

**Chanda Shikshan Prasarak Mandal's
Janata Mahavidyalaya, Chandrapur
Learning Outcomes for Mathematics Undergraduate**

(B.Sc. with Mathematics as one subject)

On successful completion of B.Sc. with Mathematics as one subject, graduates will be able to-

PSO1: Identify, formulate and analyze complex problems and reach to Substantiated conclusions by using principles of mathematical science.

PSO2: Understand complete mathematical texts.

PSO3: Develop logical and critical thinking, research aptitude and reasoning ability.

PSO4: Recognize and differentiate among diverse cultures through the history of mathematics and develop cultural competency.

PSO5: Demonstrate the ability to apply analytical and theoretical skills to solve mathematical problems.

COURSE CONTENT

Code USMT-O1	Contents: Differential and Integral calculus.
Code USMT-O2	contents: Differential calculus and Trigonometry
Code USMT-O3	Contents: Ordinary Differential Equations and Difference Equations
Code USMT-O4	Contents: Partial Differential Equations
Semester III	Paper I: Real Analysis Paper II: Set Theory and Laplace Transform
Semester IV	Paper I: Algebra Paper II: Elementary Number Theory
Semester V	Paper I: Linear Algebra Paper II: Special Relativity-I
Semester VI	Paper I: Analysis Paper II: Special Relativity-II

COURSE OUTCOMES

Semester I Paper I Code: USMT-01

content: Differential and Integral calculus

After completion of this course students will be able to-

CO1: Evaluate limit of functions of one variable algebraically.

CO2: Check the continuity of function of one variable.

CO3: Differentiate various types functions using differentiate rules: Power, Difference product, Quotient rules, Successive Differentiation.

CO4: Change the order of integration.

CO5: Find nth root of complex number.

Semester I paper II Code2: USMT-02

Contents: Differential calculus and Trigonometry

After completion of this course students will be able to -

CO1: Evaluate limit of function of two variables algebraically.

CO2: Check the continuity of function of two variables.

CO3: Trace curve in Cartesian form.

CO4: Find radius of curvature at any point (x, y) .

CO5: Find logarithm of complex quantity.

Semester II paper I Code: USMT-03

Contents: ordinary differential Equation and difference equation

After completion of this course students will be able to -

CO1: Solve problems based on first order exact differential equation.

CO2: Solve problems based on first order, higher degree equations solvable for x, y, p, q .

CO3: Solve linear equation with variable coefficient.

CO4: Find wronskian.

CO5: Form Difference equation and solve linear difference equation.

Semester I Code: USMT-04

Contents: Partial Differential Equation

After completion of this course students will be able to -

- CO1:** Solve linear partial differential equation of first order.
- CO2:** Form partial differential equation by eliminating arbitrary constants.
- CO3:** Solve homogeneous partial differential equation with constant coefficients.
- CO4:** Solve non-homogeneous linear partial differential equation.

Semester III

Paper I

Contents: Real Analysis

After completion of this course students will be able to -

- CO1:** Evaluate various problems based on limit of sequence.
- CO2:** Test the convergence of series.
- CO3:** Solve problems based on metric space, sets.
- CO4:** Define Riemann Integral and solve the problems based on it.
- CO5:** Prove fundamental theorem of Integral calculus.

Semester III

Paper II

Contents: Set Theory and Laplace Transform

After completion of this course students will be able to-

- CO1:** Solve problems based on sets and relations.
- CO2:** Evaluate examples of fuzzy set by using operations: Intersections, union, by complement of fuzzy set.
- CO3:** Find the Laplace Transformation of a function using definition and by use of table.
- CO4:** Find Inverse Laplace Transformation.
- CO5:** Solve linear differential equation with constant coefficients using Laplace transformation.

Semester IV Paper I Contents: Algebra

After completion of this course students will be able to:

CO1: Define group, subgroup, cyclic group, permutation group.

CO2: Solve problems based on groups, subgroups, coset and normal subgroup.

CO3: Solve problems based on homomorphism, isomorphism of group.

CO4: Define ring and properties of ring, subring, integral domain and field.

Semester IV Paper II Contents: Elementary Number Theory

After completion of this course students are will be able to-

CO1: Solve problems based on divisibility.

CO2: Solve fundamental theorems of arithmetic.

CO3: Define congruence and properties of congruence.

CO4: Define arithmetic function, mobius function.

Semester V Paper I Contents: Linear Algebra

After completion of this course students will be able to -

CO1: Define analytic function, harmonic function, mobius transformation, cross ratio and solve problems based on it.

CO2: Define vector space, linear span, linear independence and their basic properties and solve problems based on it.

CO3: Solve problems based on rank nullity theorem and linear transformation.

CO4: Define Inner Product and solve problems based on it.

CO5: Solve problems by using Gram-Schmidt orthogonalisation process.

Semester V Paper II Contents: Special Relativity

After completion of this course students will be able to:

- CO1:** Understand basic ideas involved in theory of relativity.
- CO2:** Derive and geometrically interpret Lorentz transformation.
- CO3:** Derive transformation equation of velocity, acceleration, Lorentz contraction factor.
- CO4:** Derive Lorentz transformation in index form.
- CO5:** Define time like, space like, light like intervals, proper time, and world line of particle.

Semester VI Paper I Contents: Analysis

After completion of this course students will be able to -

- CO1:** Solve problems based on metric space and sets.
- CO2:** Define Riemann Integral and solve problems based on it.
- CO3:** Prove fundamental theorem of integral calculus.
- CO4:** Find singularity.
- CO5:** Find Fourier series.

Semester VI Paper II Contents: Special Relativity

After completion of this course students will be able to-

- CO1:** Derive transformation equation of mass, charge density, current density.
- CO2:** Express Maxwell's equations in tensor form.
- CO3:** Understand basic ideas involved in theory of relativity.