

**Prabhakar Patil Education Society's,  
Arts, Commerce & Science College,  
Veshvi-Alibag-Raigad.**



**DEPARTMENT OF MATHEMATICS**

**Program Outcomes**

- Formulate and analyze mathematical and statistical problems, precisely define the key terms, and draw clear and reasonable conclusions.
- Read, understand and construct correct mathematical and statistical proofs and use the library and electronic databases to locate information on mathematical problems.
- Explain the importance of mathematics and its techniques to solve real life problems and provide the limitations of such techniques and the validity of the results
- Enabling students to develop positive attitude towards mathematics as an interesting and valuable subject
- Enhancing students overall development and to equip them with mathematical modeling, abilities, problem solving skills, creative talent and power of communication.
- Acquire good knowledge and understanding in advanced areas of mathematics and statistics.
- Enabling students to develop positive attitude towards mathematics as an interesting and valuable subject
- Enhancing students overall development and to equip them with mathematical modeling, abilities, problem solving skills, creative talent and power of communication.
- Acquire good knowledge and understanding in advanced areas of mathematics and physics.

**Program Specific Outcomes**

- Demonstrate basic manipulative skills in algebra, geometry, trigonometry, and beginning calculus.
- Apply the underlying unifying structures of mathematics (i.e. sets, relations and functions, logical structure) and the relationships among them
- Demonstrate proficiency in writing proofs.
- Communicate mathematical ideas both orally and in writing.
- Understand the concept of a function.
- Apply Algebraic Techniques.
- Recalling the concepts of mathematics and applying them to the various courses like algebra, analysis, Differential equations, statistics, etc to form mathematical models.
- Apply Mathematics to interdisciplinary ways like statistician, mathematical finance, industry expertise and interpret quantitative ideas.

## Course Outcomes

### F.Y.Bsc

#### Calculus-I and II:

- State the properties of real numbers.
- Apply properties of real numbers to prove some inequalities.
- Define a sequence and classify different types of sequence.
- State and apply properties of convergence and divergence to sequences
- Define limit, continuity and differentiability of real valued function
- State and prove algebra of limits, continuous functions and differentiability.
- Construct discontinuous function to continuous function
- Apply continuous function State and prove algebra of limits, continuous functions and differentiability.
- Apply differentiation to graph of function functions, L-Hospital Rule, higher derivative and Taylors Expansion.

#### Algebra-I and Discrete Mathematics

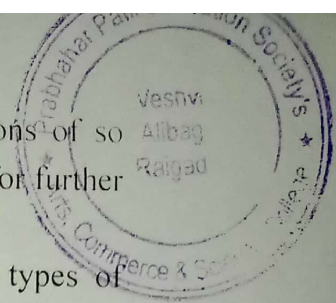
- Define logic statements.
- Identify and apply various properties relating to the integers.
- Apply different methods of proof to verify mathematical assertions.
- Apply Fundamental theorem of algebra for finding roots of given polynomial.
- Solve counting problems involving the multiplication rule, permutations, and combinations (with and without replacement).
- Apply the Addition Rule and the Principle of Inclusion and Exclusion.
- Apply the Binomial and Multinomial Theorem.
- Apply the Pigeonhole Principle.
- Solve problems using counting techniques and combinatorics.

### S.Y.Bsc

- Calculus (Sem III) & Multivariable Calculus I(Sem IV): This course gives introduction to basic concepts of Analysis with rigor and prepares students to study further courses in Analysis. Formal proofs are given lot of emphasis in this course which also enhances understanding of the subject of Mathematics as a whole.
- Linear Algebra I ( Sem III) & Linear Algebra II (Sem IV): This course gives expositions to system of linear equations and matrices, Vector spaces, Basis and dimension, Linear Transformation, Inner product space, Eigen values and eigenvectors.

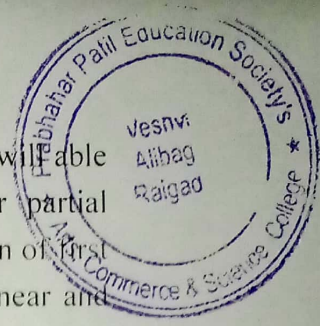


- Ordinary Differential Equations ( Sem III) prepares learner to get solutions of so many kinds of problems in all subjects of Science and also prepares learner for further studies of differential equations and related fields.
- Numerical Methods and Statistical Methods: Lerner will learn different types of Numerical methods and statistical methods to apply in different fields of Mathematics.



## T.Y.Bsc

- Multivariable Calculus II (Sem V): In this course students will learn the basic ideas, tools and techniques of integral calculus and use them to solve problems from real-life applications including science and engineering problems involving areas, volumes, centroid, Moments of mass and center of mass Moments of inertia. Examine vector fields and define and evaluate line integrals using the Fundamental Theorem of Line Integrals and Green's Theorem; compute arc length.
- Complex Analysis (Sem VI): Students Analyze sequences and series of analytic functions and types of convergence, Students will also be able to evaluate complex contour integrals directly and by the fundamental theorem, apply the Cauchy integral theorem in its various versions, and the Cauchy integral formula, they will also be able to represent functions as Taylor, power and Laurent series, classify singularities and poles, find residues and evaluate complex integrals using the residue theorem.
- Group Theory, Ring Theory (Sem V, Sem VI) Students will have a working knowledge of important mathematical concepts in abstract algebra such as definition of a group, order of a finite group and order of an element, rings, Euclidean domain, Principal ideal domain and Unique factorization domain. Students will also understand the connection and transition between previously studied mathematics and more advanced mathematics. The students will actively participate in the transition of important concepts such homomorphisms & isomorphisms from discrete mathematics to advanced abstract mathematics.
- Topology of metric spaces (Sem V), Topology of metric spaces and real analysis (Sem VI): This course introduces students to the idea of metric spaces. It extends the ideas of open sets, closed sets and continuity to the more general setting of metric spaces along with concepts such as compactness and connectedness. Convergence concepts of sequences and series of functions, power series are also dealt with. Formal proofs are given a lot of emphasis in this course. This course serves as a foundation to advanced courses in analysis. Apart from understanding the concepts introduced, the treatment of this course will enable the learner to explain their reasoning about analysis with clarity and rigour.



- Partial Differential equations (Sem V: Paper IV: Elective A): a. Students will be able to understand the various analytical methods for solving first order partial differential equations. b. Students will be able to understand the classification of first order partial differential equations. c. Students will be able to grasp the linear and non linear partial differential equations.
- Integral Transforms (Sem VI: Paper IV- Elective A): a. Students will be able to understand the concept of integral transforms and their corresponding inversion techniques. b. Students will be able to understand the various applications of integral transforms.

*Amheer*

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