

Mathematics

SEMESTER-I

Year I Course Code: 21BSC1C1MATIL

Course Title: Algebra - I and Calculus – I

Course Outcomes:-

This course will enable the students to

- Learn to solve system of linear equations.
- Solve the system of homogeneous and non-homogeneous linear of m equations in n variables by using concept of rank of matrix, finding eigen values and eigen vectors.
- Sketch curves in Cartesian, polar and pedal equations
- Students will be familiar with the techniques of integration and differentiation of function with real variables.
- Identify and apply the intermediate value theorems and L' Hospital rule.

Course Title: Practical's on Algebra - I and Calculus – I

Course Outcomes :

This course will enable the students to


- Learn Free and Open Source Software (FOSS) tools for computer programming Solve problem on algebra and calculus theory studied in MATDSCT 1.1 by using FOSS software. Acquire knowledge of applications of algebra and calculus through FOSS Practical/Lab Work to be performed in Computer Lab (FOSS)
- Suggested Software's: Maxima/Scilab/Maple/MatLab/Mathematica/Phython/R


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SEMESTER-II

Year I Course Code: 21BSC1C1MAT1L

Course Title: Algebra - II and Calculus –II

Course Outcomes:-

This course will enable the students to

- Recognize the mathematical objects called Groups.
- Link the fundamental concepts of groups and symmetries of geometrical objects.
- Explain the significance of the notions of Cosets, normal subgroups and factor groups.
- Understand the concept of differentiation and fundamental theorems in differentiation and various rules.
- Find the extreme values of functions of two variables.

Year I Course Code: 21BSC1C1MAT1P

Course Title: Practical's on Algebra - II and Calculus –II

Course Outcomes:-

This course will enable the students to

- Learn Free and Open Source Software (FOSS) tools for computer programming
 - Solve problem on algebra and calculus by using FOSS software's.
 - Acquire knowledge of applications of algebra and calculus through FOSS
- Practical/Lab Work to be performed in Computer Lab Suggested Software's:
Maxima/Scilab/Maple/MatLab/Mathematica/Phython/R.

SEMESTER-III

Year II Course Code: 21BSC3C3MAT1L

Course Title: Ordinary Differential Equations and Real Analysis – I

Course Outcomes :-

Course Learning Outcomes: This course will enable the students to:

- Solve first-order non-linear differential equations and linear differential equations.
- To model problems in nature using Ordinary Differential Equations.
- Formulate differential equations for various mathematical models
- Apply these techniques to solve and analyze various mathematical models.
- Understand the fundamental properties of the real numbers that lead to define sequence and series, the formal development of real analysis.
- Learn the concept of Convergence and Divergence of a sequence.
- Able to handle and understand limits and their use in sequences, series, differentiation, and integration.
- Apply the ratio, root, alternating series, and limit comparison tests for convergence and absolute convergence of an infinite series.

Year II Course Code: 21BSC3C3MAT1P

Course Title: Practicals on Ordinary Differential Equations and Real Analysis – I.

Course Outcomes

Course Learning Outcomes: This course will enable the students to gain hands on experience of

- Free and Open Source software (FOSS) tools or computer programming.
- Solving exact differential equations
- Plotting orthogonal trajectories
- Finding complementary function and particular integral of linear and homogeneous differential equations.
- Acquire knowledge of applications of real analysis and differential equations.
- Verification of convergence/divergence of different types of series .

SEMESTER-V

Year III Course Code: 21BSC5C5MATMJ1L

Course Title: 5.1 Real Analysis-II and Complex Analysis

Course Outcomes

Course Learning Outcomes: The overall expectation from this course is that the student builds a basic understanding on Riemann integration and elementary complex analysis. The broader course outcomes are listed as follow. At the end of this course, the student will be able to:

- Carry out certain computations such as computing upper and lower Riemann sums as well integrals.
- Describe various criteria for Integrability of functions.
- Exhibit certain properties of mathematical objects such as integrable functions, analytic functions, harmonic functions and soon.
- ProvesomestatementrelatedtoRiemannintegrationaswellasincomplexanalysis.
- Carry out the existing algorithms to construct mathematical structures such as analytic functions.
- Applies the gained knowledge to solve various other problems.

Year III Course Code:21BSC5C5MATMJ1P

Course Title: 5.1 Practical's on Real Analysis-II and Complex Analysis

Course Outcomes

Course Learning Outcomes: This course will enable the students to:

- Learn Free and Open-Source Software (FOSS) tools for computer programming.
- Solve problem on Real Analysis and Complex Analysis studied in MAT DSCT 5.1 by using FOSS software's.
- Acquire knowledge of applications of Real Analysis and Complex Analysis through FOSS.

SEMESTER-V

Year III Course Code:21BSC5C5MATMJ2L

Course Title: 5.2 Vector Calculus and Analytical Geometry

Course Outcomes

Course Learning Outcomes: This course will enable the students to:

- Get introduced to the fundamentals of vector differential and integral calculus.
- Get familiar with the various differential operators and their properties.
- Get acquainted with the various techniques of vector integration.
- Learn the applications of vector calculus.
- Recollect the fundamentals of Analytical Geometry in 3D.
- Interpret the geometrical aspects of planes and lines in 3D.

Year III Course Code:21BSC5C5MATMJ2P

Course Title: 5.2 Practical's on Analytical Geometry and Vector Calculus

Course Outcomes

Course Learning Outcomes: This course will enable the students to:

- Learn Free and Open-Source Software (FOSS) tools for computer programming.
- Solve problem on Analytical Geometry and Vector Calculus studied in MAT DSCT 5.2 by using FOSS software's.

SEMESTER-VI

Year III Course Code:21BSC6C6MATMJ1L

Course Title: 6.1 Linear Algebra

Course Outcomes

Course Learning Outcomes: The overall expectation from this course is that the student will build a basic understanding in few areas of linear algebra such as vectors spaces, linear transformations. Some broader course outcomes are listed as follows. At the end of this course, the student will be able to

- Understand the concepts of Vector spaces, subspaces, bases dimension and their properties.
- Become familiar with the concepts of Eigen values and Eigen vectors, linear transformations etc.
- Prove various statements in the context of vectors spaces.

Year III Course Code:21BSC6C6MATMJ1P

Course Title: 6.1 Practical's on Linear Algebra

Course Outcomes

Course Learning Outcomes: This course will enable the students to:

- Learn Free and Open-Source Software (FOSS) tools for computer programming.
- Solve problem on Linear Algebra studied in MAT DSCT 6.1 by using FOSS softwares.
- Acquire knowledge of applications of Linear Algebra through FOSS.


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Year III Course Code: 21BSC6C6MATMJ2L

Course Title: 6.2 Numerical Analysis

Course Outcomes

Course Learning Outcomes: The overall expectation from this course is that the student will get equipped with certain numerical techniques for various computations such as finding roots, finding the integrals and derivatives, and finding solutions to differential equations. Some broader course outcomes are listed as follows. At the end of this course, the student will be able to

- Describe various operators arising in numerical analysis such as difference operators, shift operators and so on.
- Articulate the rationale behind various techniques of numerical analysis such as in finding roots, integrals and derivatives.
- Reproduce the existing algorithms for various tasks as mentioned previously in numerical analysis. • Apply the rules of calculus and other areas of mathematics in justifying the techniques of numerical analysis.
- Solve problems using suitable numerical technique.
- Appreciate the profound applicability of techniques of numerical analysis in solving real life problems and also appreciate the way the techniques are modified to improve the accuracy

Year III Course Code: 21BSC6C6MATMJ2P

Course Title: 6.2 Practical's on Numerical Analysis

Course Outcomes

Course Learning Outcomes: This course will enable the students to:

- Learn Free and Open-Source Software(FOSS) tools for computer programming.
- Solve problem on numerical Analysis studied in MAT DSC T 6.2 by using FOSS software's.
- Acquire knowledge of applications of numerical Analysis through FOSS.

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PROGRAM OUTCOMES:-

1. **Disciplinary Knowledge:** Bachelor degree in Mathematics is the culmination of in-depth knowledge of Algebra, Calculus, Geometry, mathematics. This also leads to study the related areas such as computer science and other allied subjects.

2. **Communication Skills:** Ability to communicate various mathematical concepts effectively using examples and their geometrical visualization. The skills and knowledge gained in this program will lead to the proficiency in analytical reasoning which can be used for modelling and solving of real-life problems.

3. **Critical thinking and analytical reasoning:** The students undergoing this programme acquire ability of critical thinking and logical reasoning and capability of recognizing and distinguishing the various aspects of real life problems.

4. **Problem Solving:** The Mathematical knowledge gained by the students through this programme develop an ability to analyze the problems, identify and define appropriate computing requirements for its solutions. This programme enhances students overall development and also equip them with mathematical modelling ability, problem solving skills.

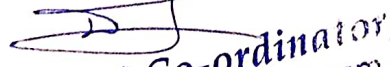
5. **Research related skills:** The completing this programme develop the capability of inquiring about appropriate questions relating to the Mathematical concepts in different areas of Mathematics.

6. **Information/digital Literacy:** The completion of this programme will enable the learner to use appropriate software's to solve system of algebraic equation and differential equations.

7. **Self-directed learning:** The student completing this program will develop an ability of working independently and to make an in-depth study of various notions of Mathematics.


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8. Moral and ethical awareness/reasoning: The student completing this program will develop an ability to identify unethical behavior such as fabrication, falsification or misinterpretation of data and adopting objectives, unbiased and truthful actions in all aspects of life in general and Mathematical studies in particular.

9. Lifelong learning: This programme provides self-directed learning and lifelong learning skills. This programme helps the learner to think independently and develop algorithms and computational skills for solving real word problems.

10. Ability to peruse advanced studies and research in pure and applied Mathematical sciences.



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