Masters of Science (Mathematics)

Program Outcome

PO-1) This provides the importance of mathematics and its techniques to solve different types of real life applications and provide the limitations of such techniques and the validity of the results.

PO-2) This provides a way to propose new mathematical and statistical questions and suggest possible software packages and/or computer programming such as Mathematica, Matlab, C,C++ etc. to find the solutions to these questions.

PO-3) This also provide a platform for acquiring career in higher studies for mathematical and statistical knowledge.

PO-4) This generates the skills for the appropriate professional activities and demonstrate highest standards of ethical issues in mathematics.

PO-5) The students may able to use computer calculations as a tool to carry out scientific investigations and develop new variants of the acquired methods, if required by the problem at hand.

PO-6) After studying this course, the students are supposed to learn following theories and concepts:

- Group theory,
- Basic concepts of ring theory
- Basic concepts of Field theory
- Basic concepts of Module theory
- Basic Galois theory
- Convergence of Sequence and series
- Use of uniform convergence
- Integration in higher dimension
- Function of several variables
- Stoke's theorem
- Vector space
- Inner product spaces
- Transformations
- Bilinear forms
- Sylvester's theorem
- Basic concepts of graphs

- Lattice Theory
- Lattice Theory and Boolean algebra
- Extended
- Boolean Algebra
- Application of Boolean algebraSet theory
- Basic concept of Fuzzy Set theory
- Basic concept of Graph theory
- Number TheoryArithmetic of Complex numbers
- Integration in contour
- Series in complex domain
- Bilinear transformation
- existence and uniqueness of solution of initial value problem
- Volterra and Fredholm integral equation
- Solution of a family of Initial value problems
- Successive approximations
- Outer measure and Measurability
- Difference between Riemann and Lebesgue integrals
- Function of bounded variation
- Integration and measure
- Uniform Convergence and completeness
- Basic concept of topological spaces
- countability and separability
- Compactness
- Connectedness
- Regular and Normal spaces
- Congruences and their related theorems
- Mobius inversion formula and congruences of higher degree
- Different theorems related to higher degree residue
- Continued fraction and their approximation
- Convergence in abstract spaces
- Weak convergence and their consequences
- Normed linear spaces
- Hilbert spaces and Banach spaces
- Introduction to different type of operators
- Introduction of fluid motion
- Equations of motion
- Use of complex analysis in fluid motion
- Circular motion in fluid
- Motion due to circular and rectilinear vertices
- Generalised co-ordinates and degree of freedom
- Canonical equations and principle of least actions
- normal Co-ordinates and vibrations
- Brackets and transformations
- Calculus of variation and shortest distance
- Basics of L.P.P.
- Integer programming
- Wolfe's and Beale's methods
- Game theory

- Mathematical formulation of inventory theory
- Queuing Theory and different models
- Uncertainty theory
- Fano-encoding procedure and encoding
- Group replacement policy and scrap policy
- Utility of machines and their job taken
- UFD
- Field extensions
- Separable Extension
- Galois theorem on solvability

Course Outcome

SI. No.	Course Code	Course Name	Learning Outcomes
SEMESTER-I			
1.	CC 1	Abstract Algebra	After completion of this course the students will be able to learn: • Group theory • Basic concepts of ring theory • Basic concepts of Field theory • Basic concepts of Module theory • Basic Galois theory
2.	CC 2	Real Analysis	After completion of this course the students will be able to learn: • Convergence of Sequence and series • Use of uniform convergence • Integration in higher dimension • Function of several variables • Stoke's theorem
3.	CC 3	Linear Algebra	After completion of this course the students will be able to learn: • Vector space • Inner product spaces • Transformations • Bilinear forms • Sylvester's theorem
4.	CC 4	Discrete Mathematics	After completion of this course the students will be able to learn: • Basic concepts of graphs • Lattice Theory • Lattice theory and Boolean algebra • Extended Boolean Algebra
5.	AECC 1	Environmental Sustainability and Swachha Bharat Abhiyaan Activities	CO1. Students will get the knowledge about the environment and its components in which one survives. CO2. Students will learn how to take care of the surroundings in general. The field work during the completion of the course will make student responsible for their ecosystem. CO3. During the course, students will get to know about so many elements of general studies that can really help them in competitive examinations as well as in day to day activities.

SI. No.	Course Code	Course Name	Learning Outcomes
SEMESTER-II			
6.	**CC 5**	**General Advanced Mathematics**	After completion of this course the students will be able to learn: • Set theory • Basic concepts of Fuzzy set theory • Basic concepts of Graph theory • Number theory
7.	**CC 6**	**Complex Analysis**	After completion of this course the students will be able to learn: • Arithmetic of Complex numbers • Integration in contour • Series in complex domain • Bilinear transformation
8.	**CC 7**	**Differential and Integral Equation**	After completion of this course the students will be able to learn: • Existence and uniqueness of solution of initial value problem • Volterra and Fredholm intergral equation • Solution of a family of Initial value problems • Successive approximations
9.	**CC 8**	**Measure Theory**	After completion of this course the students will be able to learn: • Outer measure and measurability • Difference between Riemann and Lebesgue integrals • Functions of bounded variation • Integration and measure • Uniform Convergence and completeness
10.	**CC 9**	**Tropology**	After completion of this course the students will be able to learn: • Basic concept of topological spaces • Countability and separability • Compactness • Connectedness • Regular and Normal spaces
11.	**SEC 1**	**Skill Enhancement Course: Yogic Science**	CO1. Students will learn the theoretical foundations of Yoga philosophy. CO2. Students will equip themselves with a fair number of yogic practices including meditative techniques. CO3. Yogic knowledge and practices will help the students to revitalise themselves and work with more attention.

SI. No.	Course Code	Course Name	Learning Outcomes
SEMESTER-III			
12.	**CC 10**	**Number theory**	After completion of this course the students will be able to learn: • Congruences and their related theorems • Mobius inversion formula and congruences of higher degree • Different theorems related to higher degree residue • Continued fraction and their approximation
13.	**CC 11**	**Functional Analysis**	After completion of this course the students will be able to learn: • Convergence in abstract spaces • Weak convergence and their consequences • Normed linear spaces • Hilbert spaces and Banach spaces • Introduction to different type of operatiors
14.	**CC 12**	**Fluid Dynamics**	After completion of this course the students will be able to learn: • Introduction of fluid motion • Equations of motion • Use of complex analysis in fluid motion • Circular motion in fluid • Motion due to circular and rectilinear vertices
15.	**CC 13**	**Classical Mechanics (Rigid Dynamics)**	After completion of this course the students will be able to Learn: • Generalised co-ordinates and degree of freedom • Canonical equations and principle of least actions • Normal co-ordinates and vibrations • Brackets and transformations
16.	**CC 14**	**Optimization Techniques**	After completion of this course the students will be able to Learn: • Basics of L.P.P. • Integer Programming • Wolfe's and Beale's methods • Game theory • Mathematical formulation of inventory theory
17.	**AECC 2**	**Human values and professional ethics and gender sensitisation**	CO1. Students will get the knowledge about values regarding humanity, gender equality and professionalism. CO2. Students will learn how to work together in an empathetic and unbiased way. The field work during the completion about the dignity of a human being.

SI. No.	Course Code	Course Name	Learning Outcomes
			CO3. During the course, students will acquaint themselves with such notions of morality that they will find it easier to work together in a group in a co-operative and productive way.
SEMESTER-IV			
18.	**EC 1**	**Operations Research**	After completion of this course the students will be able to Learn: • Queuing theory and different models • Uncertainty theory • Fano-encoding procedure and encoding • Group replacement policy and scrap policy • Utility of machines and their job taken
19.	**EC 2**	**Galois Theory**	After completion of this course the students will be able to Learn: • UFD • Field extensions • Separable Extension • Galois theorem on solvability
20.	**GE**	**Generic Electives: Human Rights**	CO1. Students will get themselves familiar with the various aspects of human rights, their importance and the contribution of various thinkers in the conceptual development of the Human Rights. CO2. Students are expected to emulate whatever they have learned in the course in their daily lives. CO3. This course of human rights is almost inevitable to appear in the question paper of any competitive exams and interviews.