

Course Outcome

FOUR YEAR UNDERGRADUATE PROGRAMME (FYUGP)

Semester	Paper Name	Course Outcome
1st Semester	Classical Algebra	<p>This course will enable the students to:</p> <ul style="list-style-type: none"><input type="checkbox"/> Employ De Moivre's theorem in a number of applications to solve numerical problems.<input type="checkbox"/> Learn the basic concepts of exponential, logarithmic and hyperbolic functions of complex numbers.<input type="checkbox"/> Learn how to find the nature of the roots of a given polynomial equation by Descartes' rule, also learn about symmetric functions of the roots for cubic and biquadratic equations.<input type="checkbox"/> Learn how to solve cubic and biquadratic equations.<input type="checkbox"/> Recognize consistent and inconsistent systems of linear equations by the row echelon form of the augmented matrix. Finding inverse and rank of a matrix.
2nd Semester	Calculus	<p>The students who take this course will be able to:</p> <ul style="list-style-type: none"><input type="checkbox"/> Understand continuity and differentiability in terms of limits.<input type="checkbox"/> Describe asymptotic behaviour in terms of limits involving infinity.<input type="checkbox"/> Understand the importance of mean value theorems.
3rd Semester	Ordinary Differential Equations	<p>The course will enable the students to:</p> <ul style="list-style-type: none"><input type="checkbox"/> Learn basics of 1st order ordinary differential equations and 2nd order linear differential equations<input type="checkbox"/> Learn different techniques for solving the differential equation
4th Semester	Real analysis	<p>This course will enable the students to:</p> <ul style="list-style-type: none"><input type="checkbox"/> Understand many properties of the real line R, including completeness and Archimedean properties.

		<ul style="list-style-type: none"> <input type="checkbox"/> Learn to define sequences in terms of functions from N to a subset of R. <input type="checkbox"/> Recognize bounded, convergent, divergent, Cauchy and monotonic sequences and to calculate their limit superior, limit inferior, and the limit of a bounded sequence. <input type="checkbox"/> Apply limit comparison tests for convergence, the ratio, root, Raabe's, integral tests for convergence of an infinite series of real numbers. <input type="checkbox"/> Alternating series and absolute convergence of an infinite series of real numbers.
4th Semester	Complex Analysis (with practical)	<p>The completion of the course will enable the students to:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Learn the significance of differentiability of complex functions leading to the understanding of Cauchy–Riemann equations. <input type="checkbox"/> Learn some elementary functions and evaluate the contour integrals. <input type="checkbox"/> Understand the role of Cauchy–Goursat theorem and the Cauchy integral formula.
4th Semester	Analytical Geometry	<p>This course will enable the students to:</p> <ul style="list-style-type: none"> <input type="checkbox"/> transform coordinate systems <input type="checkbox"/> learn about pair of straight lines <input type="checkbox"/> have a clear understanding of the conic sections and related properties <input type="checkbox"/> recognise three dimensional surfaces represented by equations of the second degree <input type="checkbox"/> learn two different systems of coordinates which are very useful to define the position of a point in space <input type="checkbox"/> acquire basic concepts of Vector Algebra and understand the use of geometric view of vectors in Coordinate Geometry.
4th Semester	Number Theory	<p>On successful completion of the course students will be able to:</p> <ul style="list-style-type: none"> • Explain division algorithm, Euclid's algorithms and greatest common divisor. • Explain the concepts of congruences, linear congruences . • Explore the Chinese Remainder theorem to solve simultaneous linear congruences. • Explain Fermat's theorem and Wilson's theorem.

		<ul style="list-style-type: none"> • Solve a range of problems in number theory • Apply mathematical ideas and concepts within the context of number theory. • Communicate number theoretic techniques to a mathematical audience.
5th Semester	Abstract Algebra	<p>On successful completion of the course students will be able to:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Recognize the mathematical objects called group, ring and fields. <input type="checkbox"/> Link the fundamental concepts of groups and symmetries of geometrical objects. <input type="checkbox"/> Explain the significance of the notion of Permutation groups, cosets, cyclic groups, normal subgroups, factor groups. <input type="checkbox"/> Analyse consequences of Lagrange's theorem and Fermat's Little theorem. <input type="checkbox"/> Describe structure preserving mappings between groups and their consequences. <input type="checkbox"/> Describe the fundamental concepts in ring theory such as of the subrings, integral domains, ideals, factor rings and fields.
5th Semester	Multivariate Calculus	<p>This course will enable the students to:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Learn the conceptual variations when advancing in calculus from one variable to multivariable discussion. <input type="checkbox"/> Understand the maximization and minimization of multivariable functions subject to the given constraints on variables. <input type="checkbox"/> Learn about inter-relationship amongst the line integral, double and triple integral formulations. <input type="checkbox"/> Familiarize with Green's, Stokes' and Gauss divergence theorems
5th Semester	Theory of Real Functions	<p>This course will enable the students to:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Have a rigorous understanding of the concept of limit of a function. <input type="checkbox"/> Learn about continuity and uniform continuity of functions defined on intervals. <input type="checkbox"/> Understand geometrical properties of continuous functions on closed and bounded intervals. <input type="checkbox"/> Learn extensively about the concept of differentiability using limits, leading to a better understanding for applications. <input type="checkbox"/> Know about applications of mean value theorems and Taylor's theorem

5 th Semester	Numerical Analysis (with practical)	<p>The course will enable the students to:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Learn some numerical methods to find the zeroes of nonlinear functions of a single variable and solution of a system of linear equations, up to a certain given level of precision. <input type="checkbox"/> Know about iterative and non-iterative methods to solve system of linear equations <input type="checkbox"/> Know interpolation techniques to compute the values for a tabulated function at points not in the table. <input type="checkbox"/> Integrate a definite integral that cannot be done analytically <input type="checkbox"/> Find numerical differentiation of functional values <input type="checkbox"/> Solve differential equations that cannot be solved by analytical methods
6 th Semester	Linear Algebra	<p>This course will enable the students to:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Learn about linear spaces and their general properties, linear dependence and linear independence of vectors, bases and dimensions of vector spaces <input type="checkbox"/> Basic concepts of linear transformations, dimension theorem, matrix representations of linear transformations, and the change of coordinate matrix. <input type="checkbox"/> Compute the characteristic polynomial, eigenvalues, eigenvectors and eigenspaces, as well as the geometric and the algebraic multiplicities of an eigenvalue and apply the basic diagonalization result. <input type="checkbox"/> Compute inner products and determine orthogonality on vector spaces including Gram-Schmidt orthogonalization to obtain orthonormal basis.
6 th Semester	Partial Differential Equations (with practical)	<p>The course will enable the students to:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Formulate, classify and transform first order PDEs into canonical form. <input type="checkbox"/> Learn about method of characteristics and separation of variables to solve first order PDE's. <input type="checkbox"/> Classify and solve second order linear PDEs. <input type="checkbox"/> Learn about Cauchy problem for second order PDE and homogeneous and non-homogeneous wave equations. <input type="checkbox"/> Apply the method of separation of variables for solving many well-known second-order PDEs.

6th Semester	Metric Spaces	<p>The course will enable the students to:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Learn various natural and abstract formulations of distance on the sets of usual or unusual entities. Become aware one such formulations leading to metric spaces. <input type="checkbox"/> Analyse how a theory advances from a particular frame to a general frame. <input type="checkbox"/> Appreciate the mathematical understanding of various geometrical concepts, viz. Balls or connected sets etc. in an abstract setting. <input type="checkbox"/> Learn about the two important topological properties of metric spaces, namely connectedness and compactness.
6th Semester	Mechanics	<p>The course will enable the students to:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Know about the concepts in statics such as moments, couples, equilibrium in both two and three dimensions. <input type="checkbox"/> Understand the theory behind friction and centre of gravity. <input type="checkbox"/> Know about conservation of mechanical energy and work-energy equations. <input type="checkbox"/> Learn about translational and rotational motion of rigid bodies.