

**PDE's Annasaheb Waghire College of Arts Science and Commerce, Otur
Tal. Junnar, Pune**

DEPARTMENT OF MATHEMATICS

B.Sc. MATHEMATICS PROGRAMME

PROGRAMME OUTCOMES

After completing F. Y. B. Sc. And S.Y.B.Sc. (Mathematics) Programme students will be able to:

OBJECTIVES OF THE PROGRAM:

- 1) To prepare the learners, who will understand and apply the basic as well as advanced principles of mathematics for solving problems from science with an emphasis on applications.
- 2) To produce the learners who are well-grounded in the fundamentals of mathematics with the acquisition of the necessary skills, tools, and techniques required in many applications areas.
- 3) To develop an ability to study the conceptual problem and critically analyze and also promote the use of mathematics in industry and applied sciences.
- 4) To provide exposure and motivate students for research in current trends of mathematics.

PROGRAM OUTCOMES (PO's):

After successful completion of this program, students will be able to

PO1: enhance their logical thinking and apply advanced mathematical concepts to solve complex problems.

PO2: formulate research questions, design experiments or investigations, collect and analyze data and present their findings in a clear and coherent manner.

PO3: apply advanced mathematical techniques or tools to analyze and solve challenging problems encountered in mathematics and related fields.

PO4: formulate mathematical models that represent real-world phenomena, analyze the models using mathematical methods and interpret the results to make informed decisions or predictions.

PO5: develop proficiency in utilizing computational tools, software and programming languages to aid in mathematical analysis, numerical simulations and data visualization.

PO6: present complex mathematical concepts, proofs and research findings to both technical and non-technical audiences.

PO7: develop a strong foundation for professional growth and lifelong learning in Mathematics. 8. Acquire lifelong learning skills which will lead important to better opportunities and improve quality of life.

PO8: gain knowledge with the holistic and multidisciplinary approach across the fields.

PO9: analyzing the results critically and applying acquired knowledge to solve the problems. 11. Be independent innovations and published it through research papers and projects.

PROGRAM SPECIFIC OUTCOMES (PSO's):

The student will

PSO1: have a strong foundation for being research in mathematics.

PSO2: be able to apply mathematical skills for solving problems.

PSO3: at least basic knowledge of programming and computational techniques as required for employment.

PSO4: capable to analyze the results critically and apply acquired knowledge to solve the problems.

PSO5: have at least four different skills and capable to think and communicate in three different languages.

PSO6: be able prepare the models for real life problems.

COURSE OUTCOMES

F.Y.B.Sc. as per NEP-2020

Subject: Mathematics Semester -I

MTS 101-Algebra and Calculus-I

Course type: Theory

No. of Credits:02

Course Outcomes: The student will able

CO1: To understand the concept of Well Ordering Principle and Principle of Mathematical

Induction (First Principle) , Divisibility in integers($\mathbb{Z}$) –elementary properties, Division algorithm, Greatest Common Divisor(GCD),Least Common Multiple (LCM) of integers, basic properties of GCD, Euclidean Algorithm, relatively prime integers. Prime numbers- Definition, fundamental

theorem of Arithmetic, Euclid's lemma, Theory of Congruence's, basic properties, Fermat's theorem, Euler's phi function, Euler's theorem.

CO2: To understand the method of finding roots of polynomials and relationship between roots and coefficients of a polynomial.

CO3: To classify real numbers and recognize various properties of real numbers.

CO4: To understand the concept of limit and continuity. To draw the graphs of algebraic and transcendental functions considering limits and continuity. To apply the concept of limit and continuity for advanced study of different mathematics courses, and in physical, chemical and biological sciences.

SEC-101 MTS: Python-I

Course type: SEC

No. of Credits:02

Course Outcomes: The student will able

CO1: To write python programs and develop a small application. To develop logic for problem solving.

CO2: To be familiar about the basic constructs of programming such as data, operations, conditions, loops, functions etc.

CO3: To be familiar with string and its operation.

CO4: To develop basic concepts of Function and terminology. To determine the methods to create and develop Python programs by utilizing the data structures like lists and tuples.

Semester -II

MTS-151: Algebra and Calculus-II

Course type: Theory

No. of Credits: 02

Course Outcomes: The successful completion of these course students will able to:

CO1: To understand the concept of the various types of matrices, their properties, and how to convert matrices to echelon form using elementary row operations. Learn methods to solve systems of linear equations.

CO2: To understand the concept of determinants, evaluate determinants by different methods, and solve problems using properties of determinants. To Apply the concept of matrices and determinant to the problems in chemistry, electronics, cryptography, etc.

CO3: To Understand the concept of differentiation and fundamental theorem in differentiation.

CO4: To Apply Mean Value Theorems and its applications. Explore the combined application of algebra and calculus to various mathematical problems.

SEC-151 MTS Python-II

Course type: SEC, No. of Credits:02(P)

Course Outcomes:

CO1: To write python program and develop maps using dictionary.

CO2: To develop logic for 2D graphics.

CO3: To Demonstrate the use of Python in mathematics such as matrix algebra. To write Python programs to handle matrices and vectors using NumPy.

CO4: To be familiar about basic math built in functions such as sine, cosine, etc.

CO5: To be familiar with complex numbers.

OE-101 MTS: Basic Mathematics-I

Course type: OE(T) No. ofCredits:02

Course Outcomes: The student will able

CO1: To understand the concepts of numbers and integers and able to develop skills in basic operations of integers to cultivate the right understanding and regain numerical aptitude. To understand concepts of H.C.F. and L.C.M. of numbers, square root and cube Root and ability to apply in real world problems.

CO2: To understand concepts of ratio, proportion, percentage and be able to cultivate the right understanding regaining numerical aptitude.

CO3: To understand concepts of average,

CO4: To know profit and loss develop a logical approach to ward analytical approach to real world problems. To provide a platform for the students to build the fundamentals of Basic Mathematics for competitive examination preparation strategy.

OE-151 MTS: Basic Mathematics-II**Course type: OE (T)****No. of Credits:02****Course Outcomes:** The student be will able

CO1: To understand the concepts of Time, Work and Wages also be able to logical approach towards analytical approach data of real word problem.

CO2: To understand concepts of Linear Equations and ability to solve examples in finding Age in past and future.

CO3: To understand concepts of Simple and Compound Interest and to develop Mathematical Competence.

CO4: To understand concepts of Mensuration and able to develop Mathematical competence in solving Problems. To provide a platform for the students to build the fundamentals of Basic Mathematics for competitive examination preparation strategy. To establish a framework for the students to help acquire the knowledge and expertise necessary to secure employment opportunities in the government sector.

PROGRAMME OUTCOMES

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

Semester-III**[Minor Subjects] MTS-241MN: (A) Mathematics for Physical Science-I****Course type: Minor No. of Credits:02(T)****Course Outcomes:**

Students will able to

CO1: Demonstrate a clear understanding of functions of several variables and apply partial differentiation techniques to solve multivariable problems. Analyze and distinguish between exact and in exact differentials and apply the chain rule and total derivative sin changing variables.

CO2: Perform operations with vectors, including addition, scalar multiplication, and determination of magnitudes and angles between vectors. Solve geometric problems using vector methods, including finding equations and distances related to lines, planes, and spheres.

CO3: Apply differentiation and integration techniques to vector functions and interpret physical problems involving vector fields.

CO4: Evaluate and apply vector calculus operator's gradient, divergence, and curl and use related vector identities in solving applied mathematical problems.

Semester-II

[Minor Subjects] MTS-291MN: (A) Mathematics for Physical Science-II Course type: Minor No. of Credits: 02(T)

Course Outcomes:

Students will able to

CO1: Understand and classify different types of first order differential equations and solve them using appropriate analytical techniques such as separable, linear, exact, and homogeneous methods. Apply integrating factors and solve real-world problems modeled by first-order differential equations, including applications in electrical circuits and population dynamics.

CO2: Analyze and solve second-order linear differential equations with constant coefficients, and determine their general solutions. Interpret and model physical systems such as un damped and damped harmonic oscillators using second-order differential equations.

CO3: Solve initial value problems numerically using Euler's method, Modified Euler's method, and Runge-Kutta methods. Demonstrate the ability to choose and apply suitable analytical or numerical methods for solving differential equations in applied contexts.