COURSE OUTCOMES

DEPARTMENT OF B.SC MATHEMATICS

SEMESTER: I

Subject Name: Algebra **Subject Code: U2MAC11**

In this course the students will

CO1:	Determine the relations between the roots and coefficients.
CO2:	Get skills in transforming equations in one form into another.
CO3:	Find the solution of equations using Horner's method.
CO4:	Perform expansion of Sinθ, Cosθ Tanθ and power of Sinθ and Cosθ, in terms of functions of multiples of θ.
CO5:	Understand hyperbolic functions and logarithm of complex numbers.

Subject Name: Differential Calculus **Subject Code: U2MAC12**

In this course the students will

CO1:	Acquire knowledge about Differential Calculus, subfield of Calculus.
CO2:	Understand that the derivative of a function at a chosen input value describes the rate of change of the function near that input value.
CO3:	Learn about envelopes and evolutes and know that evolute is the envelope of the normals to a curve.
CO4:	Find large number of industrial applications like the shape of cooking towers, mirrors used for long distance telescope.

Subject Name: Sequences and Series **Subject Code: U2MASI**

In this course the students will

CO1:	Be able to describe a sequence in different ways.
CO2:	Classify the sequences as bounded, convergence and divergence.
CO3:	Write down the properties of monotonic sequences.
CO4:	Study general theorems on infinite series.
CO5:	Find the convergence of infinite series by various comparison tests.

Subject Name: MECHANICS, PROPERTIES OF MATTER AND SOUND

Subject Code: U1PHA1X1/U1PHA3X1

In this Course, the students will

CO1:	Understand the concept of force, friction and energy.
CO2:	Get the knowledge about the angular momentum, torque and moment of inertia.
CO3:	Understand principle of gravity.
CO4:	Learn about the principles of Elasticity and bending of beams.
CO5:	The types of wave motions and their equations.

Subject Name: **General Chemistry-I for Physical Science**

Subject Code: **U2CHA1X1**

In this course the students will

CO1:	Know the basics ideas about organic chemistry.
CO2:	Know the details about periodic table and its periodic properties.
CO3:	Learn chemical equilibrium and its importance in industrial processes.
CO4:	Acquire knowledge about petroleum and petrochemical products.

SEMESTER: II

Subject Name: Integral Calculus **Subject Code: U2MAC21**

In this course the students will

CO1:	Get the skills of evaluating integrals by the method of substitution, integration of functions, integration of trigonometric functions, evaluation of definite integrals, reduction formula, double and triple integrals.
CO2:	Define the double integrals over a rectangle and triple integrals over parallelepipeds.
CO3:	Know the usage & integral calculus.
CO4:	Learn about space travel and Navigation**.**

Subject Name: Analytical Geometry 3D and Vector Calculus Subject Code: U2MAC22

In this course the students will

CO1:	Know various forms of equations of a plane in three dimensional space.
CO2:	Study vector differentiation and vector integration.
CO3:	Find the shortest distance between two skew lines.
CO4:	Understand the concept of Gradient, Curl and Divergene.
CO5:	Be able to evaluate line integrals and Surface integrals.

Subject Name: THERMAL PHYSICS

Subject Code: U1PHA2X2/U1PHA4X2

In this Course, the students will

CO1:	Impart knowledge about the concept of specific heat capacity and experimental determination of specific heat capacities.
CO2:	Understand the concepts convection, stability of atmosphere, different latent heat equations.
CO3:	Impart knowledge about Stefan's law, pyrometry and solar constant.
CO4:	Understand the kinetic theory and transport phenomena of gases.
CO5:	Study the Carnot's engine, Joule- Thomson effect and liquefaction of gases.

Subject Name: **General Chemistry-II for Physical Science**

Subject Code: **U2CHA2X2**

In this course the students will

CO1:	Learn the basics gaseous state.
CO2:	Get idea about the polymer and its applications.
CO3:	Study adequate knowledge about nuclear chemistry.

Subject Name: ALLIED PHYSICS PRACTICAL –I

Subject Code: U1PHA2PX

In this Course, the students will

CO1:	Get basic practical knowledge about General Physics
CO2:	Understand theory behind the properties of Matter by doing experiments

CO3:	Do experiments based on galvanometer, potentiometer and bridges
CO4:	Understand basic principles of Sound

Subject Name: **Volumetric Analysis**

Subject Code: **U2CHA2PX1**

In this course the students will

CO1:	Study the applications of volumetric analysis.

II B.Sc Mathematics

SEMESTER: III

Subject Name: Differential Equations **Subject Code: U2MAC3**

In this course the students will

CO1:	Be Familiar with Legendre Euler and Bessel's equation.
CO2:	Get skill of solving the ordinary differential equations particularly homogeneous non-homogeneous equations.
CO3:	Acquire the knowledge of solving partial differential equations and understand boundary value problems.
CO4:	Get exposure to the concepts of charpits method first order equations.
CO5:	Know the application of differential equations in real life.

Subject Name: ELECTRICITY & ELECTRONICS

Subject Code: U1PHA3X3

In this Course, the students will

CO1:	Understand the fundamentals electrostatic parameters, Gauss's law and its application, Electric Potential, Capacitance and different types Capacitors.
CO2:	Learn about Kirchhoff's Laws and its applications, principle of potentiometer.
CO3:	Study about the principle & working of galvanometer and LCR circuits.
CO4:	Know about performance of transistor amplifiers and op-amps.
CO5:	Study the principle of digital electronics and related concepts.

Subject Name: **General Chemistry for Physical Science**

Subject Code: U2CHA3X3

In this course the students will

CO1:	Learn the basic requirements of chemical calculations.
CO2:	Understand the fundamental of bonding.
CO3:	Know the fundamental concept about adsorption, catalysis and co-ordination compounds.
CO4:	Study the principles of water analysis.

Subject Name: Numerical Methods **Subject Code: U2MAA3**

In this course the students will

CO1:	Understand the various methods to solve algebraic and transcendental equations.
CO2:	Learn the methods to find solution of system of simultaneous linear equations.
CO3:	Develop the skills in solving problems in interpolation and inverse interpolation.
CO4:	Find the numerical derivatives by making use of numerical differentiation formula.
CO5:	Apply Newton cote's quadrature formula to solve problems in numerical integration.

Subject Name: Discrete Mathematics **Subject Code: U2MAS3**

In this course the students will

CO1:	Understand the theory of sets, relations and functions.
CO2:	Use the tool of mathematical induction.
CO3:	Acquire the knowledge of logics.
CO4:	Solve the recurrence relation.

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SEMESTER: IV

Subject Name: Modern Algebra **Subject Code: U2MAC4**

In this course the students will

CO1:	Learn the general algebraic structure of various sets such as Real numbers, Complex numbers, Matrices and Vector spaces.
CO2:	Know the usage of group theory to simplify differential equations.
CO3:	Learn a method to count the elements & a finite group.
CO4:	Construct quotient groups using an integral domain.
CO5:	Understand that with additional structure, more theorems could be proved, but the generality is reduced.

Subject Name: OPTICS, SPECTROSCOPY & MODERN PHYSICS

Subject Code: U1PHA4X4

In this Course, the students will

CO1:	Understand the basics of geometrical and physical optics.
CO2:	Study the different technique in spectroscopy and photo electricity.
CO3:	Get basic knowledge about quantum physics
CO4:	Understand the concept of relativity

Subject Name: **General Chemistry for Physical Sciences**

Subject Code: U2CHA4X4

In this course the students will

CO1:	Study the basics of chemical equilibrium.
CO2:	Acquire basic idea about drugs.
CO3:	Study the chromatographic techniques.
CO4:	Understand the role of bio-organic materials.

Subject Name: ALLIED PHYSICS PRACTICAL –II

Subject Code: U1PHA4PX

In this Course, the students will

CO1:	Get basic practical knowledge about General Physics and Electronics
CO2:	Understand the theory of interference and diffraction through Optics experiments
CO3:	Understand the theory of Boolean algebra by constructing Logic gates
CO4:	Do experiments based on rectifier, transistor and oscillator circuits

Subject Name: **Organic Qualitative Analysis**

Subject Code: U2CHA4PX

In this course the students will

CO1:	Gain the fundamental knowledge about organic analysis.

Subject Name: Linear Programming **Subject Code: U2MAA4**

In this course the students will

CO1:	Understand origin & development of OR.
CO2:	Understand application of OR.
CO3:	Analyze the application of OR in second world war.
CO4:	Develop the skills in solving LPP using various methods.
CO5:	Understand the concept of travelling salesman problem and solve it by assignment method.

Subject Name: Transformation Techniques **Subject Code: U2MAS4**

In this course the students will

CO1:	Understand the method of applying Laplace transformation Techniques.
CO2:	Solve differential equation using inverse Laplace transform.
CO3:	Impart the knowledge of Fourier series.
CO4:	Acquire the knowledge of Fourier transform.

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III B.Sc Mathematics

SEMESTER: V

Subject Name: Graph theory and its applications **Subject Code: U2MAC51**

In this course the students will

CO1:	Gain the knowledge & the basic concepts of graph theory.
CO2:	Master the ways & solving real life problems using graph models.
CO3:	Develop the ability to apply various graph concepts in solving the challenging problems in real life.
CO4:	Possess the Knowledge & various important conjectures and established theorems in graph theory.

Subject Name: Linear algebra and matrices **Subject Code: U2MAC52**

In this course the students will

CO1:	Gain knowledge about the basic concepts of vector spaces and linear transformations.
CO2:	Know the relationship between matrices and linear transformations.
CO3:	Become familiar with the rank of the matrices.
CO4:	Have thorough acquaintance with eigen values and eigen vectors.

Subject Name: Modern Analysis **Subject Code: U2MAC53**

In this course the students will

CO1:	Acquire a conceptual understanding as the concepts such as infinite series, limits, continuity.
CO2:	Understand the importance of formulating clear definitions.
CO3:	Gain experience in deductive reasoning.
CO4:	Acquire knowledge about compact space, connected space, complete space and learn how to apply these spaces to real life.

Subject Name: Mathematical Statistics **Subject Code: U2MAA51**

In this course the students will

CO1:	Learn about the data interpretations and important concepts in mathematical statistics.
CO2:	Gain the knowledge of the characteristics of frequency distribution.
CO3:	Study the dispersion of a distribution of the individual values from a measure of central tendency.
CO4:	Learn moments, skewness kurtosis and curve fitting.
CO5:	Study different types of correlations, positive, negative, perfect and rank correlation.

Subject Name: Mechanics **Subject Code: U2MAE51**

In this course the students will

CO1:	Learn about the statics branch of theoretical physics that uses probability theory.
CO2:	Have knowledge about the application of statics the field of mechanics.
CO3:	Acquire the knowledge about the dynamics branch of applied mathematics concerned with the study of forces and torques and their effect on motion as opposed to kinematics.
CO4:	Find the method & application of molecular bearing in the growing nanotechnology literature using classical molecular dynamics.
CO5:	Know the concepts of forces and resolution of forces and its applications.

Subject Name: Fundamentals of Mathematics (NME) **Subject Code: U3MAN51**

In this course the students will

CO1:	Classify different types of equations and solve them.
CO2:	Be able to define sequence of numbers and understand progression as sequence.
CO3:	Study different types of progressions and thereby study Arithmetic and Geometric means.
CO4:	Understand the notion of set and describe different types of sets.
CO5:	Possess the knowledge of Matrix and write down different types of matrices.
CO6:	Perform algebra of Matrices.

SEMESTER: VI

Subject Name: Complex Analysis **Subject Code: U2MAC61**

In this course the students will

CO1:	Demonstrate the idea of the Complex number system and work with arithmetic of complex numbers.
CO2:	Acquire a good knowledge of analytic functions in terms of power series approach, differentiability approach and the geometrical approach.
CO3:	Identify many important applications of line integrals and curve integrals by recalling Green's theorem, Stoke's theorem and Gauss Divergence theorem from vector calculus.
CO4:	Know the importance of improper integrals and the application of "Contour integration".
CO5:	Understand main ideas behind the elementary transformations like translation, rotation, homothetic transformation and inversion in transforming regions in the complex plane.

Subject Name: Theory of Numbers **Subject Code: U2MAC62**

In this course the students will

CO1:	Acquire the knowledge of number theory.
CO2:	Learn the applications of Fermat's theorem, Euler's theorem and Wilson's theorem.
CO3:	Understand the concepts of primes and prime factorizations.
CO4:	Gather the knowledge of number theoretic functions.

Subject Name: Operation Research **Subject Code: U1MAC63**

In this course the students will

CO1:	Know about application of advanced analytical methods.
CO2:	Find an optimal solution to complex decision making problems.
CO3:	Acquire the knowledge of applications of inventory decisions which are relevant to undergraduate level.
CO4:	Know about the concept of queuing models networking problem.

Subject Name: Advanced statistics **Subject Code: U2MAA61**

In this course the students will

CO1:	Learn the advanced lend concepts in probability and random variable.
CO2:	Know the applications of statistics and to derive the properties of various distributions.
CO3:	Learn the mathematical theory of probability and the concept of random variables.
CO4:	Learn about some important distributions of random variable which are frequently used in statistics.
CO5:	Investigate the statistical data that deals with the study of some characteristics of a collection of objects.

Subject Name: Applications of Differential Equation **Subject Code: U2MAS61**

In this course the students will

CO1:	Become aware of the important practical problems in which differential equations find their applications.
CO2:	Acquire a wide knowledge of practical problems which include the calculation of continuous compound interest and derivation of the equations of planetary motion using differential equations.
CO3:	Learn the method of developing mathematical models to real life problems using differential equation concept.
CO4:	Understand the importance of Brachistochrone problem and the tautochronous property of cycloid.

Subject Name: Random Process **Subject Code: U2MAS62**

In this course the students will

CO1:	Know that noise is a random process and Noise power, Noise correlation is possible only through a study of random process.
CO2:	Gain the knowledge wireless communication.
CO3:	Understand applications in communications such as properties of "fading" or random channel, noise properties and properties of digital modulation.
CO4:	Solve many other problems in correlation Ergodic process, and power spectral density function.

Subject Name: Statistics and Operations Research **Subject Code: U2MAN61**

In this course the students will be able to

CO1:	Study classification and tabulation of data.
CO2:	Present data as frequency distribution.
CO3:	Study about mean, median, mode.
CO4:	Find index numbers using various methods.
CO5:	Know the fundamental concepts of Operations Research.
CO6:	Formulate day-today life problems as LPP and to find solution of LPP.

I B.Sc Mathematics (Physics | Chemistry)

Subject Name: Ancillary Mathematics – I **Subject Code: U2MAA1X1**

In this course the students will

CO1:	Gain knowledge on various series like binomial series, logarithmic series, trigonometric series.
CO2:	Develop the ability to solve equations and understand the nature of roots of higher order equations.
CO3:	Acquire knowledge on hyperbolic functions.

Subject Name: Ancillary Mathematics - II **Subject Code: U2MAA2X2**

In this course the students will

CO1:	Apply the reduction formula to solve problems in integral calculus.
CO2:	Utilize the concept of vector differentiation to identify the curl, divergence of a given vector.
CO3:	Construct the evolute of any curve using differential calculus.
CO4:	Develop the skills of solving simultaneous equations by marking use of the rank of matrices.
CO5:	Find the eigeon values, eigeon vectors of a given matrix.

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II B.Sc Mathematics (Physics |Chemistry)

Subject Name: Ancillary Mathematics – III **Subject Code: U2MAA3X3**

In this course the students will

CO1:	Understand the concepts of differential equations, partial differential equations, Laplace transforms and Analytical geometry.
CO2:	Analyse various methods solving partial differential equations.
CO3:	Acquire skill to solve many problems in Laplace transform and in Analytical geometry.
CO4:	Understand that Laplace domain allows algebraic manipulation of differential equations.
CO5:	Understand the linear equations occur in subareas of mathematics and especially in applied mathematics.

Subject Name: Ancillary Mathematics - IV **Subject Code: U2MAA4X4**

In this course the students will

CO1:	Learn the various statistical tools to analyse the data collected.
CO2:	Know the basic concepts of group theory.
CO3:	Have an introduction about the Fourier transformations and solving techniques.
CO4:	Gain knowledge in varieties of index numbers.

I M.Sc Mathematics

SEMESTER: I

Subject Name: Group Theory **Subject Code: P2MAC11**

In this course the students will

CO1:	Learn the concept of group theory.
CO2:	Construct new groups from some groups already on hand.
CO3:	Learn the symmetry to analyse the object using group theoretic methods.
CO4:	Know about the concept of group, the algebraic structure such as rings, fields and vector spaces.
CO5:	Use group theory as a powerful tool research in robotics, computer vision, computer graphics and medical image analysis.

Subject Name: Real Analysis **Subject Code: P2MAC12**

In this course the students will

CO1:	Know how to connect abstract statement with concrete examples.
CO2:	Get experience in reading and writing proofs.
CO3:	Acquire more ideas about Calculus and Linear Algebra.
CO4:	Analyse the technical proofs and intuitive ideas.
CO5:	Learn how the principles and theory of Real Analysis can be applied in a variety of settings in subjects.

Subject Name: Differential equations **Subject Code: P2MAC13**

In this course the students will

CO1:	Understand the method of solving initial value problems.
CO2:	Acquire the knowledge of relationship between Wronstian and independent of solutions.
CO3:	Become familiar with Legendre, Euler and Bessel equations.
CO4:	Be able solve many types of partial differential equations.

Subject Name: Statistics **Subject Code: P2MAC14**

In this course the students will

CO1:	Apply the different statistical measures for any data.
CO2:	Understand Statistics facilitates comparison.
CO3:	Formulate and test hypothesis.
CO4:	Attain several skill to solve various problems in all statistical concepts.
CO5:	Be able to deal with all sciences such as Biology, Zoology, Education, Economics, Planning, industry, Medical sciences.

Subject Name: Discrete Mathematics **Subject Code: P2MAE11**

In this course the students will

CO1:	Apply the rules of inference of Predicate and Propositional Logic to verify the validity of an argument.
CO2:	Apply formal proof techniques for reasoning problems.
CO3:	Analyze the growth of elementary functions and compare algorithms based on their computational complexity.
CO4:	Use basic and advanced counting techniques to solve combinatorial problems.
CO5:	Make a Model of finite state machines with and without output to perform simple tasks.
CO6:	Construct a Turing Machine to recognize the formal languages.

Subject Name: Fuzzy sets and Logics **Subject Code: P2MAE12**

In this course the students will

CO1:	Gain the main subject of fuzzy sets.
CO2:	Learn crips and fuzzy set theory.
CO3:	Decide the difference between crips set and fuzzy set theory.
CO4:	Make calculation on fuzzy set theory.
CO5:	Gain the methods of fuzzy logic.
CO6:	Recognize fuzzy logic membership function.
CO7:	Recognize fuzzy logic fuzzy inference systems.
CO8:	Make applications on Fuzzy logic membership function and fuzzy inference systems.

Subject Name: Java and Web Designing **Subject Code: P2MAE13**

In this course the students will

CO1:	Create Java programs that solve simple business problems.
CO2:	Understand the concept of exception handling and Input / Output operations. Construct a Java class based on a UML class diagram.
CO3:	Perform a test plan to validate a Java program.
CO4:	Document a Java program.

CO5:	Design the applications of Java & Java applet.
CO6:	Analyze & Design the concept of Event Handling and Abstract Window Toolkit.

SEMESTER: II

Subject Name: Rings and Vector Spaces **Subject Code: P2MAC21**

In this course the students will

CO1:	Understand the concept of dual spaces, inner product space.
CO2:	Know about the conversion & Clint data in to personality vector as part of scientific algorithm.
CO3:	Create the abstract concept of a vector space.
CO4:	Know about main application of the ring theory in cryptography area.
CO5:	Learn about the conversion documents in to word frequency vectors.

Subject Name: Integration and Transformations **Subject Code: P2MAC22**

In this course the students will

CO1:	Understand the analytic properties of functions, sequences, convergence, limit of sequences, continuity, linear transformation, differentiation, etc.,
CO2:	Become familiar with the concept Riemann.
CO3:	Analyse inverse operations such as integration and differentiation.
CO4:	Try to analyse the problems that arise when limit processes are interchanged.

Subject Name: Topology **Subject Code: P2MAC23**

In this course the students will

CO1:	Understand the terms and definitions of Topological Spaces, Accumulation Points, Interior, Closure, Boundary and exterior of sets, Coarser and Finer Topologies – Subspace and theorems related to topology.
CO2:	Be motivated to unify the basics like open set, closed sets, components, continuity, completeness and so on, that are learned through one semester course on Real and complex analysis.

CO3:	Elaborate the knowledge of concepts such as connectedness and compactness.
CO4:	Recognize Bases and Subbases for topologies and write Topologies generated by classes of sets.
CO5:	Understand the importance of Metrizable topological spaces and know sufficient conditions for metrizability of a topological space.
CO6:	Use the concept of homeomorphism to identify the spaces that are having similar geometrical structures.

Subject Name: Graph Theory **Subject Code: P2MAC24**

In this course the students will

CO1:	Know basic definitions & Graph theory.
CO2:	Use mathematical definitions to identify and construct examples and to distinguish the existence and non-existence of certain properties.
CO3:	Gather the graph theoretical knowledge and its application through algorithm.
CO4:	Identify special graphs and know related theorems.
CO5:	Solve some real time problems using the concepts of Graph theory.
CO6:	Apply graph as models for many standard problems.

Subject Name: Number Theory and Cryptography **Subject Code: P2MAC25**

In this course the students will

CO1:	Apply the concept of divisibility and GCD.
CO2:	Understand the application of congruences in solving number theoretic problems.
CO3:	Learn more things on arithmetic functions and primitive roots.
CO4:	Have introduction in cryptography.
CO5:	Be Enriched with the knowledge of doing research in number theory.

Subject Name: Industrial Statistics (NME) **Subject Code: P2MAN2**

In this course the students will

CO1:	Understand the concept of statistical inference by testing hypothesis.
CO2:	Apply t-test for small samples.
CO3:	Understand the concept of control chart, types of control chart.
CO4:	Learn the construction of index numbers and uses of index numbers.
CO5:	Utilize the concept of time series to fit a given straight line and parabola.

II M.Sc Mathematics

SEMESTER: III

Subject Name: Field Theory **Subject Code: P2MAC31**

In this course the students will

CO1:	Gain the knowledge of classifying a given field.
CO2:	Obtain the knowledge of extension fields and determining the dimension of the extension fields.
CO3:	Grasp the essence & Galois theory, an excellent composite of the theory of groups and the theory of algebraic field extensions.
CO4:	Acquire the knowledge of applications of field theory to the theory of equations and geometry.
CO5:	Be enriched with the knowledge of rings with chain conditions.

Subject Name: Complex Analysis **Subject Code: P2MAC32**

In this course the students will

CO1:	Understand the concept of analytic functions, rational functions and multi-valued functions.
CO2:	Have thorough understanding of the concept of harmonic and Elliptic functions.
CO3:	Evaluate line integrals and determine winding number.
CO4:	Study the importance of Cauchy's theorem and Local correspondence theorem.
CO5:	Be able to state mean value property of Harmonic Functions and to know about Poisson's Integral and Schwartz Reflexion Principal.

Subject Name: Numerical Methods **Subject Code: P3MAC33**

In this course the students will

CO1:	Solve an algebraic or transcendental equation using an appropriate numerical method.
CO2:	Approximate a function using Interpolation methods.
CO3:	Solve system of linear equations.
CO4:	Be able to determine Eigen values and Eigen vectors for any square matrices.
CO5:	Evaluate the derivative at a value using the techniques based on interpolations, finite difference operators, undetermined coefficients.

Subject Name: Measure Theory **Subject Code: P2MAC34**

In this course the students will

CO1:	Acquire basic knowledge of measure theory needed to understand probability theory, statistics and functional analysis.
CO2:	Understand the fundamentals of measure theory and be acquainted with the proofs of the fundamental theorems underlying the theory of integration.
CO3:	Have an understanding of the use of mathematical concepts such as volume, area and integration.
CO4:	Learn the basics of integration that are useful in the applications in quantum mechanics, signal processing and so on.

Subject Name: Applications of Graph theory **Subject Code: P3MAE31**

In this course the students will

CO1:	Understand Different algorithms involved in solving real life problems using graph models.
CO2:	Apply the graph solving techniques to research level.
CO3:	Learn the application of graph theory to solve real time.
CO4:	Gain awareness on the importance of Ramsey numbers.

Subject Name: Differential Geometry **Subject Code: P2MAE32**

In this course the students will be able to

CO1:	Determine the Arc length, Curvature, Torsion and Osculating Plane for any curve in the Euclidean space.
CO2:	Analyze the behavior of a space curve and its contact with the surfaces.
CO3:	Find the moving triad of a point in the space curve to identify the Evolutes and Involutes of the curve.
CO4:	Parametrize a surface using the local intrinsic properties of a surface.
CO5:	Construct the first and second fundamental forms for any given surface.
CO6:	Define the geodesics on a surface with their characterization.

SEMESTER: IV

Subject Name: Optimization Techniques **Subject Code: P2MAC41**

In this course the students will

CO1:	Make divisions irrespective of the situation involved.
CO2:	Be able to compare the alternative courses of action for a problem.
CO3:	Evolve with the capability of minimizing the waiting time in a queue.
CO4:	Be capable of maximizing profit in a firm considering all the constraints.

Subject Name: Functional Analysis **Subject Code: P2MAC42**

In this course the students will

CO1:	Learn the definition of banach space.
CO2:	Understand the importance of Hahn Banach theorem and the open mapping theorem.
CO3:	Study about Hilbert spaces and their properties.
CO4:	Classify the different types of operators with reference to a Hilbert space.
CO5:	Study in detail about Banach Algebras and their properties.

Subject Name: Advanced Statistics **Subject Code: P2MAC43**

In this course the students will

CO1:	Learn several methods of mathematical statistics.
CO2:	Use the distributions such as binomial, poisson, gamma, chi-square and normal Distribution.
CO3:	Solve many problems which are given as exercise problems.
CO4:	Use the applications in Trade, Industry or Commerce, economics, biology, botany, astronomy, physics, chemistry, education, medicine, sociology, psychology or metrology.
CO5:	Be able to help in prediction and formulation of suitable policies.

Subject Name: Combinatorics **Subject Code: P2MAC44**

In this course the students will

CO1:	Solve counting problems by applying counting techniques using sum and product rule, permutation and combination.
CO2:	Construct generating functions and enumerators for permutations and combinations.
CO3:	Solve recurrence relation using generating functions.
CO4:	Use the Principle of Inclusion and Exclusion to identify the number of derangement of n objects with restriction on relative positions.
CO5:	Apply Burnsides theorem to find the number of equivalence Classes.
CO6:	Identify the weights and Inventories of equivalence class of functions using Polya's Fundamental theorem.

Subject Name: Classical Mechanics **Subject Code: P2MAE41**

In this course the students will

CO1:	Have the ability to understand the concept of generalized co – ordinates.
CO2:	Learn to derive the equations of motion using the different approaches of Lagrange, Hamilton, Euler independently.
CO3:	Be aware of different variation principles.
CO4:	Understand the Canonical transformation to ease the solving process of equation of motion of the system that has been introduced to them.

Subject Name: Stochastic Processes **Subject Code: P2MAE43**

In this course the students will be able to

CO1:	Carry out derivations involving conditional probability distributions and conditional expectations.
CO2:	Understand the basic concepts of theory of Markov chains and importance of essential theorems
CO3:	Identify classes of states in Markov chains and characterize the classes.
CO4:	Understand in detail about the Markov renewal process and its limiting behaviour.
CO5:	Compute probabilities of transition between states and return to the initial state after long time intervals in Markov chains.
CO6:	Understand how to model various real life problems mathematically and know exactly the application of finding the limiting behaviour in each such cases.

M.Phil. Mathematics

SEMESTER 1

Subject Name: RESEARCH METHODOLOGY

Subject Code: M2MAC11

In this course the students will

CO1:	Be introduced to Research concepts in Mathematics.
CO2:	Be familiar with Advanced topics in topology.
CO3:	Learn Recent trends in graph theory have been learned.

Subject Name: ADVANCED ALGEBRA

Subject Code: M2MAC12

In this course the students will

CO1:	Be motivated to do research in algebra.
CO2:	Learn the advanced topics in algebra.
CO3:	Gain knowledge of ring theory.

Subject Name: RESEARCH TOPICS IN GRAPH THEORY

Subject Code: M2MAE11

In this course the students will

CO1:	Acquire the knowledge in Graph Theory.
CO2:	Be motivated to do research in Graph Theory.
CO3:	Study intensively three types of research topics in graph theory.

Subject Name: DISTRIBUTIONS AND FOURIER TRANSFORMS

Subject Code: M2MAE12

In this course the students will

CO1:	Acquire basic knowledge about the fourier transform of L1-functions.
CO2:	Be given motivation on the distributions, convolution of distributions and properties.
CO3:	Become familiar with the concept of tempered distributions, Fouriers transforms and Payley-Wiener theorems.

Subject Name: Approximation Theory

Subject Code: M2MAE13

In this course the students will

CO1:	Students should know about various techniques in approximation and know a wide range of applications of approximation theory.
CO2:	Student able to use several algorithms for various approximation problems.
CO3:	After successful learning of this course one should firmly accept the fact that "methods / techniques that are used under various titles during their undergraduate and postgraduate courses" have Strong Mathematical background.
CO4:	Able to understand the importance of various kinds of **existence theorem of best approximations.**
CO5:	Students should get motivated to do research in the field of approximation theory in more advanced level.

Subject Name: Abstract Measure and Integration

Subject Code: M2MAE14

In this course the students will

CO1:	Understand the main fact that Measure theory provides a foundation for many branches of mathematics such as harmonic analysis, ergodic theory, theory of partial differential equations and probability theory.
CO2:	Will develop an appreciation of the basic concepts of measure theory.
CO3:	Get more awareness about the various building blocks of the Measure and Integration theory by learning L^p-spaces, Riesz Representation theorem, Fubini's theorem and Distributions.
CO4:	Should understand the systematic development of abstract measure and integration in more general context and make use of this for further study to more higher level of research.

Subject Name: Functional Analysis

Subject Code: M2MAE15

In this course the students will

CO1:	Understanding the basic properties of topological vector spaces and structure of locally-convex topological vector spaces.
CO2:	Get aware of the importance of the F-spaces, Frechet spaces and normable spaces.
CO3:	Able to understand the notion of weak topologies on the more generalized function spaces.
CO4:	Expected to appreciate the various applications Great theorems like Generalized Stone-Weierstrass theorem, Two interpolation theorems, Fixed-point theorem and theorem related to vector valued integration.
	Motivated to do research in the field of Functional Analysis and in particularly to do research in the field of generalized function spaces.

Subject Name: Stochastic Processes

Subject Code: M2MAE16

In this course the students will

CO1:	Carry out derivations involving conditional probability distributions and conditional expectations.
CO2:	Define basic concepts from the theory of Markov chains and present proofs for the most important theorems.
CO3:	Compute probabilities of transition between states and return to the initial state after long time intervals in Markov chains.
CO4:	Identify classes of states in Markov chains and characterize the classes.
CO5:	Determine limit probabilities in Markov chains after an infinitely long period.
CO6:	Understand how to model various real life problems mathematically and know exactly the application of finding the limiting behaviour in each such cases.
CO7:	Understand the fact that there is a wide scope for do research in any field of applied mathematics.

Subject Name: Advanced Complex Analysis

Subject Code: M2MAE17

In this course the students will

CO1:	Understand the fact that complex analysis is the building base for various field of applied mathematics by learning conformal mapping, Riemann-Zeta functions, Harmonic functions and elliptic functions.
CO2:	Understand the basic techniques of contemporary complex analysis as well as use methods of complex analysis in various applications such as harmonic analysis, differential equations etc.,
CO3:	Get enough Knowledge about both introductory/higher level of contemporary complex analysis, in particular spaces of analytic functions, quasiconformal mappings.
CO4:	Do independent work in these topics and especially to use the methods of complex

	analysis in other areas of mathematics.
CO5:	Participate in scientific discussions and conduct researches on high international level in contemporary and classical complex analysis and its applications.

Subject Name: Project Dissertation & Viva Voce **Subject Code: M2MA2PV**

In this course the students will

CO1:	Motivate the scholars to do research in Pure and Applied Mathematics.
CO2:	Motivate the students to do further research for their doctoral degree.