Post Graduate Department of Mathematics

Department of Mathematics grooms the ability of the student in terms of logical, analogical, and mental reasoning in different fields that help in improving calculative decisions according to the needs of the industry like financial calculations, weather forecasting, measuring calculations in construction, and fashion industry, etc. It enriches the students with the knowledge of Mathematics in both pure and applied sciences.

Aim of the department:

1. Amplify Mathematical skills to solve real-life problems
2. To develop inventive and productive imagination.
3. To provide a platform to students to extend mathematical ideas
4. Elucidate students to learn Mathematics for future research.
5. To develop creative as well as logical skills to meet the demands of work in the related field.
6. To promote the student's problem-solving skills.

M.Sc. (Mathematics)

Eligibility: The candidates must have qualified B.A with Mathematics or B.Sc (Non-Medical, Computer Application, and CSM) or equivalent courses with Mathematics with at least 50% marks.

This course comprises two academic years and is divided into four semesters. The course Mathematics is segregated into various branches like algebra, geometry, Mathematical analysis, Topology, Applied Mathematics, etc. The role of various subjects is as follows:

Algebra: This area of Mathematics is very useful in Business and Finance management, professional advancement, sports, cooking, and technology, etc as it includes numbers and their properties. It is bifurcated into elementary algebra and abstract algebra. Elementary algebra deals with numbers and their arithmetical operations whereas abstract algebra deals with various methods to solve equations and studies group and ring theory.

Geometry: Students will learn about shapes, figures, and properties and will study to find the length, area, etc of the different plane and solid figures. It includes differential geometry, discrete geometry, convex geometry, algebraic geometry, etc that plays a pivotal role in our life like in constructions of buildings, art, designing, Geographic computer system, medicine, mapping, etc.

Topology: The subject covers the properties of that figures that do not change with deformation. It includes algebraic topology, general topology, and differential topology. It plays an important role in biology, physics, computer science, etc.

Mathematical Analysis: Students will understand the concept of mathematics that deals with the rate of change. It has many applications in other branches of mathematics as well as in sciences.

Applied Mathematics: This includes probability and statistics, Computational sciences, Mathematical physics and other applied Mathematics like operation research, mathematical programming etc .It includes not only the collection, analysis, and interpretation of such data but also the planning of the collection of data that is implemented in various fields like surveying, estimation. It helps in real world problems.

This course provides a platform to the student in the following fields:

1. Banking
2. Data Analyst
3. Market Researcher
4. Actuarial Sciences
5. Teaching
6. Research Organization
7. UPSC and other competitive exam
8. IT Sector
9. Data Entry Operator
10. Data Manager

B.Sc. CSM (Computer, Statistics, Mathematics)

Eligibility: A candidate who has passed 10+2 examination (with maths) from recognized university/Board or any other examination equivalent there is to eligible to join this programme.

This course allows the students to study three different fields i.e. Computer, statistics and Mathematics collaboratively therefore it enhances the knowledge in all three fields which is altogether required in any industry that deals with logical and analogical decision making process. It grooms the students with both technical, logical and research analysis techniques.

This program comprises three academic years and is divided into six semesters. This course includes statistical methods, probability theory, inference, applied statistics, Sample survey, Computer oriented numerical methods, Algebra and trigonometry, calculus, geometry etc.

Algebra: This area of Mathematics is very useful in Business and Finance management, professional advancement, sports, cooking, and technology, etc as it includes numbers and their properties. It is bifurcated into elementary algebra and abstract algebra. Elementary algebra deals with numbers and their arithmetical operations whereas abstract algebra deals with various methods to solve equations and studies group and ring theory.

Geometry: Students will learn about shapes, figures, and properties and will study to find the length, area, etc of the different plane and solid figures. It plays a pivotal role in our life like in constructions of buildings, art, designing, Geographic computer system, medicine, mapping, etc.

Analysis: Students will understand the concept of mathematics that deals with the rate of change. It has many applications in other branches of mathematics as well as in sciences.

Mechanics: The course contents will expertise the students in mechanics. It is subdivided into two parts statics and dynamics that make the student familiar with real-life problems. It correlates mathematics with physics that together performs calculations that is essential to understand present models of physical sciences.

Differential Equation: Students will get the basic knowledge of mathematics including linear and non-linear equation solving, basic properties of continuity and differentiability, solutions of homogeneous and non-homogeneous differential equations with constants coefficient as well as variable coefficient and series methods.

Statistical Methods : It deals with the methods of collecting, organizing, presenting, analyzing, and interpreting data and facts. Various statistical methods such as central tendency, dispersion, skewness, moments, kurtosis, correlation, regression, the theory of attributes, etc. are part of it.

Probability Theory: It is the science of decision making with calculated risks in the face of uncertainty. This subject include various topics like the chance of occurrence of random events, Bayes theorem, random variable, expectation, generating functions, discrete and continuous distributions, law of large numbers, certain inequalities etc.

Statistical Inference: The main aim of the inference is to find the unknown parameters of the population from a given sample. The subject deals with various methods of estimation, hypothesis testing, sampling distributions (chi-square, t, F, Z etc), large sample tests, exact tests, small sample tests etc.

Applied Statistics: Applied statistical techniques like time series, index numbers, demand analysis, statistical quality control, inventory control, etc are used in almost every business, industry, govt. and non-govt. sectors.etc.

Sampling Survey: It is a process of selecting sample observations from a targeted population by following a sequence of steps. Various sampling methods are simple random sampling, stratified random sampling, systematic sampling, multistage sampling, Quota sampling, cluster sampling, judgment sampling, purposive sampling, area sampling etc.

Computer Oriented Numerical methods: This subject deals with various methods like representing numbers in Floating point; conversion of numbers in decimal to binary, octal, hexadecimal and vice versa; solving algebraic and transcendental equations using bisection, secant, Regula-Falsi, Newton Raphson methods; Finite differences, Interpolation; solution of set of simultaneous equations etc.

Linear Programming Problems: These problems involve optimization of objective function with respect to certain constraints using graphical method, simplex, Big M method, Two Phase method duality, transportation problem, assignment problem, Sensitivity Analysis etc.

Design of Experiments: The logical construction of experiment in which the degree of uncertainty with which the conclusions drawn are well defined. It deals with linear models, ANOVA, CRD, RBD, LSD, factorial experiments etc.

The various subjects of this course that are discussed above are used practically in real world situations and are used in almost every industry such as manufacturing, textile, aircraft, pharmaceutical, automobile, petroleum, chemical, transportation, electronics, IT, artificial intelligence, cryptography, coding and de-coding, agriculture, genetics, plant breeding etc.

This course provides a platform to the student in the following fields:

- The syllabus for B. Sc CSM covers a lot for the UPSC examination i.e. ISS (Indian Statistical Services) and Statistical Officer
- The students are eligible for the post of Statistical Investigator of SSC-CGL .
- Post of field investigator and various other posts in MOSPI (Ministry of Statistics and Programme Implementation)
- Post of JSO and SSO in NSSO (National Sample Survey Organizations)
- Post of Statistician and Data Scientist in various Govt and Non-Govt departments like Health care organizations, pharmaceutical industries, IT sector, Data Science, Machine Learning, Artificial Intelligence, Biotechnological industries, Actuarial Sciences etc
- Posts in Registrar Office, Medical Examiner office, Finance Sector, Stock Exchange, Immigration Offices, Insurance Agencies, Labor Bureau,

B.A /B.Sc (Non Medical, Computer Applications)

In this course, students will get the basic knowledge of mathematics including concepts of concavity convexity, asymptotes, linear and non-linear equation solving, basic properties of continuity and differentiability, solutions of homogeneous and non-homogeneous differential equations with constants coefficient as well as variable coefficient and series methods. Linear algebra helps the students to learn about the problem-solving technique of matrices and concepts of vector spaces like transformations that are very helpful in other fields.

The main focus is to equip the students with the knowledge of vector analysis and its applications to the evaluation of areas, volume, inertia, calculus of several variables, etc. It enables them to grasp the knowledge of partial differential equations, Laplace, heat and wave equation that plays a vital role in physics and other sciences. This course also helps them to understand two and three-dimensional geometry including sphere, cone, cylinder, which is fruitful in interdisciplinary fields.

The course contents will expertise the students in mechanics. It is subdivided into two parts statics and dynamics that make the student familiar with real-life problems. It correlates mathematics with physics that together performs calculations that is essential to understand present models of physical sciences. It brings physics and mathematics closer to solve many problems concurrently like air pressure, tension, thrust, energy, etc. It will also include numerical methods, some convergence tests of sequences and series which are important to that situation in which complete solutions are not feasible due to the complexity.

Students will get knowledge of algebra that is bifurcated into elementary algebra and abstract algebra. It includes many concepts like the principle of inclusion and exclusion, relations and functions, Boolean algebra, Lattices, Graph theory, Fourier series, Dirichlet's conditions that help them in various fields like physical sciences, Computer sciences, etc. This course also gives knowledge of vector spaces, transformations, operators, switching circuits, analysis of algorithms-Time complexity, Fourier transforms, and applications of Laplace transformation to the solution of an ordinary differential equation.

B.COM / BBA

This course helps to solve many of the problems and helps in the decision-making process concerning business and industry. Business Mathematics provides knowledge to the students to learn about the problem-solving technique of matrices, Compound Interest, and annuity, mathematical functions and

functions related to cost, revenue, and profit, the elasticity of demand and supply that provides help in business decisions.

Business Statistics helps in conducting a statistical inquiry and includes all the statistical methods beginning from the collection of data, the techniques for classification and tabulation, and the methods of calculating statistical measures like mean, median, variance, correlation, and regression, etc. It also includes correlation that is used to show how variables are related and regression is used to analyze the effect of one variable on the other variable. These are extensively used in various areas like economics, physical sciences, etc.

B.CA

This course helps the student to familiar with matrices and determinants, to know about the basic idea geometry like circles, straight lines. This also helps in evaluation of probability, complex theory, and solutions of quadratic equations. It includes solution of the transcendental functions which are important to that situation in which complete solutions are not feasible due to the complexity. It includes all the statistical methods beginning from the collection of data, the techniques for classification and tabulation, and the methods of calculating statistical measures like mean, median, variance, correlation, and regression, etc. It also includes correlation that is used to show how variables are related and regression is used to analyze the effect of one variable on the other variable.