Rajgad Dnyanpeeth's

Anantrao Thopte College, Bhor

Department of Mathematics

After completing B.Sc (Mathematics) Programme students will be able to:

PO1: Explain the importance of mathematics and investigate the real-world problems and learn to how to apply mathematical ideas and models to those problems.

PO2: Reason mathematically and apply rigorous, analytic, highly numerate approach to analyze, execute tasks and solve problems in daily life and at work.

PO3: Recognize the power of abstraction and generalization, and to carry out investigative mathematical work with independent judgment.

PO4: Investigate and apply mathematical problems and solutions in a variety of contexts related to science, technology, business and industry, and illustrate these solutions using symbolic, numeric, or graphical methods

PO5: Identify the type and solve abstract mathematical problems and give geometrical interpretation of various concepts.

PO6: Recognize connections between different subjects in mathematics.

PO7: Develop an understanding of the underlying unifying structures of mathematics (sets, relations and functions, logical structure) and the relationships among them.

PO8: Conduct self-evaluation, and continuously enrich them through lifelong learning.

PO9: Communicate and interact effectively with different audiences and collaborate intellectually and creatively in diverse contexts, while emphasizing the importance of clarity and precision in communication and reasoning.

PO10: Formulate and analyze mathematical problems, precisely define the key terms, and draw clear and reasonable conclusions.

PSO1: Help the students to enhance their knowledge in soft skills and Computing skills.

PSO2: Enable the students to equip knowledge in various concepts involved in functions of single variable.

PSO3: Enable the students to equip knowledge in various concepts involved in Calculus and geometry.

F.Y. B Sc (Mathematics)

Course MT101: Algebra and Geometry (SEM - I)

After successfully completing this course, students will be able to:

CO1: Define the terms gcd, lcm, relation, equivalence relation, matrices, polynomial.

CO2: Describe the methods of solving Homogenous and Non-Homogenous system of linear equations and its solutions by Gauss elimination and Gauss Jordan method

CO3: Explain algebraic properties of integers, finding gcd by Euclidean Algorithm, supremum, infimum, solving problems using first principle of Mathematical induction and strong induction.

CO4: Solve the system of equations using matrices, matrices by using Cayley Hamilton theorem, addition and multiplication and finding gcd of of two polynomials

CO5: Calculate gcd of numbers, remainder using congruence properties

CO6: Use factor theorem, Remainder theorem to calculate remainder when one polynomial divides another polynomial.

Course MT101: Algebra and Geometry (SEM - II)

After successfully completing this course, students will be able to:

CO1: Define Conic, Translation, Rotation, Centre, dcs, drs, etc. by using basic concepts.

CO2: Explain the concepts of Geometry by using basic definitions.

CO3: Calculate shortest distance between skew lines, radius, centre of sphere and angle between planes and lines, cylinder, cone by using some formulae.

CO4: Reduce the general equation of conic to its standard form by using reduction formulae.

CO5: Determine the condition of tangency for the Sphere by using basic formulae.

CO6: Give diagrammatic representations of various concepts by sketching diagrams.

Course MT102: Calculus and Differential Equation (SEM - I)

After successfully completing this course, students will be able to:

CO1: Recall definitions of the topics in calculus

CO2: Recognize the definitions and concepts giving examples of calculus

CO3: Describe the concepts and solve simple examples of single variable functions

CO4: Solve tricky examples of of single variable functions

CO5: Illustrate concepts in calculus of a single variable

CO6: Classify and apply concepts of a single variable calculus

Course MT102: Calculus and Differential Equation (SEM - II)

After successfully completing this course, students will be able to:

CO1: Define the terms differential equation, order, degree, Bernoullis equation, self-orthogonal

CO2: Describe the methods of solving integration using partial fraction, substitution of trigonometric, logarithm, exponential functions and differential equations

problems using variable separable form, exact equations, homogenous, non-homogenous, etc.

CO3: Convert non exact differential equation to exact differential equation by finding integrating factor

CO4: Solve differential equation of first order and higher degree using method of solvable for p, solvable for x, solvable for y and lagranges equation and Cairauts equation

CO5: Explain reduction formula for trigonometric equation like cos n x

CO6: Use self-orthogonal method to find orthogonal trajectory for a curve of family.

Course MT103: Mathematics Practical

CO1: Calculate gcd of two numbers using Euclidean algorithm and perform reverse process., radius and centre of sphere using formula

CO2: Solve system of linear equations using gauss elimination and gauss Jordan method

CO3: Solve polynomial to find roots by using synthetic division.

CO4: Calculate remainder using congruence properties.

CO5: Calculate limit using definition derivative, integration using partial fraction, substitution of trigonometric, logarithm, exponential functions, differential equations variable separable form, exact equations, homogenous, non-homogenous, etc.

CO6: Determine the solution of first order and higher degree differential equation using method of solvable for p, solvable for x, solvable for y and lagranges equation and Cairauts equation

S. Y. B Sc (Mathematics)

Course MT211: Multivariable Calculus (Sem - I)

After successfully completing this course, students will be able to:

CO1: Recall the definitions of the topics in multivariable calculus.

CO2: Recognize all the definitions and concepts by giving examples of multivariable calculus.

CO3: Describe the concepts and solve simple examples of multivariable calculus by using basic definitions.

CO4: Solve tricky examples of multivariable calculus by usingcorrect methods

CO5: Illustrate theorems in multivariable calculus by using basic concepts and definitions.

CO6: Classify and apply concepts for solving problems in multivariable calculus by using correct method.

CO7: Analyze and draw diagrams for solving examples of multivariable calculus.

CO8: Choose appropriate method for solving examples in multiple integrals by using double or triple integrals.

Course MT212: Discrete Mathematics (Sem - I)

After successfully completing this course, students will be able to:

CO1: Recall basics of logics, permutations (arrangements), combinations(selections)

CO2: Define concepts as Proposition, Quantifier, its types universal and existential, Principle of Addition, Principle of multiplication

CO3: Describe the methods such as direct method and indirect method to check validity of Argument

CO4: Explain the truth values of Nested quantifier, Validity of arguments and provide counter examples where necessary

CO5: Apply the formula of Advanced counting technique to solve the problems

CO6: Solve the sums based on counting like arrangement and selections using repetition

and non-repetition

CO7: Classify the problems of arrangements and selections with repetitions and without repetitions

CO8: Explain the counting arrangements using Venn diagrams

Course MT213 : Practical based on MT211, MT212

CO1: Solve propositions by truth tables

CO2: Calculate limit continuity and differentiability of function in two variables

CO3: Discuss the validity of a proposition using direct and indirect method

CO4: Discuss the maxima and minima of functions

CO5: Solve examples such as finding intersection and union of two or more sets using inclusion exclusion principle

CO6: Calculate area and volume for function using double and triple integration

CO7: Classify the problems of arrangements and selections with repetitions and without repetitions

CO8: Draw level curves for various functions using graph such as $f(x,y) = X^2 + y^2$

Course MT221: Linear Algebra (Sem – II)

After successfully completing this course, students will be able to:

CO1: Recall the algebraic properties, commutative, associative laws etc of real numbers.

CO2: Define concepts as Vector Spaces, subspace, span, kernel, linearly dependent etc.

CO3: Describe spanning of vector space, inner product of vectors, linear transformation for set of vectors

CO4: Give counter examples for set not satisfying properties of subspace

CO5: Solve examples to find inverse of a linear transformation and check whether linear transformation is bijective or not.

CO6: Apply dimension theorem to find nullity and dimension of vector space.

CO7: Calculate coordinate vector, orthogonality, orthonormality, norm of vectors using formulas.

CO8: Explain Gram Schmidt process to convert basis to orthonormal basis

Course MT222: Numerical techniques (Sem – II)

After successfully completing this course, students will be able to:

CO1: Recall definitions and formulae of various numerical methods for finding roots of the equations, interpolation,

CO2: Define concepts as Aitken & #39;s D process

CO3: Describe methods of solving algebraic and non-algebraic equations

CO4: Give original examples for concepts in numerical methods

CO5: Solve the problems in Numerical methods

CO6: Apply theorem to find numerical solution

CO7: Calculate numerical integration

CO8: Explain concepts of numerical methods and evaluate problems

Course MT223 (Sem – II) : Practical based on MT221, MT222

After successfully completing this course, students will be able to:

CO1: List solutions of algebraic and transcendental equations

CO2: Discuss linear independence of a set

CO3: Solve examples by using interpolation formula

CO4: Solve examples of finding rank, nullity using dimension theorem

CO5: Solve the problems in Numerical methods

CO6: Solve differential equations using Euler’s method and Runge Kutta method

CO7: Calculate numerical integration

CO8: Calculate inner product, norm.