

**ST. JOSEPH'S COLLEGE (AUTONOMOUS),
BENGALURU**

Syllabus for B. A/B.Sc. (Honors) Mathematics

Name of the Degree Program : B.A./B.Sc.

Discipline Course : Mathematics

Starting Year of Implementation: 2021-22

SEMESTER – I

Mathematics Open Elective-1

(For students who have not chosen Mathematics as one of Core subjects)

Pre-requisite :12th Std/PUC Mathematics

MATOET 1.1(A): Mathematics - I	
Teaching Hours: 3 Hours/Week	Credits: 3
Total Teaching Hours: 42 Hours	Max. Marks: 100 (S.A.-70 + I.A. -30)

Course Learning Outcomes: This course will enable the students to

- Learn to solve system of linear equations.
- Solve the system of homogeneous and non-homogeneous m linear equations by using the concept of rank of matrix, finding eigenvalues and eigenvectors.
- Students will be familiar with the techniques of differentiation of function with real variables.
- Identify and apply the intermediate value theorems and L'Hospital's rule.
- Learn to evaluate integrals, find arc-lengths, areas and volume

Unit-I: Matrices- Recapitulation of Symmetric and Skew Symmetric matrices, Algebra of Matrices; Row and column reduction to Echelon form. Rank of a matrix; Finding rank of a matrix by reducing to row reduced echelon form and normal form; Solution of system of linear equations; Criteria for existence of non-trivial solutions of homogeneous system of linear equations. Solution of non-homogeneous system of linear equations. Eigenvalues and Eigen vectors of square matrices, Cayley- Hamilton theorem (Without Proof), inverse of matrices by Cayley-Hamilton theorem.

14 Hours

Unit-II: Differential Calculus - Limits, Continuity, Differentiability and properties. Intermediate value theorem (statement only with examples), Rolle's Theorem (statement only with examples), Lagrange's Mean Value theorem (statement only with examples), Cauchy's Mean value theorem (statement only with examples) and examples. Taylor's theorem (without proof), Maclaurian's series and L'Hospital's rule-problems.

14 Hours

Unit-III: Integral Calculus- Recapitulation of Definite integrals and its properties. Computation of length of arc, area of plane curves, surface area and volume of revolution in Cartesian form.

14 Hours

Reference Books:

1. University Algebra - N.S. Gopala Krishnan, New Age International (P) Limited
2. Theory of Matrices - B S Vatsa, New Age International Publishers.
3. Matrices – A. R. Vasista, Krishna Prakashana Mandir.
4. Applications of Calculus, Debasish Sengupta, Books and Allied (P) Ltd., 2019.
5. Differential Calculus - Shanti Narayan, S. Chand & Company, New Delhi.
6. Calculus – Lipman Bers, Holt, Rinehart & Winston.
7. Calculus – S. Narayanan & T. K. Manicavachogam Pillay, S. Viswanathan Pvt.Ltd., vol. I & II.
8. Schaum's Outline of Calculus - Frank Ayres and Elliott Mendelson, 5th ed. USA:Mc.Graw.

Elective Paper

PART - A (Questions from all units)	8 questions out of 12 questions	8*2=16 marks
Part-B		
Unit - I	3 questions out of 5 questions	3*6=18 marks
Unit - II	3 questions out of 5 questions	3*6=18 marks
Unit - III	3 questions out of 5 questions	3*6=18 marks
Total		70 marks