issues and Problems	<ul style="list-style-type: none"> <li>➤ To enable to trace the evolution of a given social problem to understand the historical, economic, cultural and political reasons that an issue has come to be defined as a social problem.</li> <li>➤ To critically assess how social problems are presented to the public by the media, including how the various sides of the debate surrounding a social problem and possible solutions.</li> <li>➤ To consider alternative explanations and solutions for contemporary social issues.</li> </ul>

### Semester V

S.No	Course Code	Name of the Course	Course Outcomes
1.	22SCCMM9	Numerical Methods with MAT LAB Programming	<ul style="list-style-type: none"> <li>➤ To apply the MAT LAB programming to solve numerical problems.</li> <li>➤ To know the techniques of Numerical methods.</li> <li>➤ To understand the exciting world of programming through MATLAB.</li> </ul>

2.	22SCCMM10	Real Analysis	<ul style="list-style-type: none"> <li>➤ To generate sets and functions of required nature.</li> <li>➤ To characterize structures of connected sets, dense sets, continuity of a function, compact sets and category of sets.</li> <li>➤ To explain the concepts such as real valued functions, continuity, connectedness, compactness, etc.</li> </ul>
3.	22SCCMM11	Statics	<ul style="list-style-type: none"> <li>➤ To develop a working knowledge to handle practical problems.</li> <li>➤ To provide the basic knowledge of equilibrium of a particle.</li> </ul>
4.	22SCCMM1P	Numerical Methods with MAT LAB Programming (P)	<ul style="list-style-type: none"> <li>➤ To Experience the programming skills through numerical methods.</li> <li>➤ To Know basic commands in MAT LAB programming.</li> <li>➤ To solve numerical problems using MAT LAB programming.</li> </ul>
5.	22SMBEMM1A	Operations Research	<ul style="list-style-type: none"> <li>➤ To Make use of different methods to get optimality in LPP, TP, AP and games.</li> <li>➤ To check the existence of alternate / infeasible / unbounded solutions.</li> <li>➤ To Convert possible real life problems into OR model.</li> </ul>
6.	22SSBEMM1	Introduction to Latex	<ul style="list-style-type: none"> <li>➤ To utilize bibtex feature of including bibliographies and indexes.</li> <li>➤ To use various style files and in particular amsmath, amsfons, amsssth.</li> <li>➤ To understand how to align math equations, matrices etc.</li> </ul>

7.	22UGSDC	Soft Skills Development	<ul style="list-style-type: none"> <li>➤ To communicate effectively through verbal / oral communication and to improve the listening skills.</li> <li>➤ To become more effective individual through goal / target setting, self-motivation and practicing creative thinking.</li> <li>➤ To function effectively in multi-disciplinary and heterogeneous teams through the knowledge of team work.</li> </ul>
----	---------	-------------------------	--

### Semester VI

S.No	Course Code	Name of the Course	Course Outcomes
1.	22SCCMM12	Linear Algebra	<ul style="list-style-type: none"> <li>➤ To prove standard theorems in Linear Algebra</li> <li>➤ To define basic concepts of vector spaces, linear transformation, inner product spaces.</li> <li>➤ To determine basis and dimension of vector spaces, orthogonal basis, eigen values, eigen vector and posets.</li> </ul>
2.	22SCCMM13	Complex Analysis	<ul style="list-style-type: none"> <li>➤ To acquire the knowledge and develop manipulation skills in the use of Rouche's theorem.</li> <li>➤ To understand and learn to use Argument Principle and the principle of Analytic Continuation and the concerned results.</li> <li>➤ To understand the concepts of complex integration and series expansions.</li> </ul>
3.	22SCCMM14	Dynamics	<ul style="list-style-type: none"> <li>➤ To acquire knowledge about the basic concepts of kinematics.</li> <li>➤ To analyze the motion of projectiles and the results.</li> <li>➤ To critique the concept of central orbits, differential equation of a central orbit.</li> </ul>

4.	22SMBEMM2A	Graph Theory	<ul style="list-style-type: none"> <li>➤ To understand and apply the fundamental concepts in graph theory.</li> <li>➤ To understand the tree.</li> <li>➤ To know the planarity.</li> </ul>
5.	22SMBEMM3B	Number Theory	<ul style="list-style-type: none"> <li>➤ To understand the concepts of divisibility and fundamental theorem of arithmetic.</li> <li>➤ To understand the congruences.</li> <li>➤ To solve using Chinese remainder theorem.</li> </ul>
6.	22UGGS	Gender Studies	<ul style="list-style-type: none"> <li>➤ To make the students aware of feminine and masculine genders of strength and weakness.</li> <li>➤ To develop sensitivity towards both genders in order to lead an ethically enriched life.</li> <li>➤ To promote attitudinal change towards a gender balanced ambience, gender issues and women empowerment.</li> </ul>

**Programme: M.Sc. Mathematics**

PO NO.	Programme Outcomes upon Completion of the M.Sc., Mathematics Degree Programme, the Graduates will be able to
PO1	Master Degree Programme in Mathematics will meet the present day needs of academic and Research, Institutions and Industries.
PO2	Students may acquire depth knowledge in Algebra, Analysis, Topology, Functional Analysis, Optimization Techniques and Graph Theory which will motivate the students to go for higher studies/research in Mathematics.
PO3	Inculcate critical thinking to carry out scientific investigation objectively without being biased with preconceived notions.
PO4	Prepare students for pursuing research or careers in mathematical sciences and applied fields.
PO5	Equip the student with skills to analyze problems, formulate a hypothesis, evaluate and validate results, and draw reasonable conclusions thereof.



## Semester I

S.No	Course Code	Name of the Course	Course Outcomes
1.	P22MACC11	Algebra	<ul style="list-style-type: none"> <li>➤ To gain expertise in the basic concepts of group theory with the help of numerous examples.</li> <li>➤ To discuss in detail about permutation groups and Normal subgroups and discuss on counting tricks in algebra.</li> <li>➤ To learn the fundamental concept in field theory of field extensions and would see the idea of generating new fields.</li> </ul>
2.	P22MACC12	Real Analysis	<ul style="list-style-type: none"> <li>➤ To describe fundamental properties of the real numbers that lead to the formal development of real analysis.</li> <li>➤ To demonstrate an understanding of limits and how that are used in sequences.</li> <li>➤ To demonstrate an understanding of limits and how that are used in series.</li> </ul>
3.	P22MACC13	Ordinary Differential Equations	<ul style="list-style-type: none"> <li>➤ To find the general solution of the first order linear homogeneous equations.</li> <li>➤ To understand the utility of the theory of power series which is studied in Real Analysis course through solving various second order differential equations.</li> <li>➤ To Solve the problems arises in Mathematical physics using properties of special functions.</li> </ul>
4.	P22MACC1A	Classical Dynamics	<ul style="list-style-type: none"> <li>➤ To understand the idea of impulsive constraints.</li> <li>➤ To compare dissipative systems and velocity dependent potentials.</li> <li>➤ To understand the nature of equations of motion for holonomic and non-holonomic systems.</li> </ul>

5.	P22MAE1A	Graph Theory	<ul style="list-style-type: none"> <li>➤ To relate practical problems to languages, automata, and computability.</li> <li>➤ To demonstrate an increased level of mathematical sophistication.</li> <li>➤ To apply mathematical and formal techniques for solving problems.</li> </ul>
----	----------	--------------	---

### Semester II

S.No	Course Code	Name of the Course	Course Outcomes
1.	P22MACC21	Complex Analysis	<ul style="list-style-type: none"> <li>➤ To work out the path integrals on the complex plane.</li> <li>➤ To understand the central theme of Cauchy theory, viz., existence of local primitives and local power series expansion.</li> <li>➤ To classify singularities, compute poles and residues and understand the Laurent series expansion.</li> </ul>
2.	P22MACC22	Linear Algebra	<ul style="list-style-type: none"> <li>➤ To realise that the subject evolves as a generalization of solving a system of linear equations.</li> <li>➤ To master the dimension formula and rank and nullity theorem which are often exploited.</li> <li>➤ To learn the theory of determinants and put them in practice.</li> </ul>
3.	P22MACC2A	Partial Differential Equations	<ul style="list-style-type: none"> <li>➤ To classify first order partial differential equations and their solutions. Solve first order equations and nonlinear partial differential equations using various methods.</li> <li>➤ To use the method of characteristics to solve first order partial differential equations.</li> <li>➤ To solve one dimensional wave equations using method of separation of variables.</li> </ul>

4.	P22MAE2C	Stochastic Process	<ul style="list-style-type: none"> <li>➤ To acquire adequate knowledge about Continuous Time Markov chain and Queuing system.</li> <li>➤ To gain understanding on the Renewal process, Cumulative process and Semi Markov process.</li> <li>➤ To apply different methods to solve birth and death queues.</li> </ul>
5.	P22ITNME1	Fundamentals of Information Technology	<ul style="list-style-type: none"> <li>➤ To know the latest trends in information technology</li> <li>➤ To understand the fundamentals of computers.</li> <li>➤ To gain knowledge about networks.</li> </ul>
6.	P22MAVAC1B	Introduction to MATLAB	<ul style="list-style-type: none"> <li>➤ To understand the main features of the MATLAB development environment.</li> <li>➤ To use the MATLAB GUI effectively.</li> <li>➤ To write simple programs in MATLAB to solve scientific and mathematical problems.</li> </ul>

### Semester III

S.No	Course Code	Name of the Course	Course Outcomes
1	P22MACC31	Topology	<ul style="list-style-type: none"> <li>➤ To understand the concepts of metric spaces, topological spaces.</li> <li>➤ To provide patience to contend with life outside the campus.</li> <li>➤ To understand the concept of continuous deformations of objects.</li> </ul>
2	P22MACC32	Measure Theory and Integration	<ul style="list-style-type: none"> <li>➤ To learn the basic concepts of integration using measures.</li> <li>➤ To comprehend the differences between different types of convergences.</li> <li>➤ To understand the concepts of Classical Banach Spaces.</li> </ul>
3	P22MACC3B	Algebraic Number Theory	<ul style="list-style-type: none"> <li>➤ To understand and work numerous problems on concepts of divisibility and primes.</li> <li>➤ To solve congruences as application of Chinese remainder Theorem.</li> <li>➤ To attain mastery in the fundamentals of greatest integer function, recurrence functions and solving combinatorial problems.</li> </ul>

4	P22MAE3A	Integral Equations and Calculus of Variations	<ul style="list-style-type: none"> <li>➤ To understand the concepts of variations and its properties.</li> <li>➤ To derive sufficient conditions based on second variation.</li> <li>➤ To classify Fredholm, Volterra and singular type integral equations.</li> </ul>
5	P22ITNME2	Fundamentals of Internet	<ul style="list-style-type: none"> <li>➤ To acquire knowledge about Domain name system.</li> <li>➤ To understand Internet applications.</li> <li>➤ To know the E-mail usages and different types of browsers.</li> </ul>
6	P22MAVAC2B	Introduction to Sagemath	<ul style="list-style-type: none"> <li>➤ To comprehend the theoretical concept and visualize them in much better way.</li> <li>➤ To use plotting ideas and others to work on basic real analysis problems.</li> <li>➤ To gain expertise on the computations involving matrices and linear algebra in general.</li> </ul>

#### Semester IV

S.No	Course Code	Name of the Course	Course Outcomes
1	P22MACC41	Functional Analysis	<ul style="list-style-type: none"> <li>➤ To examine and identify properties of Complex Banach Spaces and Hilbert space.</li> <li>➤ To apply for the analytical techniques and theoretical knowledge in Hilbert spaces.</li> <li>➤ To attain knowledge and experience of working with many pure mathematical problems.</li> </ul>
2	P22MACC42	Differential Geometry	<ul style="list-style-type: none"> <li>➤ To describe surfaces as a solution sets of differential equations.</li> <li>➤ To exhibit geodesics on surfaces.</li> <li>➤ To compute the Gaussian curvature of various surfaces.</li> </ul>
3	P22MACC43	Fluid Dynamics	<ul style="list-style-type: none"> <li>➤ To understand the basic ideas of fluid velocity, streamlines and rotational and irrotational flows.</li> <li>➤ To develop special mathematical methods involving images and complex variables for incompressible fluids.</li> <li>➤ To derive images in three dimensions.</li> </ul>

4	P22MAE4A	Theory of Probability	<ul style="list-style-type: none"><li>➤ To understand Probability axioms and find conditional probability for lot of cases.</li><li>➤ To compute expectations and moments on a number of distributions.</li><li>➤ To gain mastery in the important probability distributions.</li></ul>
---	----------	-----------------------	---