

Department of Mathematics
(2020-2021)
GDC Paonta Sahib

Course learning outcomes

S.No.	Course Title	Course Code	Nature of Course and Year	Co's	Course Outcome
1	Differential Calculus	MATH 101TH	B.A/ B.SC 1st Year	CO1	Calculate the limit and examine the continuity of a function at point and different indeterminate forms of limit.
				CO2	Understand the consequences of various mean value theorems for differentiable function.
				CO3	Understand the concept of maximum and minimum behavior of function of two variables.
2	Differential Equations	MATH 102TH	B.A/ B.SC 1st Year	CO1	Find the complete solution of non homogeneous differential equations as a linear combination of complementary function and a particular solution.
				CO2	Learn various methods of getting exact solution of first order and higher order differential equations.
				CO3	Have a working knowledge of basic application problems of second order differential equation with constant coefficients.
3	Real Analysis	MATH 201TH	B.A/ B.SC 2nd Year	CO1	Recognize bounded, convergent, divergent, Cauchy's and Monotonic sequences and to calculate their limit superiors and inferior and limit of bounded sequence.
				CO2	Understand many properties of real line and learn to define sequence of real numbers.
				CO3	Apply the ratio test, alternating test and limit comparison test for convergence and absolute convergence of an infinite series of real numbers.
				CO4	Recognize the difference between point wise and uniform convergence of sequence of functions.
4	Algebra	MATH 202TH	B.A/ B.SC 2nd Year	CO1	Understand the basic concept of groups and their properties.
				CO2	Understand the importance of algebraic properties with regards to working within various number systems.
				CO3	Understand the fundamental concept of ring theory such as concept of ideals, quotient rings, integral domain and fields.
5	Logic and sets	MATH 307TH	B.A/ B.SC 2nd Year	CO1	Analyze logical proposition via truth table.
				CO2	Draw and interpret Venn diagrams of set relations and operations and use Venn diagram to solve the problems.
6	Analytical Geometry	MATH 308TH	B.A/ B.SC 2nd Year	CO1	Define the techniques for sketching parabola, ellipse and hyperbola.
				CO2	Understand the concept of classification of quadratic equations representing lines, parabola etc.
				CO3	Reorganized the concept of illustrations of graphing standard quadratic surfaces like cone, ellipsoid.
7	Integral Calculus	MATH 309TH	B.A/ B.SC 2nd Year	CO1	Understand the concept of integration of rational and irrational functions and properties of definite integral.
				CO2	Calculate the length of an arc of a curve when equation are given in parametric and polar form.
				CO3	Evaluate the area of surface of revolution.
				CO4	Determine the area and volume by applying the techniques of double and triple integral.
8	Vector Calculus	MATH 310TH	B.A/ B.SC 2nd Year	CO1	Memorize the definition of scalar and Vector product of three vectors, product of four vectors and reciprocal of vectors.
				CO2	Understand the concept of gradient divergence and curl of vectors.
				CO3	Understand the concept of Green's theorem to evaluate the line integral along simple closed contours on the plane.
				CO4	Apply gradient to solve problems involving normal vectors to level surfaces.
9	Boolean algebra	MATH 311TH	B.A/ B.SC 2nd Year	CO1	Define Definition, examples and basic properties of ordered sets and duality principle.
				CO2	Understand the concept of lattices as ordered sets, complete Lattices and lattices as algebraic structures.
				CO3	Recognize the concept of Boolean algebra and Boolean polynomials.
10	Number Theory	MATH 312TH	B.A/ B.SC 2nd Year	CO1	Define and interpret the concept of divisibility, congruency, prime and prime factorization.
				CO2	Explain lame's theorem, fundamental theorem of arithmetic.
				CO3	Understand the concept of dirichlet product, the mobius inversion formula and Euler's phi function.

11	Matrices	MATH 301TH	B.A/B.SC 3rd Year	CO1	Define matrices, types of matrices, invariance of rank under elementary transformations.
				CO2	Recognize the system of linear equations, identify the existence of solutions and if there are solution, solve the equations.
				CO3	Understand the concept of matrix form of basic geometric transformations.
12	Mechanics	MATH 302TH	B.A/B.SC 3rd Year	CO1	Have a deep understanding of Newton's Law's.
				CO2	Learn about the condition and of equilibrium of particle and of coplanar forces acting on a rigid body.
				CO3	State the laws of friction.
				CO4	Learn about the work and potential energy.
				CO5	Understand the concept of simple harmonic motion and projectile motion.
13	Linear Algebra	MATH 303TH	B.A/B.SC 3rd Year	CO1	Solve the systems of linear equations.
				CO2	Understand the concept of dual space, dual basis, Eigen values, and Eigen vectors.
				CO3	Recognize the concept of terms linear span, linear independence, dependence, basis and dimensions and apply these concepts to various vectors spaces and sub spaces.
				CO4	Use matrix algebra and related matrices to linear transformations.
				CO5	Understand the concept of isomorphism and use of the theorems based on isomorphism.
14	Numerical Methods	MATH 304TH	B.A/B.SC 3rd Year	CO1	Obtain the numerical solutions of algebraic and transcendental equations using an appropriate numerical method.
				CO2	Establish the limitations, advantages and disadvantage of numerical methods.
				CO3	Solve initial and boundary value problem in differential equations using numerical methods.
15	Complex Analysis	MATH 305TH	B.A/B.SC 3rd Year	CO1	Have deep knowledge of limit involving the point at infinity, continuity, properties of complex numbers.
				CO2	Recognize the concept of analytic functions, contours, contour integrals.
				CO3	State Cauchy's- Goursat theorem, Liouville's theorem's etc.
16	Linear Programming	MATH 306TH	B.A/B.SC 3rd Year	CO1	Describe graphical approach for solving some linear programs, theory of simplex method and their comparison.
				CO2	Explain duality, formulation of the dual problems primal-dual relationships and economic interpretation of the dual.
17	Probability and Statistics	MATH 313TH	B.A/B.SC 3rd Year	CO1	Recognize the role of probability theory.
				CO2	Define and illustrate the concept of sample space, events and compute the probability of events and use Baye's rule.
				CO3	Understand the concept of discrete and continuous random variable.
				CO4	Understand the use of various methods to compute the probability of events.
18	Mathematical finance	MATH 314TH	B.A/B.SC 3rd Year	CO1	Have deep knowledge of interest (simple and compound), time value of money, inflation, and internal rate of return (calculation by bisection and networks Raphson methods.)
				CO2	Understand the concept of bond prices, floating rate bonds and immunization.
19	Mathematical modeling	MATH 315TH	B.A/B.SC 3rd Year	CO1	Understand the concept of free damped motion, forced motion and resonance phenomena etc.
				CO2	Define the application to traffic flow. Conduction of heat in solid and conservation laws.
20	Theory of Equations	MATH 316TH	B.A/B.SC 3rd Year	CO1	Understand the concept of general properties and graphical representation of polynomials.
				CO2	Define symmetric function and applications of symmetric function of the roots.
				CO3	Understand the relation between roots and the coefficients of equation and solution of cubic and biquadrate equations with the help of Cardan's method and Descartes method.
21	Transportation and game theory	MATH 317TH	B.A/B.SC 3rd Year	CO1	Understand the transportation problem and its mathematical formulation.
				CO2	Define Vogel approximation method for determination of starting basic solution.
				CO3	Understand the concept of game theory involving formulation of the person zero sum games and games with mixed strategies.
22	Graph Theory	MATH 318TH	B.A/B.SC 3rd Year	CO1	Describe and demonstrate basic properties of graphs.
				CO2	Describe the concept of isomorphism of graphs, Hamiltonian cycles and weighted graph.

				CO3	Understand the concept of shortest path, dijkstra's algorithm and Floyd war shall algorithm.
23	Portfolio Optimization	MATH 319TH	Generic Elective B.A 3rd Year	CO1	Explain technical terminologies essential for the understanding of portfolio optimization including financial markets, investment objectives.
				CO2	Discriminate between different sources of risk and demonstrate the concepts of diversification.
				CO3	Demonstrate measure to evaluate a portfolio performance.
24	Queuing and Reliability Theory	MATH 320TH	Generic Elective B.A 3rd Year	CO1	The basic concept of queueing system.
				CO2	The basic of reliability, classes of distribution and reliability models.
				CO3	Reliability of a system and mean time before failure and hazard rate of exponential and weibull distributions.
25	Descriptive Statistics and Probability Theory	MATH 321TH	Generic Elective B.A 3rd Year	CO1	Acquaintance with various methods of collecting data and get familiar with some elementary methods of data viz Measures of central tendency, dispersion, Skewness and kurtosis and to interpret them.
				CO2	Understanding the concept of probability and to find probabilities of various events.
				CO3	Understanding the concept of correlation and regression, Karl Pearson coefficients of correlation and lines of regression.
				CO4	Organize, manage and present data.
26	Sample Surveys and Design of experiments	MATH 322TH	Generic Elective B.A 3rd Year	CO1	Understand the basic knowledge of complete enumeration and sample, sampling frame, sampling and non- sampling errors.
				CO2	Understand the basic terms used in design of experiments.
				CO3	Knowledge about comparing various sample techniques.
				CO4	Use appropriate experimental design to analyse the experimental data.