

DEPARTMENT OF MATHEMATICS

Programme outcome:

On completion of the programme, the student will

1. Have good knowledge and understanding of core areas of Mathematics including Calculus, Mechanics, three dimensional geometry, Differential equations and Abstract algebra.
2. Be able to employ different methods of proofs of theorems to solve problems including direct proof, method of contradiction and mathematical induction.
3. Be able to criticize mathematical arguments encountered during interaction or while reading text books.
4. Be able to develop and maintain problem solving skills, to read and understand basic proofs.
5. Be able to work on their own during preparation for competitive examinations.
6. Be able to spread the knowledge of the subject to school students.

Course Outcome:

Course Name	Course Outcomes
Paper I Calculus I and Algebra I	Students should be able to 1. solve problems on matrices and sets including solutions of equations by matrix methods. 2. plot graphs of functions and to determine continuity or discontinuity from the graph. 3. compute limits using methods including L-Hospital's rule. 4. understand the geometrical meaning of definite integral and derivative, the relationship between derivative and definite integral as expressed in fundamental theorem of integral calculus. 5. solve differential equations of various forms by the available methods taught to them.
Paper II Geometry and Vector Calculus	The student should be able to 1. understand and visualize straight lines, planes, spheres, cylinders, cones, to determine their equations, solving problems on these and other related problems in real life. 2. Represent vectors analytically and geometrically and compute dot product and cross product of vectors, 3. Compute the curl and divergence of vector fields, directional derivative,

	gradient of scalar valued functions and interpret these geometrically.
Paper III Algebra II and Calculus II	The student should be able to 1. understand the definitions of groups, determine whether a set with a binary operation is a group, determine whether a group is cyclic, find the number of subgroups. 2. distinguish between reducible and irreducible polynomials, solve polynomials over rationals by the available methods, apply division algorithm. 3. find limits of sequences, determine convergence of sequences and series by different tests of convergence, apply mean value theorems in simple functions, determine whether the function is homogeneous and hence answer related questions. 4. apply integrals to find areas of plane curves and surfaces and volumes of solids of revolutions.
Paper IV Statics and Dynamics	The student should be able to 1. understand action of forces and construct diagrams maintaining equilibrium of forces based on the problems. 2. apply various laws of forces mentioned to solve problems and to relate to real life problems including forces of friction. 3. understand the basic concept of velocities, accelerations, forces, work, kinetic energy.
Paper V Elementary number theory and advanced algebra	The student should 1. have a working knowledge of important mathematical concepts such as finding remainder using division algorithm and congruence, order of element of a group, order of finite group and normal subgroups. 2. be knowledgeable of the examples of ring, fields, vector spaces and linear transformations. 3. be able to relate matrix with linear transformations.
Paper VI Differential equations and advanced dynamics	The student should be able to 1. identify techniques for solutions of differential equations and also their applications in other branches of science besides mathematics. 2. learn to analyse kinematics of particle motion and plane motion of rigid bodies and construct free body diagrams. 3. understand the basic concepts of velocity, force, mass and acceleration, work and energy, impulse and momentum.
Paper VII Advanced Calculus	The student should be able 1. To read and write proofs for basic theorems involving fundamental tools of continuity and differentiability. 2. To analyse the problems and identify available techniques for solving them.
Paper VIII Operations Research	The student should be able 1. To analyze a problem and arrive at a mathematical formulation using which the problem can be tackled. 2. to understand the characteristics of different types of decision-making environments and the appropriate steps and tools to be used.