FATIMA COLLEGE (AUTONOMOUS), MADURAI – 625018

2021 - 2022

1.1.1 Curricula developed and implemented have relevance to the local, national, regional and global developmental needs which is reflected in Programme outcomes (POs), Programme specific outcomes (PSOs) and Course Outcomes (COs), of the Programmes offered by the Institution.

NAME OF THE PROGRAMME: B. Sc Mathematics

Programme outcomes (POs)

PO1	Apply acquired scientific knowledge to solve complex issues.
PO2	Attain Analytical skills to solve complex cultural, societal and environmental issues
PO3	Employ latest and updated tools and technologies to analyse complex issues
PO4	Demonstrate Professional Ethics that foster Community, Nation and Environment Building Initiatives.

Programme specific outcomes (PSOs)

PSO 1	Gain broad knowledge and understanding in pure Mathematics and applications of Mathematics.
PSO 2	Demonstrate a computational ability and apply logical thinking skills to solve problems that can be modelled Mathematically
PSO 3	Read, understand, analyse and formulate Mathematical theorems
PSO 4	Acquire proficiency in the use of technology to assist in learning and investigating, Mathematical ideas and in problem solving.
PSO 5	Communicate Mathematical concepts accurately, precisely and effectively with clarity and coherence both verbal and in written form.

Course Outcomes (COs)

Course Code	Course Title	Nature of the Course (Local/National/ Regional/Global)	Course Description	Course Outcomes
19M1CC1	Calculus	National	This course provides broad view on differential and integral calculus	CO1:Explain higher derivatives and apply Leibnitz theorem to find the n^{th} derivative of functions. CO2: Solve problems on curvature, envelopes, asymptotes and curve tracing. CO3:Construct reduction formula for trigonometric functions. CO4:Define Jacobian, double & triple integrals and apply the knowledge of change of variables to solve the problems in double and triple integrals. CO5:Construct Fourier series by recalling integration.

19M1CC2	Classical algebra	National	This course is designed to understand the concepts of algebra which are useful for solving various real word problems.	CO1: Explain sets, relations and functions CO2: Define binomial series, logarithmic and exponential series and solve problems. CO3: Identify Relations between the roots and coefficients of equations. CO4: Explain the transformations of equations. CO5: Recognize the important Methods in finding roots.
21B1ACM1	Computer programming in c	National	This course provides skills in designing and writing simple p	CO1: Explain various data types and operators in C CO2: Summarize Decision Making Branching, looping statements and arrays CO3: Categorize function,

				pointers and structures. CO4: Describe Strings and String Handling Functions. CO5: Create C program for real life problems
19M1ACP1	Allied mathematics – i	National	This course provides the basic concepts in various branches of	CO1: Find summation of any series. CO2: Explain the concepts of theory of equations. CO3: Calculate roots of equations using different methods. CO4: Expand trigonometric functions CO5: Apply the Leibnitz's theorem to find the n^{th} derivative
19M2CC3	Differential equations	National	This course will provide the	CO1: Solve problems in differential equations of first

			knowledge for solving ordinary and partial differential equations	order. CO2: Classify homogeneous and Non homogeneous differential equations of second order and solve problems. CO3: Solve differential equation problems using Laplace transform. CO4: Define Partial differential equations and solve problems. CO5: Solve problems on Growth, decay and chemical reactions
21M2CC4	Statistics	National	This course is designed to make the students understand the importance of statistical literacy	CO1: Solve problems on moments, skewness, kurtosis and correlation CO2: Construct regression lines and curve equation CO3: Explain random variables

			in today's data rich world.	and probability density function CO4: Solve problems on expectation. CO5: Define and explain analysis of time series and index numbers.
21B2ACM3	Object oriented programming with c++	National	This course introduces the student to object-oriented programming through a study of the concepts of program specification and design, algorithm development.	CO1: Define the features of C++ supporting object-oriented programming CO2: Describe classes and objects CO3: Distinguish Constructors and Destructors and Explain overloading concepts CO4: Classify Inheritance in C++ CO5: Design C++ programs for real life situations
19M1NME /	Quantitative	National	This course is	CO1: Solve problems on ages

19M2NME	aptitude		designed to help the students to appear in competitive examinations.	CO2: Illustrate profit and loss with examples CO3: Explain partnership and related problems CO4: Discuss problems on time and work CO5: Solve problems on time and distance
19M2ACP2	Allied mathematics –ii	National	This course provides the fundamentals concepts in various branches of Mathematics	CO1: Solve linear differential equations CO2: Solve second order linear differential equations with variable coefficient. CO3: Define Laplace transform and apply it to solve differential equation. CO4: Define Laplace transform and apply it to solve differential

				equation. CO5: Apply line, volume and surface integrals to verify the Gauss divergence and Stoke's theorem.
19M3CC5	Modern algebra	National	This course introduces the abstract concepts of modern algebra	CO1: Classify groups and explain their properties CO2: Describe cosets and Lagrange's theorem CO3: Explain the characteristics of different types of rings and their properties CO4: Classify various types of ideals CO5: Construct polynomial rings over UFD
19M3CC6	Vector calculus and fourier transforms	National	This course emphasizes the fundamental concepts of vector	CO1: Explain the concept of differentiation of vectors

			calculus and Fourier transforms	CO2: Compute divergence and curl of vectors CO3: Solve problems on line and surface integrals CO4: Compute Fourier sine and cosine transforms CO5: Describe the properties of Fourier transforms
19M3SB1	Applications of calculus and differential equations	National	This course deals with applications of calculus and differential equations.	CO1: Explain Beta and Gamma functions and their properties. CO2: Solve the problems in Maxima minima of functions of two variables. CO3: Describe trajectories and orthogonal trajectories. CO4: Solve Brachistochrone problems CO5: Discuss dynamical

				problems with variable mass
19C3ACM1	Allied mathematics – i	National	The course develops Mathematical knowledge needed by the chemistry students.	CO1: Appraise rank of a matrix, Eigen value and Eigen vectors CO2: Obtain higher derivatives of functions CO3: Solve exact and higher order differential equations CO4: Expand trigonometric functions CO5: Define Moments, kurtosis and to apply the same
19B3ACM1	Linear programming	National	The course provides appropriate methods for the efficient computation of optimal solutions to problems which are modeled by objective function and linear	CO1: Define basic concepts of Linear Programming problems CO2: Apply various simplex methods to solve linear programming problems CO3: Construct dual problem and solve the primal problem

			constraints	CO4: Solve transportation problems CO5: Distinguish assignment problem and travelling salesman problem
19M4CC7/ 19G4CC7	Sequences and series	National	This course introduces the concept of sequence and series and to enable the students to understand the fundamental ideas in Real Analysis	CO1: Define basic concepts of sequences CO2: Explain subsequences and Cauchy sequences CO3: Differentiate various convergence test for series and use them to solve problems CO4: Recognize alternating, convergent, conditionally and absolutely convergent series CO5: Distinguish the behaviour of series and power series
19M4CC8	Linear algebra	National	This course will focus on matrix as	CO1: Define Vector Space and explain its various concepts

			linear transformations relative to a basis of a vector space	CO2: Illustrate Inner Product Spaces CO3: Define basic concepts of matrices and solve linear equations CO4: Appraise Eigen Value and Eigen Vectors of matrices CO5: Describe bilinear forms and quadratic
19M4SB2/ 19G4SB2	Foundations of mathematics	National	This course helps the students to develop their problem solving skills.	CO1: Recall some expansions of Trigonometric functions. CO2: Explain Logarithms of Complex Quantities. CO3: Describe properties of integers. CO4: Solve puzzles using Chinese Remainder Theorem. CO5: Analyse inequalities.

19C4ACM2	Allied mathematics – ii	National	The course provides the mathematical skills needed by the chemistry students for advanced study.	CO1: Describe the concepts of groups, subgroups and normal subgroups CO2: Compute the definite integral and construct reduction formula. CO3: Solve differential equations using Laplace transforms. CO4: Explain the concepts of correlation, rank correlation coefficient and regression. CO5: Apply the principle of least squares to fit a straight line and parabola.
19B4ACM2	Algebra and graph theory	National	This course enables the students to have better application	CO1: Recall relations and functions CO2: Appraise Eigen values and E Vectors

			of abstract concepts through Graph Theory.	CO3: Define various types of graphs CO4: List out the characterization trees CO5: Apply different algorithms to the shortest path in gr
19M5CC9	Real analysis	National	This course introduces the basic concepts in analysis and to enable the students to understand fundamental ideas and theorems on metric spaces.	CO1: Describe fundamental ideas and theorems on Metric spaces CO2: Distinguish the continuity, discontinuity and uniform continuity of functions CO3: Demonstrate the connectedness and its properties CO4: Explain the concept of compactness and their roles in the real line CO5: Organize theorems in a

				correct mathematical way
19M5CC10	Statics	National	This course describes laws, principles, and postulates governing the statics of the system in physical reality.	CO1: Explain the concept of the forces and static equilibrium conditions CO2: Describe the perception of parallel forces and moments CO3: Classify a thorough force analysis of rigid bodies and simple structures in equilibrium CO4: Illustrate and give examples of couples and equilibrium of three forces acting on a rigid body CO5: Solve problems related to friction forces in various applications. Summarize the concept of equilibrium of strings to prepare and demonstrate the

				models.
19M5CC11/ 19G5CC11	Linear programming	National	The course provides appropriate methods for the efficient computation of optimal solutions to problems which are modeled by objective function and linear constraints	CO1: Formulate linear programming problems and solve by graphical method CO2: Classify simplex, two phase and Big - M method to solve linear programming problems CO3: Illustrate Duality in Linear programming CO4: Recognize and formulate transportation, assignment problems and find the optimal solution CO5: Define two person zero sum game, saddle point and solve problems.
19M5CC12	Graph theory	National	This course is	CO1: Define graphs and

			designed to introduce the students the basics of graph theory.	operations on graphs. CO2: Summarize and understand various techniques in proving theorems on connectedness. CO3: Create examples and counter examples to illustrate Eulerian and Hamiltonian graphs with examples CO4: List out the characterization of trees and construct various matchings for a graph. CO5: Solve problems involving planarity and colourability.
19M5ME1	Computer programming in c	National	This course provide skills in designing and writing simple	CO1: Explain various data types and operators in C CO2: Summarize Decision

			programs in C.	Making Branching, looping statements and arrays CO3: Categorize function, pointers and structures CO4: Describe Strings and String Handling Functions. CO5: Create C program for real life problems
19M5ME2	Fuzzy mathematics	National	This course discusses the fundamentals of fuzzy set theory and fuzzy logic.	CO1: Explain the difference between crisp set and fuzzy set theory CO2: Identify the methods of fuzzy logic CO3: Recognize the operations on fuzzy sets and combination of fuzzy operations CO4: Illustrate and give examples related to fuzzy

				relations CO5: Build sufficient understanding of fuzzy numbers and $\alpha-$ cuts
19M5SB3	Data interpretation and analytical aptitude	National	This course helps the students to prepare for competitive examinations	CO1: Solve problems on Data Interpretation CO2: Identify Analogy CO3: Classify coding and Decoding CO4: Solving Problems using ven diagram CO5: Identify missing numbers and character
19M5SB4	Cryptography	National	This course provides important tools for ensuring the privacy, authenticity and integrity of the sensitive information	CO1: Explain the fundamentals of cryptography CO2: Describe Security Services CO3: Explain Symmetric Cipher Model

			involved in modern digital systems	CO4: Discuss Block Ciphers CO5: Explain Block Cipher Design Principles
19M6CC13	Complex analysis	National	This course provides various concepts in complex analysis of one variable	CO1: Explain the concept of bilinear transformations. CO2: Identify continuous, differentiable and analytic functions CO3: Solve problems on complex integration CO4: Compute analytic functions in series form and classify singularities CO5: Evaluate definite integrals using Residues
19M6CC14	Dynamics	National	This course will provide a sound knowledge of the concepts and principles in	CO1: Describe the behaviour related to projectiles CO2: Apply the laws and

			Dynamics	principles governing dynamics of the system in physical reality. CO3: Describe the collision of elastic bodies. CO4: Explain Simple harmonic motion and its properties. CO5: Explain the motion under the action of central forces.
19M6CC15	Operations research	National	This helps in solving problems in different environments that needs decisions.	CO1: Define sequencing problem and apply it to solve real life problems CO2: Solve problems in decision making CO3: Apply inventory control to solve practical problems. CO4: Classify queuing models CO5: Explain CPM and PERT to plan schedule and control

				project activities.
19M6ME3	Object oriented programming with c++	National	This course introduces the student to object-oriented programming through a study of the concepts of program specification and design, algorithm development.	CO1: Define the features of C++ supporting object oriented programming CO2: Describe classes and objects CO3: Distinguish Constructors and Destructors and Explain overloading concepts CO4: Classify Inheritance in C++ CO5: Design C++ programs for real life situations
19M6ME4	Theory of numbers	National	The students are introduced about the basic topics of Number Theory which includes Divisibility,	CO1: Explain prime number and its distributions CO2: Define and interpret the concepts of divisibility, greatest common divisor, relatively prime integers and Fibonacci sequence

			Primes, Congruences, positive divisors, Fermat's and Wilson's theorem, Quadratic reciprocity.	CO3: Recognize the congruences, properties of congruences, special divisibility tests and Chinese remainder theorem. CO4: Explain the Law of Quadratic reciprocity, Quadratic Congruence with Prime and Composite Modulus CO5: Explain Fermat's theorem and its applications
19M6ME5	Lattices and boolean algebra	National	This course helps the students to know more about Lattices and Boolean Algebra and their usefulness in	CO1: Recall Posets and classify Lattices. CO2: Identify ideals and dual ideals in Lattices. CO3: Classify Modular and Distributive Lattices. CO4: Explain the concepts of

			other areas of Mathematics.	Boolean Rings and Boolean Functions CO5: Apply Switching Circuits in real life situations.
19M6ME6	Discrete mathematics	National	This course strengthens and increases the understanding of some concepts in Discrete Mathematics	CO1: Describe any statement formula in normal forms CO2: Analyse the consistency of premises CO3: Classify various functions CO4: Solve Recurrence Relations CO5: Distinguish Posets and Lattices
19M6SB5	Matlab	National	This course provides knowledge of basic concepts in MATLAB.	CO1: Solve scientific problems using MATLAB CO2: Explain Operators in MATLAB CO3: Apply MATLAB in Data Analysis

				CO4: Construct MATLAB programs for Mathematical Calculations CO5: Describe MATLAB tools
19M6SB6	Combinatorial mathematics	National	This course enables to study of different enumeration techniques of finite but large sets	CO1: Explain the concepts of various combinatorial numbers CO2: Identify solutions by the technique of generating functions and recurrence relation CO3: Solve problems on principle of inclusion and exclusion CO4: Identify Euler's function and the Menage problem CO5: Explain Burnside's lemma and solve problems on Fibonacci numbers

19M1CC1	Calculus	National	This course provides broad view on differential and integral calculus	CO1:Explain higher derivatives and apply Leibnitz theorem to find the n^{th} derivative of functions. CO2: Solve problems on curvature, envelopes, asymptotes and curve tracing. CO3:Construct reduction formula for trigonometric functions. CO4:Define Jacobian, double & triple integrals and apply the knowledge of change of variables to solve the problems in double and triple integrals. CO5:Construct Fourier series by recalling integration.
19M1CC2	Classical algebra	National	This course is designed to understand the	CO1: Explain sets, relations and functions CO2: Define binomial series,

			concepts of algebra which are useful for solving various real word problems.	logarithmic and exponential series and solve problems. CO3: Identify Relations between the roots and coefficients of equations. CO4: Explain the transformations of equations. CO5: Recognize the important Methods in finding roots.
21B1ACM1	Computer programming in c	National	This course provides skills in designing and writing simple p	CO1: Explain various data types and operators in C CO2: Summarize Decision Making Branching, looping statements and arrays CO3: Categorize function, pointers and structures. CO4: Describe Strings and String Handling Functions.

				CO5: Create C program for real life problems
19M1ACP1	Allied mathematics – i	National	This course provides the basic concepts in various branches of	CO1: Find summation of any series. CO2: Explain the concepts of theory of equations. CO3: Calculate roots of equations using different methods. CO4: Expand trigonometric functions CO5: Apply the Leibnitz's theorem to find the n^{th} derivative
19M2CC3	Differential equations	National	This course will provide the knowledge for solving ordinary and partial	CO1: Solve problems in differential equations of first order. CO2: Classify homogeneous and Non homogeneous

			differential equations	differential equations of second order and solve problems. CO3: Solve differential equation problems using Laplace transform. CO4: Define Partial differential equations and solve problems. CO5: Solve problems on Growth,decay and chemical reactions
21M2CC4	Statistics	National	This course is designed to make the students understand the importance of statistical literacy in today's data rich world.	CO1: Solve problems on moments, skewness, kurtosis and correlation CO2: Construct regression lines and curve equation CO3: Explain random variables and probability density function CO4: Solve problems on

				expectation. CO5: Define and explain analysis of time series and index numbers.
21B2ACM3	Object oriented programming with C++	National	This course introduces the student to object-oriented programming through a study of the concepts of program specification and design, algorithm development.	CO1: Define the features of C++ supporting object oriented programming CO2: Describe classes and objects CO3: Distinguish Constructors and Destructors and Explain overloading concepts CO4: Classify Inheritance in C++ CO5: Design C++ programs for real life situations
19M1NME / 19M2NME	Quantitative Aptitude	National	This course is designed to help the students to	CO1: Solve problems on ages CO2: Illustrate profit and loss with examples CO3: Explain

			appear in competitive examinations.	partnership and related problems CO4: Discuss problems on time and work CO5: Solve problems on time and distance
19M2ACP2	Allied Mathematics –II	National	This course provides the fundamentals concepts in various branches of Mathematics	CO1: Solve linear differential equations CO2: Solve second order linear differential equations with variable coefficient. CO3: Define Laplace transform and apply it to solve differential equation. CO4: Define Laplace transform and apply it to solve differential equation. CO5: Apply line, volume and

				surface integrals to verify the Gauss divergence and Stoke's theorem.
19M3CC5	Modern Algebra	National	This course introduces the abstract concepts of modern algebra	CO1: Classify groups and explain their properties CO2: Describe cosets and Lagrange's theorem CO3: Explain the characteristics of different types of rings and their properties CO4: Classify various types of ideals CO5: Construct polynomial rings over UFD
19M3CC6	Vector Calculus and Fourier Transforms	National	This course emphasizes the fundamental concepts of vector calculus and Fourier transforms	CO1: Explain the concept of differentiation of vectors CO2: Compute divergence and curl of vectors

				CO3: Solve problems on line and surface integrals CO4: Compute Fourier sine and cosine transforms CO5: Describe the properties of Fourier transforms
19M3SB1	Applications of calculus and differential equations	National	This course deals with applications of calculus and differential equations.	CO1: Explain Beta and Gamma functions and their properties. CO2: Solve the problems in Maxima minima of functions of two variables. CO3: Describe trajectories and orthogonal trajectories. CO4: Solve Brachistochrone problems CO5: Discuss dynamical problems with variable mass
19C3ACM1	Allied mathematics	National	The course	CO1: Appraise rank of a matrix,

	– I		develops Mathematical knowledge needed by the chemistry students.	Eigen value and Eigen vectors CO2: Obtain higher derivatives of functions CO3: Solve exact and higher order differential equations CO4: Expand trigonometric functions CO5: Define Moments, kurtosis and to apply the same
19B3ACM1	Linear Programming	National	The course provides appropriate methods for the efficient computation of optimal solutions to problems which are modeled by objective function and linear constraints	CO1: Define basic concepts of Linear Programming problems CO2: Apply various simplex methods to solve linear programming problems CO3: Construct dual problem and solve the primal problem CO4: Solve transportation problems CO5: Distinguish

				assignment problem and travelling salesman problem
19M4CC7/ 19G4CC7	Sequences And Series	National	This course introduces the concept of sequence and series and to enable the students to understand the fundamental ideas in Real Analysis	CO1: Define basic concepts of sequences CO2: Explain subsequences and Cauchy sequences CO3: Differentiate various convergence test for series and use them to solve problems CO4: Recognize alternating, convergent, conditionally and absolutely convergent series CO5: Distinguish the behaviour of series and power series
19M4CC8	Linear Algebra	National	This course will focus on matrix as linear transformations	CO1: Define Vector Space and explain its various concepts CO2: Illustrate Inner Product Spaces

			relative to a basis of a vector space	CO3: Define basic concepts of matrices and solve linear equations CO4: Appraise Eigen Value and Eigen Vectors of matrices CO5: Describe bilinear forms and quadratic
19M4SB2/ 19G4SB2	Foundations Of Mathematics	National	This course helps the students to develop their problem solving skills.	CO1: Recall some expansions of Trigonometric functions. CO2: Explain Logarithms of Complex Quantities. CO3: Describe properties of integers. CO4: Solve puzzles using Chinese Remainder Theorem. CO5: Analyse inequalities.
19C4ACM2	Allied Mathematics – II	National	The course provides the	CO1: Describe the concepts of groups, subgroups and normal

			mathematical skills needed by the chemistry students for advanced study.	subgroups CO2: Compute the definite integral and construct reduction formula. CO3: Solve differential equations using Laplace transforms. CO4: Explain the concepts of correlation, rank correlation coefficient and regression. CO5: Apply the principle of least squares to fit a straight line and parabola.
19B4ACM2	Algebra And Graph Theory	National	This course enables the students to have better application of abstract concepts through	CO1: Recall relations and functions CO2: Appraise Eigen values and Vectors CO3: Define various types of graphs

			Graph Theory.	CO4: List out the characterizati trees CO5: Apply different algorithms t the shortest path in gr
19M5CC9	Real Analysis	National	This course introduces the basic concepts in analysis and to enable the students to understand fundamental ideas and theorems on metric spaces.	CO1: Describe fundamental ideas and theorems on Metric spaces CO2: Distinguish the continuity, discontinuity and uniform continuity of functions CO3: Demonstrate the connectedness and its properties CO4: Explain the concept of compactness and their roles in the real line CO5: Organize theorems in a correct mathematical way
19M5CC10	Statics	National	This course	CO1: Explain the concept of the

			describes laws, principles, and postulates governing the statics of the system in physical reality.	forces and static equilibrium conditions CO2: Describe the perception of parallel forces and moments CO3: Classify a thorough force analysis of rigid bodies and simple structures in equilibrium CO4: Illustrate and give examples of couples and equilibrium of three forces acting on a rigid body CO5: Solve problems related to friction forces in various applications. Summarize the concept of equilibrium of strings to prepare and demonstrate the models.
19M5CC11/	Linear Programming	National	The course provides	CO1: Formulate linear

19G5CC11			appropriate methods for the efficient computation of optimal solutions to problems which are modeled by objective function and linear constraints	programming problems and solve by graphical method CO2: Classify simplex, two phase and Big - M method to solve linear programming problems CO3: Illustrate Duality in Linear programming CO4: Recognize and formulate transportation, assignment problems and find the optimal solution CO5: Define two person zero sum game, saddle point and solve problems.
19M5CC12	Graph Theory	National	This course is designed to introduce the	CO1: Define graphs and operations on graphs. CO2: Summarize and

			students the basics of graph theory.	understand various techniques in proving theorems on connectedness. CO3: Create examples and counter examples to illustrate Eulerian and Hamiltonian graphs with examples CO4: List out the characterization of trees and construct various matchings for a graph. CO5: Solve problems involving planarity and colourability.
19M5ME1	Computer Programming In C	National	This course provid skills in designi and writing simp programs in C.	CO1: Explain various data types and operators in C CO2: Summarize Decision Making Branching, looping statements and arrays

				CO3: Categorize function, pointers and structures CO4: Describe Strings and String Handling Functions. CO5: Create C program for real life problems
19M5ME2	Fuzzy Mathematics	National	This course discusses the fundamentals of fuzzy set theory and fuzzy logic.	CO1: Explain the difference between crisp set and fuzzy set theory CO2: Identify the methods of fuzzy logic CO3: Recognize the operations on fuzzy sets and combination of fuzzy operations CO4: Illustrate and give examples related to fuzzy relations CO5: Build sufficient

				understanding of fuzzy numbers and $\alpha-$ cuts
19M5SB3	Data Interpretation and Analytical Aptitude	National	This course helps the students to prepare for competitive examinations	CO1: Solve problems on Data Interpretation CO2: Identify Analogy CO3: Classify coding and Decoding CO4: Solving Problems using ven diagram CO5: Identify missing numbers and character
19M5SB4	Cryptography	National	This course provides important tools for ensuring the privacy, authenticity and integrity of the sensitive information involved in modern digital systems	CO1: Explain the fundamentals of cryptography CO2: Describe Security Services CO3: Explain Symmetric Cipher Model CO4: Discuss Block Ciphers CO5: Explain Block Cipher

				Design Principles
19M6CC13	Complex Analysis	National	This course provides various concepts in complex analysis of one variable	CO1: Explain the concept of bilinear transformations. CO2: Identify continuous, differentiable and analytic functions CO3: Solve problems on complex integration CO4: Compute analytic functions in series form and classify singularities CO5: Evaluate definite integrals using Residues
19M6CC14	Dynamics	National	This course will provide a sound knowledge of the concepts and principles in Dynamics	CO1: Describe the behaviour related to projectiles CO2: Apply the laws and principles governing dynamics of the system in physical reality.

				CO3: Describe the collision of elastic bodies. CO4: Explain Simple harmonic motion and its properties. CO5: Explain the motion under the action of central forces.
19M6CC15	Operations Research	National	This helps in solving problems in different environments that needs decisions.	CO1: Define sequencing problem and apply it to solve real life problems CO2: Solve problems in decision making CO3: Apply inventory control to solve practical problems. CO4: Classify queuing models CO5: Explain CPM and PERT to plan schedule and control project activities.
19M6ME3	Object Oriented Programming With	National	This course	CO1: Define the features of C++

	C++		introduces the student to object-oriented programming through a study of the concepts of program specification and design, algorithm development.	supporting object oriented programming CO2: Describe classes and objects CO3: Distinguish Constructors and Destructors and Explain overloading concepts CO4: Classify Inheritance in C++ CO5: Design C++ programs for real life situations
19M6ME4	Theory Of Numbers	National	The students are introduced about the basic topics of Number Theory which includes Divisibility, Primes, Congruences,	CO1: Explain prime number and its distributions CO2: Define and interpret the concepts of divisibility, greatest common divisor, relatively prime integers and Fibonacci sequence CO3: Recognize the congruences, properties of

			positive divisors, Fermat's and Wilson's theorem, Quadratic reciprocity.	congruences, special divisibility tests and Chinese remainder theorem. CO4: Explain the Law of Quadratic reciprocity, Quadratic Congruence with Prime and Composite Modulus CO5: Explain Fermat's theorem and its applications
19M6ME5	Lattices and Boolean Algebra	National	This course helps the students to know more about Lattices and Boolean Algebra and their usefulness in other areas of Mathematics.	CO1: Recall Posets and classify Lattices. CO2: Identify ideals and dual ideals in Lattices. CO3: Classify Modular and Distributive Lattices. CO4: Explain the concepts of Boolean Rings and Boolean Functions

				CO5: Apply Switching Circuits in real life situations.
19M6ME6	Discrete Mathematics	National	This course strengthens and increases the understanding of some concepts in Discrete Mathematics	CO1: Describe any statement formula in normal forms CO2: Analyse the consistency of premises CO3: Classify various functions CO4: Solve Recurrence Relations CO5: Distinguish Posets and Lattices
19M6SB5	Matlab	National	This course provides knowledge of basic concepts in MATLAB.	CO1: Solve scientific problems using MATLAB CO2: Explain Operators in MATLAB CO3: Apply MATLAB in Data Analysis CO4: Construct MATLAB programs for Mathematical

				Calculations CO5: Describe MATLAB tools
19M6SB6	Combinatorial Mathematics	National	This course enables to study of different enumeration techniques of finite but large sets	CO1: Explain the concepts of various combinatorial numbers CO2: Identify solutions by the technique of generating functions and recurrence relation CO3: Solve problems on principle of inclusion and exclusion CO4: Identify Euler's function and the Menage problem CO5: Explain Burnside's lemma and solve problems on Fibonacci numbers