DON BOSCO ARTS AND SCIENCE COLLEGE
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Attainment of Course Outcomes and Program Outcomes in Outcome Based Education (OBE)

Department Name ……Mathematics……

PO :

PO STATEMENTS
PO 1 ACADEMIC PURSUIT • **Capacitating one's potentials to acquire knowledge through critical thinking, creative and innovative methods, and interventions.** • **Learning career management skills to find solutions to problems in the present and future.**
PO 2 MORALLY UPRIGHT CITIZENSHIP • **Honing individuals with sound character built on moral values and spirituality.**
PO 3 EFFECTIVE COMMUNICATORS • **Articulating oneself through oral and written modern languages.** • **Mastering English Language as a passport to global citizenship.**
PO 4 SOCIALLY RESPONSIBLE • **Moulding individuals committed to the service of the needy.** • **Cultivating interdependency through inclusive relationship, gender equality and mutual accountability.** **PO 5 ENVIRONMENTALLY COMMITTED** • **Shaping environmentally conscious citizens to contribute towards the well-being of society and humanity at large.**

PSO :

PSO STATEMENTS
1. **Acquire a strong foundation in various branches of mathematics to formulate real life problems into mathematical models.**
2. **Develop problem solving skills, cultivating logical thinking**
3. **Enhance numerical ability and address problems in interdisciplinary areas which would help in project works.**

4. Develop the ability to understand and view mathematical structures.
5. Apply the mathematical knowledge and skills to face competitive examinations with confidence.

CO/Semester :1

Semester 1			
Statements		**Activities**	**Assessment mechanism**
1A01 ENG COMMUNICATIVE ENGLISH	1. Ensuring a strong base in grammar. 2. Increased storehouse of Vocabulary 3. Correcting the Pronunciation. 4. Learning the art of good writing and rhetoric. 5. Enabling proficiency in English	1.Assignments 2.Learning five new words everyday 3.Phonetic transcription & Language Lab 4. Competitions 5. Proficiency Courses	Class Test Language Games Phonetic transcription practice test
1A02 ENG-READINGS ON KERALA	1. Introducing the cultural heritage of the State through the native reforms and related works. 2. Creating awareness about the struggle that the history witnessed in forming contemporary Kerala. 3. Getting to know more about the renaissance leaders. 4. Understanding the genealogy of the motherland. 5. Bringing closer to the tastes, value- system, beliefs and ideology of our native culture	Book Reviews Seminars Debates Assignments Writing competitions	Internal assessment tests Viva Class Tests
1A07 HINDI KAVITHA	1. Understanding the role played by the poets of Bhakthikal in literature and society. 2. Knowledge about the contemporary spirit of poets. 3. Getting to know the philosophy of life as well as poem of Chayavad. 4. Understanding the poems	Assignment Seminar poem Reviews poem Writing	Class test Internal exams

	of Modern poets in context with their experience of life. 5. Understanding the role played by the *SAMKALEEN* Hindi poets. 6. Understanding the contemporary spirit of the poets.	Criticism	Viva
1A07 **MAL-Katha mathrukakal)**	1. To learn various short Stories of different periods of Malayalam literature. 2. To Have empathy for others, socialize effectively and become involved in making the community a better place. 3. Provides multi- narratives which gives the reader capacity to analyse a concept as a whole. 4. Provides a blueprint of human society to become a good human being. 5. To improve reading skills.	Short story writing Assignment Seminars Book reviews	Class tests Internal examination
1B01 MAT **Set Theory, Differential Calculus and Numerical Methods**	1. Understand the concept of relations and functions. 2. Understand the idea of limit and continuity of functions. 3.Understand the concept of successive differentiation and standard results of nth derivatives. 4. Analyze Leibnitz theorem and related problems. 5. Understand the basic concepts of functions of several variables. 6.To learn homogeneous functions 7. To find out the solutions of algebraic and transcendental equations.	1. Assignment/ seminars 2. Unit-wise examinations.	1. Assessing seminar presentations. 2.Conducting viva-voce. 3.Assignment evaluation. 4. Assessment of the examinations.
CSC Introduction to Computers & Programming	1. Knowledge about the characteristics and components of a computer. 2. Distinguish different number systems and	1. Demonstrations 2. Exercise 3. Discussion and presentation 4. Demonstration and	1. Communication skill, tools used for demonstration, knowledge of topic 2. Accuracy in result,

	encoding schemes. 3. Explain the concepts of Operating System, and networking. 4. Describe the basic programming concepts.	practice	correct use of ideas 3. Participation in discussion, ideas proposed, presentation skill, content 4. Knowledge of subject, application of concept, accuracy of choosing concepts
1C01 STA- BASIC STATISTICS	1. Understand the different types of data. 2. Learn various measures of central tendency and their properties. 3. Understand the concept of correlation and regression analysis, their relations with examples. 4. Get to about time series and index numbers	1. Assignments 2. Exercises 3. Discussion and presentation 4. Practice real life problems related to the topics.	1. Participation in discussion, ideas proposed, evaluating presentation skill 2. Knowledge of subject 3.Application of concept, accuracy of choosing concepts.

Semester 2			
Statements		Activities	Assessment mechanism
2B02MAT Integral Calculus and Logic	1. Understand the concept of Hyperbolic functions. 2. Learn the reduction formulas for trigonometric functions and thereby evaluating definite integrals. 3. Study polar coordinates. 4. Acquire knowledge about double integrals, triple integrals in various forms. 5. Analyze and study numerical integration methods-Trapezoidal rule, Simpson's $1/3^{rd}$ rule. 6.Learn Logic and the method of proofs.	1. Seminars. 2. Assignments on various topics under the syllabus. 3. Conduct unit-wise examinations.	1.Assessing seminar presentations. 2.Conducting viva-voce. 3.Assignment evaluation. 4. Assessment of the examinations.
2C02CSC Programming in C	1. Explain the fundamentals of C language. 2. Demonstrate the input output management and decision-making mechanism. 3. Apply the concepts of functions and pointers. 4. Use arrays, strings and structures in program development.	1.Assignment 2.Demonstrations 3.Practice 4.Demonstration and exercises	1.Points included, organization of points 2.Communication skill, method used, knowledge of topic 3.Engagement in lab session, use of concepts, quality of programs

			4.Communication skill, method used, Accuracy of logic and proper use of concepts
2C02STA PROBABILITY THEORY AND RANDOM VARIABLES	1.To understand the basics of probability. 2. To describe Baye's theorem and its applications. 3. Understand the concept of random variables with examples. 4. Evaluate the probability distribution of discrete and continuous random variables	1. Assignments 2. Exercises 3. Discussion and presentation 4. Practice real life problems related to the topics.	1.Participation in discussion, ideas proposed, evaluating presentation skill 2. Knowledge of subject 3. Application of concept, accuracy of choosing concepts.
2A03 ENG Readings on Life and Nature	1. Introduction to ecological readings. 2. Realizing the importance of maintaining environmental balance. 3. Understanding the importance of becoming ecologically responsible individuals. 4. Feeling the strong and close bond that humans share with mother nature. 5. Getting to know the relevant and famous environmental activists, nature poets, & writers and their concern towards life and nature	Book Reviews Debates Seminars Eco Club Reading, assignments, watching interviews	Viva Class Test Internal Assessment
2A04 ENG Readings on Gender	1. Erasing the pseudo bias against gender discriminations. 2. Understating gender as a "Social Construct" 3. Educating the future generation that man, woman and the third gender are equally important in creating a balance in the society. 4. The hardships and agonies portrayed in the work stands as an eye-opener to the sufferings of the other gender 5. Create mentally and socially stable society with zero gender discriminations.	Talks from famous people ex: Ted Talks Debates Seminars Readings Assignments	Class Test Viva Cass test
2A08 HIN Rechana Thatha Preyog	1.Understanding fundamental principles of Hindi grammar 2.Understanding the correct usage of Hindi grammar 3.Developing significant increase in vocabulary	Assignment Class work Home work	Viva Class test Internal examination
2 A 08MAL Kavitha mathrukakak)	1. Getting to know many poems of different period 2. To become sensible to both human and nonhuman lives 3. Knowledge about different	1. Poem writing 2. Assignment 3. Seminars 4. Book reviews	1. Class test 2. Internal examination

	authors/poets as motivation to write 4. Approaching real issues through satire. 5. Help in improving reading habit		

CO/Semester :3

Semester 3			
Statements		Activities	Assessment mechanism
3B03 MAT Analytic Geometry and Applications of Derivatives	1. Understand Cartesian equations and Polar equations of different conics, lines and circles. 2. Understand tangents, normals, study asymptotes. 3. Understand the idea of curvature, radius of curvature and circle of curvature for cartesian and polar curves, and thereby study evolutes. 4. Understand Rolle's theorem, Lagrange's Mean Value theorem, Cauchy's Mean Value theorem and Taylor's theorem. 5. Study the concept of extreme values of functions, derivative tests. 6. Understand the idea of concavity, learn curve sketching. 7. Understand different kinds of indeterminate forms and the method to evaluate them using L' Hospital's rule.	1. Seminars. 2. Assignments on various topics under the syllabus. 3. Conduct unit-wise examinations.	1. Assessing seminar presentations. 2. Conducting viva-voce. 3. Assignment evaluation. 4. Assessment of the examinations.
3C03CSC Web Technology with Data Base Management System	1. Explain the basics of HTML programming. 2. Create and manage forms using HTML and CSS. 3. Describe database concepts and perform data manipulation using SQL. 4. Employ PHP programming concepts.	1. Assignment Discussion 2. Exercise Assignment 3. Discussion 4. Practical sessions	1.Importance of Contents, organizations of data, timely submission, importance of points, communication skills 2.Correctness in design, Importance of Contents, organizations of data, 3.Relevance of points, communication skills, collaboration with others

			4.Perfection in designing, application of ideas
3C03 STA PROBABILITY DISTRIBUTIONS	1.To describe and compute mathematical expectations of random variables 2.To describe discrete distribution, discuss some distributions such as Bernoulli distribution, Binomial distribution, etc 3.To recognize and describe continuous distributions 4.To demonstrate sampling distribution.	1.Assignments 2.Give Exercises 3.Discussion and presentation 4. Practice real life problems related to the topics.	1.Participation in discussion, ideas proposed, evaluating presentation skill 2. Knowledge of subject 3. Application of concept, accuracy of choosing concepts.
3A09 HIN Kathasahithya	1.To analyze the variety of short stories in the cultural and historical context. 2. To analyze Novel in the modern context	Class work Homework Assignment Group work	Class test Internal examination Viva
3A09MAL- ***Gadhya sahitham)***	1.To open the eyes to new reality through historic fiction. 2. To learn the impact of extended prose like autobiography, memoirs etc. 3. To use it as an escape from monotonous life situations. 4. To create a beautiful canvass and extend imagination 5. To develop creative thinking	Essay writing Assignment Seminars Book reviews	Class test Internal examination
3A05 ENG Readings on Democracy and Secularism	1. To discuss the power of democracy and secularism through stories and poems. 2. To define the true sense of democracy and secularism. 3. To Connect our sense of belonging trans-nationally. 4. To identify the misrepresentation of social orders by the hegemonic world. 5. To learn to stand with good and unbiased situations and become morally grounded individuals.	Readings & Reviews Debates Assignments Seminars and write-ups	Class Tests Viva Internal Assessment Class test

CO/Semester :4

SEMESTER 4

Statements		Activities	Assessment mechanism
4B04 MAT Number Theory and Applications of Integrals	1. Study division algorithm, greatest common divisor and the Euclidean algorithm. 2. Learn Diophantine equations. 3. Acquire the knowledge about Prime numbers, their distribution and study the fundamental theorem of arithmetic. 4. Understand the basic properties of congruence. 5. Study Picard's little theorem, Wilson's theorem and Euler's theorem. 6. Learn the concept of area between curves, arc length. 7. Analyze and study the method of finding volumes using cross sections, volumes using cylindrical shells and areas of surfaces of revolution.	1.Assignment 2. Discussions on various topics under the syllabus. 3.Conduct unit-wise examinations.	1. Assessing seminar presentations. 2. Conducting viva-voce. 3. Assignment evaluation. 4. Assessment of the examinations.
4C04CSC Computation Using Python	1. Knowledge on the basic elements and control statements in Python language. 2. Understand the functions, modules and exception handling mechanism. 3. Describe the object-oriented concepts in Python. 4. Implement Arrays and data visualization.	1. Presentation 2. Demonstration exercise 3. Assignment 4. Practical session	1.Knowledge about the topic, communication skill, presentation style 2.Clarity of ideas, methods used, perfection in idea delivery, Correctness in design 3.Importance of Contents, organizations of data, timely submission 4.Engagement in lab session, use of concepts, quality of programs
4C05CSC Lab-I: C 4C05CSC LAB 1: PROGRAMMING IN C, WEB PROGRAMMING AND PYTHON PROGRAMMING	1. Develop C Program for solving different problems. 2. Create and execute HTML programs. 3. Develop various types of SQL queries to create and manipulate databases. 4. Create PHP programs.	1.Exercises 2.Practical session 3.4Exercise 4.Practice	1.Standard of the program, way of implementing concepts 2.Perfection in design, ideas implemented 3.Way of Implementing the concepts 4.Understanding of problem, solution design

4C04 STA STATISTICAL INFERENCE	1. Understand the use of Chebychev's inequalities 2. To establish theory of estimation and apply various method of estimation 3. To enable the students to understand the concept of testing statistical hypothesis. 4. To describe and apply ANOBA.	1. Assignments 2. Exercises 3.Discussion and presentation 4. Practice real life problems related to the topics.	1.Participation in discussion, ideas proposed, evaluating presentation skill 2. Knowledge of subject 3. Application of concept, accuracy of choosing concepts.
4A10HIN Natak Aur Ekanki	1. Understand the social and the artistic movements that have shaped theater 2. Analyze and interpret texts and performances both in writing and orally	Class work Home work Group work Assignment	Class Tests
4A10MAL- Drisya kalasahithyam	1. Understanding culture and appreciate them 2. To learn about life on Earth from those who walked before us 3. Skills at applied level 4. Appreciation of art in its variety especially kathakali, thullal, folk dance etc. 5. Improve reading habit	1. Assignment 2. Seminar 3. Debate	Class test Internal examination

Semester 5			
Statements		Activities	Assessment mechanism
5B05 MAT Set Theory, Theory of Equations & Complex Numbers	1. Study of finite and infinite sets. 2. Get all important concepts and formulae related to theory of equations. 3. Understand Descartes Rule of signs, De Guas rule. 4. Understand reciprocal equations. 5.To find nth roots of unity and understand polar form of complex numbers, powers and roots	1. Seminars. 2. Assignments on various topics under the syllabus. 3.Conduct unit-wise examinations.	1. Assessing seminar presentations. 2.conducting viva-voce. 3.Assignment evaluation. 4. Assessment of the examinations.
5B06 REAL ANALYSIS I	1. Describe the fundamental properties of the real numbers that lead to the formal development of Real Analysis. 2. Understanding of the theory of sequences & series. 3. Understanding of limits and how they are used in sequences and series.	1.Assign each student to perform seminars. 2. Give assignments on various topics under the syllabus. 3.Conduct unit-wise examinations.	Examinations, short quizzes, graded homework, cumulative final exam & viva-voice

	4. Define continuity of real functions. 5. Construct mathematical proofs of basic results.		
5B07 MAT – ABSTRACT ALGEBRA	1. Acquaint with Group Theory 2. Applications to fields outside of mathematics, such as chemistry and in particular, physics. 3. Ability to think abstractly, make conjectures and construct rigorous mathematical proofs. 4. Demonstrate accurate and efficient use of advanced algebra. 5.To be able to conduct a research either as an individual or as a team member.	1. Seminars. 2. Examinations.	1.Assessing presentations. 2. Viva-voce. 3.Assignment evaluation. 4. Assessment of the examinations.
5B08 DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORM	1. Study of first order differential equations and different methods for solving differential equations. 2. Study of second order differential equations and different methods for solving differential equations. 3. Understand Nonhomogeneous ordinary differential equations. 4. Understand Laplace transform and inverse Laplace transform.	1. Divide students into different groups to solve a problem in different methods 2. Provide exercise questions to students. 3. Conduct unit-wise examinations	1. Assessment of unit examinations. 2. Class tests, short quizzes, graded homework, cumulative final exam and viva voice.
5B09 VECTOR CALCULUS	1. The significance of Vector Calculus to enable the use Mathematical concepts in different applications 2. To understand lines, planes and different structures in terms of their vector representation and compute different quantities associated with them. 3. Understand physical quantities and learn the role Mathematics to simplify and solve the problems. 4. Gets a precise idea about Arc length, unit tangent vector T, curvature, torsion and finding these quantities using different methods 5. Understand the concept functions of several variables, properties and operations to find several practical	Encourage students to find application using the concepts in vector calculus. Divide into groups and solve problems Seminar	Class test Note book checking viva

	problems.		

Semester 6			
Course Name	**Statements**	**Activities**	**Assessment mechanism**
6B10 MAT- REAL ANALYSIS II	1. Understand uniform continuity, monotone functions and Inverse functions. 2. To understand Beta and Gamma functions and their properties. 3. Understand uniform and pointwise convergence. 4. Understand the concept of metric spaces.	1.Assign each student to perform seminars. 2.Give assignments on various topics under the syllabus. 3.Conduct unit-wise examinations.	1. Assessing seminar presentations. 2. Conducting viva-voce. 3. Assignment evaluation. 4. Assessment of the examinations.
6B11 MAT- COMPLEX ANALYSIS	1. Understand analytic functions, Zeros of an Analytic functions, Learn the concept of index of a closed curve. 2. Understand Cauchy's theorems and integral formula to evaluate complex integrals. 3. Understand the concept of singularities, residue theorem and learn residue integration method to calculate real integrals. 4. Understand argument principle, maximum modulus principle, and Schwarz's lemma. 5.Understand compactness and convergence in space of Analytic functions, learn the concepts of Riemann mapping theorem and Weierstrass factorization theorem, know factorization of the sine function, and gamma function.	Assign each student to perform seminars. Give assignments on various topics under the syllabus. Conduct unit-wise examinations.	Assessing seminar presentations. Conducting viva-voce. Assignment evaluation. Assessment of the examinations.
6B12 MAT- NUMERICAL METHODS, FOURIER SERIES & PARTIAL DIFFERENTIAL EQUATIONS	1. Recognize the concept of the term span,linear independence, basis, and dimension and apply these concepts to various vector spaces and subspaces. 2.Discuss algebra of linear transformation and characteristic roots 3.Set up and solve linear system or linear inequalities using matrices 4. Use matrix algebra and related matrices to linear transformations.	Seminar Assignment	Homework Internal examination Viva-voice

	5.Compute and use eigen vectors and eigen values.Determine and use orthogonality.		
6B13 MAT-LINEAR ALGEBRA	1. Recognize the concept of the term span, linear independence, basis, and dimension and apply these concepts to various vector spaces and subspaces. 2. Discuss algebra of linear transformation and characteristic roots 3. Set up and solve linear system or linear inequalities using matrices 4. Use matrix algebra and related matrices to linear transformations. 5.Compute and use eigen vectors and eigen values. Determine and use orthogonality.	1. Divide students into different groups to solve a problem in different methods 2. Provide exercise questions to students. 3. Conduct unit-wise examinations	1. Assessment of unit examinations. 2. Class tests, short quizzes, graded homework, cumulative final exam and viva voice.
6B14B MAT-OPERATIONS RESEARCH	1. To convert the real-world problems into mathematical equations which could be solved 2. To describe the simplex method for linear programming problem 3. To find the sequence of jobs or activities which optimizes the effectiveness of a situation 4. To understand problems such as transportation problem, assignment problem etc. 5. To make decision in competitive situation such as games	Encourage students to find application using the concepts in operations research. Divide into groups and solve problems Seminar	Class test Note book checking viva

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Attainment of Course Outcomes and Program Outcomes in Outcome Based Education (OBE)

Department Name …MATHEMATICS
Programme: M.Sc Mathematics

PO :

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PSO :

1. **Provide advanced knowledge on topics in pure mathematics.**
2. **To equip with the knowledge and ability in problem solving, logical analysis and capable to communicate mathematical ideas and concepts with clarity and coherence.**
3. **To recognize and learn the importance of life-long learning.**
4. **Develop and understand value of proof,the single factor that distinguishes mathematics from all other disciplines,and will demonstrate proficiency in writing and understanding proof.**
5.**The basic knowledge and its application of the subject is provided in this two-year program which is essential to access the 2nd cycle programs in Mathematics or Mathematics teaching.**

CO/Semester :

Semester 1			
Statements		**Activities**	**Assessment mechanism**
MAT1CO1:	1.Concept of group action.	1.Seminar	1.Homework

BASIC ABSTRACT ALGEBRA	2.Solving problems using the powerful concept of group action. 3.Concept of Sylowtheorems and its applications. 4.Analyze and demonstrate examples of ideals and quotient rings. 5.Handling problems involving polynomial equations.	2.Assignment 3.Group discussion	2.Internal examination 3.Viva-voice
MAT1C02: LINEAR ALGEBRA	1.To critically analyze and construct mathematical arguments that relate to the study of introductory linear algebra. 2.To use computational techniques and algebraic skills essential for the study of linear equations, vector spaces, eigen values and eigenvectors, Orthoganality and diagonalization 3. To use geometric properties and strategies to solve problems and view solutions especially in $\mathbb{R}^2$ and $\mathbb{R}^3$ as well as conceptually extend these results to higher dimensions. 4. To communicate and understand mathematical statements ideas and results both verbally and in writing with the correct use of mathematical definitions and symbolism. 5. Work collaboratively with peers and instructors to acquire mathematical understanding and to formulate and solve problems and present solutions.	1.Seminars,assignments.	1. Class tests, short quizzes, graded homework, cumulative final exam and viva voice.
MAT1C04: BASIC	1.To understand the journey from Euclidean geometry to topological space	Assignment, Seminar PowerPoint presentation regarding	Unit wise class test Viva By giving a

TOPOLOGY	2.To describe topology in terms of open sets, closed sets and understand the concept of basis 3.To construct different topological spaces such as product spaces and quotient spaces from a given topological space 4.To understand the concept of continuity between different topological spaces and nature of convergence in different spaces 5.To explain the homeomorphism between different objects	the homeomorphism between different objects	topological space student are asked to check different topological properties
MATICO3: REAL ANALYSIS	1.To develop in a rigorous and self-contained manner the elements of real variable functions 2.To describe the fundamental properties of the real numbers that underpin the formal development of real analysis 3. To demonstrate skills in communicating mathematics 4.To understand the theories of sequences and series, continuity, differentiation and integration 5.Apply the theory in the course to solve a variety of problems at an appropriate level of difficulty	1. Seminars, assignments.	1.Two in class Examinations, short quizzes, graded homework, cumulative final exam & viva-voice
MAT1CO5: DIFFERENTIAL EQUATIONS	1. Develop the ability to grasp theoretical concepts their own. 2.Learn to solve power series solution of differential equations of first order and	1.Assignment 2. Seminar 3. Additional problems to work out	1.Assessing assignment 2. evaluate seminar presentation 3. Conducting viva.

	second using different methods 3.To understand properties and solutions of Legendre polynomial, Bessel's equation and Gamma function 4.Analyze linear system of equations and learn to solve homogeneous linear system with constant coefficient. 5.Understand the concept of successive approximation to solve differential equations and study the important theorem Picard's theorem.		
Semester 2			
Statements		**Activities**	**Assessment Mechanism**
MAT2C06: ADVANCED ABSTRACT ALGEBRA	1.Understand the concepts of polynomial rings, EDs, PIDs, and UFDs and relation among them. 2. Demonstrate an understanding of extension fields and type of extensions. 3.Introduceautomorphism of fields 4.Understand the isomorphism extension theorem.		
MAT2CO7: ADVANCED TOPOLOGY	1. Compare different topological properties such as continuity, convergence etc. 2.To understand the concept of compactness of different spaces and its characterization 3. To understand connectedness of topological spaces and can explain it with mathematical models 4.To understand the different separation axioms and the difference between them 5.To understand the homotopic paths and enable students to find out different paths which are homotopic	To explain relation between separation axioms using diagrams Before giving the proof of a theorem students are asked to prove it. Provide exercise questions to students	

MAT2C09: FOUNDATIONS OF COMPLEX ANALYSIS	1. Understand analytic functions, zeros of an Analytic functions, learn the concept of index of a closed curve. 2. Understand Cauchy's theorems and integral formula to evaluate complex integrals, learn how to use Morera'stheorem and Goursat theorem. 3.Understand the concept of singularities, residue theorem and learn residue integration method to calculate real integrals. 4.Understand argument principle, maximum modulus principle, Schwarz' lemma. 5.Understand compactness and convergence in space of analytic functions, learn the concepts of Riemann mapping theorem and Weierstrass factorization theorem.	1. Seminars. 2.Assignments on various topics under the syllabus	1. Assessing seminar presentation 2. Conducting viva-voce 3. Assignment evaluation
MAT2C07: MEASURE AND INTEGRATION	1.Understand that the main objective of measures is in the foundations of the Lebesgue integral. 2. The theory makes rigorous the notions of length, area and volume and generalizes these notions. 3. Measure theory along with the associated theory of (Lebesgue) integration, has important applications in many areas, including functional analysis, probability theory. 4.Learning integration theory, for new ways of thinking about measuring objects useful for many other areas of mathematics such as probability. 5.Measure theory gives essential results on differentiation and functions of bounded variation.	1. Assignment 2. Seminar	1. Class test 2. Viva
MAT2C10:	1.To describe curve,surface in	1.Seminar	1.Assessing assignment

PARTIAL DIFFERENTIAL EQUATIONS AND INTEGRAL EQUATIONS	terms of functions of several variables and their representation 2.Study in detail the classification of Partial differential equations and solution of first order PDE using different mechanisms. 3.Understand the practical applications of PDE to solve different physical problems 4.Create deep knowledge in classification of second order PDE and solution of wave equation, heat equation and Laplace equation 5.Demonstrate the formation of integral equations and solve them using different methods.	2.Assignment 3.Additional problems to work out	2.Evaluate seminar 3.Viva
Semester 3			
Statements		**Activities**	**Assessment mechanism**
MAT3C14: **ADVANCED REAL ANALYSIS**	1.To acquire an appreciation of rigour in mathematics, be able to use proof by induction, proof by contradiction, and to use epsilon delta proofs both as a theoretical tool of approximation. 2.To be able to determine the convergence and divergence of infinite series. 3.To understand uniform convergence,pointwise convergence and equi-continuous families of functions. 4.To demonstrate skills in communicating mathematics. 5.To develop in a rigorous and self –contained manner the elements of real variable functions.	Seminars, Assignments etc.	Class test, Short quizzes,Graded homework, Cumulative final exam and viva – voice
MAT3C13: **COMPLEX**	1.Understand elliptic functions,Riemann zeta functions. 2. Understand the basic ideas	1. Assign each student to perform seminars. 2. Give assignments on various topics	1. Assessing seminar presentations. 2. Conducting viva-voce.

FUNCTION THEORY	of Weierstrass theory. 3. Understand the importance of Runge's theorem, study simple connectedness. 4.Analyze theorems on the existenceof meromorphic functions, study the concept of Riemann surfaces. 5. Learn harmonic functions, theirproperties, know Jensen's formula,genus and order of entire functions and Hadamard factorization theorem.	under the syllabus. 3. Conduct unit-wise examinations.	3. Assignment evaluation. 4. Assessment of the examinations.
MAT3C12: **FUNCTIONAL ANALYSIS**	1. Understand the fundamental properties of normed spaces and of the transformations between them. 2. Understand the importance of Hahn-Banach theorems and its corollaries. 3. Analyze and interpret the concepts of Banach space. 4. Understand the most celebrated results for bounded linear maps on Banach spaces. 5. Learn the geometric structure of a linear space using inner product, and thereafter study Hilbert spaces in detail.	1. Assigneachstudentto perform seminars. 2. Give assignments on various topics under the syllabus. 3. Conduct unit-wise examinations.	1. Assessing seminar presentations. 2. Conductingviva-voce. 3. Assignment evaluation. 4. Assessment of unit examinations.
MATE01: **GRAPH THEORY**	1.The primary objective of this introductory course in Graph theory is to acquaint the graduate with studying graphs. 2.Apply theories and concepts to test and validate intuition and independent mathematical thinking in problem solving. 3.Integrate core theoretical knowledge of graph theory to solve problems 4.The study of graph theory has numerous applications to fields outside of mathematics,such as computer science, Operation research,Physics. 5. To be able to conduct a research either as an individual or as a team member.		

MAT3C11: **NUMBER THEORY**	1. Integers are the building blocks of the theory of numbers. Introduce basic operations on integers. 2. Prove results using divisibility and greatest common divisor. 3.Understand the definitions of Congruences,Residue classes etc. 4.Solve system ofDiophantine equations using the Chinese remainder theorem. 5.Provide the necessary background for a brief introduction to modern cryptography.	1.Seminar 2.Assignment 3.Group discussion	1.Homework 2.Internal examination 3.Viva-voice
Semester 4			
Statements		**Activities**	**Assessment mechanism**
MAT4CI6: **DIFFERENTIAL GEOMETRY**	1.To analyze and describe geologic structure 2. To understand the vector fields and gradient fields and its application real life 3.To get an idea of geodesics and parallel transport 4.To understand the curvature of a surfaces and different methods to calculate it 5.To understand Gauss map and Weingarten map	1. Seminar, assignments 2. Encouraging students to explain theorems with real life examples	1. Class test 2. Viva
MAT4C15; **OPERATOR** **THEORY**	1. Understand Spectrum of a bounded operator,learn bounded linear functionals in detail. 2.Understand the concept of convergence in a normed space and in its dual space,know reflexive normed space. 3.Understand compact operators on normed spaces. 4.Analyze how to use the main properties of compact		

	operators. 5.Learn to use the specific techniques for bounded operators over Hilbert spaces.		
MAT4E03: **OPERATIONS RESEARCH**	1.The objective of this course is to produce intellectual and proficient operational researchers. 2.Learn how to model a range of real-world problems using optimization,simulation. 3.Operation research provides with the skills needed to apply mathematical methods to real-world analytics problems faced by companies,governments and other institutions. 4.This subject provides the technical skills needed to formulate and solve problems that arise in field such as computer modeling, data analysis, management of business operations. 5.To find the sequence of jobs or activities which optimizes the effectiveness of a situation.	1. Encouraging students to find out relevant examples to each session. 2. Divide students into different groups to solve a problem in different methods.	1. Unit wise class test 2. Viva