Course Outcomes
Program Name: FYUGP
Subject: Mathematics

Semester	Course Code	Paper's Name	Course Outcomes
1	MAT010104	Classical Algebra	The students who take this course will be able to: 1. Identify symmetric functions of the roots for cubic and biquadratic equations, solve cubic and biquadratic equations. 2. Recognize consistent and inconsistent systems of linear equations by the row echelon form of the augmented matrix and calculate the inverse and rank of a matrix. 3. Classify and compute Learn how to find the nature of the roots of a given polynomial equation by Descartes' rule 4. Express the basic concepts of exponential, logarithmic and hyperbolic functions of complex numbers. 5. Apply De Moivre's theorem in a number of applications to solve numerical problems.
2	MAT020104	Calculus	The students who take this course will be able to: 1. Describe asymptotic behavior in terms of limits involving infinity. 2. Recognize function of two variables and operate the partial derivatives. 3. Express continuity and differentiability in terms of limits. 4. Calculate integrations which can be solved by reduction formula 5. Use the mean value theorems
3	MAT030104	Ordinary Differential Equations	This course will enable the students to: 1. Identify 1s t order ordinary differential equations like exact first order differential equations, Bernoulli equations and rules of finding integrating factors of exact equations. 2. Recognize t he second order differential equations like homogenous equations with constant coefficients equations, non-homogenous equations and Cauchy-Euler equations 3. Solve first order and second order differential equations 4. Calculate Wronskian and show its properties. 5. Use the method of undetermined coefficients, variation of parameters.

4	MAT040104:	Real analysis	This course will enable the students to: 1. Identify the properties of the real line R, including completeness and Archimedean properties. 2. Define sequences in terms of functions from N to a subset of R. 3. Recognize bounded, convergent, divergent, Cauchy and monotonic sequences and to calculate their limit superior, limit inferior, and the limit of a bounded sequence. 4. Distinguish alternating series and infer absolute convergence of an infinite series of real numbers. 5. Apply limit comparison tests for convergence, the ratio, root, Raabe's, integral tests for convergence of an infinite series of real numbers.
	MAT040204:	Complex Analysis-I (with practical)	The course will enable the students to: 1. List some elementary functions and evaluate the contour integrals. 2. State Cauchy-Goursat theorem and the Cauchy integral formula 3. Discuss the differentiability of complex functions 4. Explain the concept of Cauchy-Riemann equations. 5. Apply Cauchy-Riemann equations, Cauchy-Goursat theorem and the Cauchy integral formula.
	MAT040304:	Analytical Geometry	The course will enable the students to: 1. Define Vector Algebra and represent the use of geometric view of vectors in Coordinate Geometry. 2. Recognize three dimensional surfaces represented by equations of the second degree 3. Change the coordinate systems 4. Explain pair of straight lines, conic sections and related properties 5. Express systems of coordinates which are very useful to define the position of a point in space
	MAT040404:	Number Theory-I	This course will enable the students to: 1. State Fermat's theorem and Wilson's theorem and use them to solve problems 2. Explain division algorithm, Euclid's algorithms , greatest common divisor, the concepts of congruences, linear congruences 3. Explore the Chinese Remainder theorem to solve simultaneous linear congruences. 4. Apply mathematical ideas and concepts within the context of number theory. 5. Summarize number theoretic techniques to a mathematical audience.

5	MAT050104:	Abstract Algebra	The course will enable the students to: 1. Recognize the mathematical objects called group, ring and fields. 2. Associate the fundamental concepts of groups and symmetries of geometrical objects. 3. Explain the significance of the notion of Permutation groups, cosets, cyclic groups, normal subgroups, factor groups. 4. Analyse consequences of Lagrange's theorem and Fermat's Little theorem. 5. Describe structure preserving mappings between groups and their consequences. 6. Describe the fundamental concepts in ring theory such as of the subrings, integral domains, ideals, factor rings and fields.
	MAT050204:	Multivariate Calculus	The course will enable the students to: 1. Identify the conceptual variations when advancing in calculus from one variable to multivariable discussion. 2. Describe the maximization and minimization of multivariable functions subject to the given constraints on variables. 3. Explain about the inter-relationship amongst the line integral, double and triple integral formulations. 4. Assess Green's, Stokes' and Gauss divergence theorems
	MAT050304:	Theory of Real Functions	This course will enable the students to: 1. Describe the concept of limit of a function. 2. Define differentiability using limits, leading to a better understanding for applications. 3. Explain the continuity and uniform continuity of functions defined on intervals. 4. Analyze geometrical properties of continuous functions on closed and bounded intervals. 5. Apply mean value theorems and Taylor's theorem
	MAT050404:	Numerical Analysis (with practical)	The course will enable the students to: 1. Apply numerical methods to find the zeroes of nonlinear functions of a single variable and solution of a system of linear equations, upto a certain given level of precision. 2. Compute the values for a tabulated function at points not in the table using interpolation techniques. 3. Measure a definite integral that cannot be done analytically 4. Estimate numerical differentiation of functional values 5. Solve differential equations that cannot be solved by analytical methods

6	MAT060104:	Linear Algebra	Completion of the course will enable the students to: 1. Define linear spaces and discuss their general properties, linear dependence and linear independence of vectors, bases and dimensions of vector spaces 2. Explain the basic concepts of linear transformations, dimension theorem, matrix representations of linear transformations, and the change of coordinate matrix. 3. 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. 4. Determine inner products and orthogonality on vector spaces. 5. Use Gram-Schmidt orthogonalization to obtain orthonormal basis.
	MAT060204:	Partial Differential Equations (with practical)	The course will enable the students to: 1. Formulate, classify and transform first order PDEs into canonical form. 2. Explain method of characteristics, separation of variables and solve first order PDE's. 3. Classify and solve second order linear PDEs. 4. Discuss Cauchy problem for second order PDE and homogeneous and non-homogeneous wave equations. 5. Apply the method of separation of variables for solving many well-known second-order PDEs.
	MAT060304:	Metric Spaces	The course will enable the students to: 1. Define various natural and abstract formulations of distance on the sets of usual or unusual entities. Become aware one such formulations leading to metric spaces. 2. Analyse how a theory advances from a particular frame to a general frame. 3. Construct the mathematical understanding of various geometrical concepts, viz. Balls or connected sets etc. in an abstract setting. 4. Develop the two important topological properties of metric spaces, namely connectedness and compactness
	MAT060404:	Mechanics	Apropos conclusion of the course will empower the student to: 1. Define the concepts in statics such as moments, couples, equilibrium in both two and three dimensions. 2. Explain the theory behind friction and center of gravity. 3. Formulate conservation of mechanical energy and work-energy equations. 4. Illustrate translational and rotational motion of rigid bodies.