# JYOTI NIVAS COLLEGE AUTONOMOUS
# SYLLABUS FOR 2018 BATCH AND THEREAFTER

**Programme: B.C.A** **Semester: II**

## MATHEMATICAL FOUNDATION FOR COMPUTER SCIENCE-II

**Course Code: 18BCAIIT1** **No. of Hours: 60**

**COURSE OBJECTIVES:**

- To understand and inquire wide range of concepts in mathematics.
- To understand the concepts of Linear Algebra.
- To give the clear notion of iteration process in numerical methods to use it in programming.

**LEARNING OUTCOMES:**

- Have a clear idea about the structures of vector spaces and subspaces.
- Determine a basis and the dimension of a finite-dimensional vector spaces.
- Know about spanning sets and their linear independence for vectors in the space $R^n$ .
- Understand the concepts of range space, null space and verify Rank nullity theorem.
- Find a matrix representation for the linear transformation when its bases are given.
- Interpret a matrix as a linear transformation from $R^n$ to $R^m$
- Clarity to use interpolating and extrapolating methods.
- Usage of numerical methods in real life problems.
- Apply the Quadrature formula to solve definite integrals.

**UNIT I** **15 HRS**

**Linear Algebra:**

**Vector Space :** Definition of Vector spaces, examples, properties of vector spaces, subspace, criterion for a subset to be a subspace, linear combination, concepts of linear independent and dependent subsets, basis and dimension of a vector space, Standard results related to basis, Examples illustrating concepts and results.(**No theorems only problems**)

**UNIT II** **15 HRS**

**Linear Transformation**: Definition of linear transformation, properties of linear transformation, matrix of linear transformation, change of basis, Range and Kernel of a linear transformation, Rank and nullity of a linear transformation, Rank – Nullity theorem, Verification of rank – nullity theorem.

**Numerical Methods**

**UNIT III** **10 HRS**

Finding the roots of an equation – Iterative method, Newton-Raphson method, Regula- Falsi method and Secant method.

Solving simultaneous linear equations – Gauss elimination Method , Gauss Jordon method, Jacobi and Gauss Seidal Iterative methods.

**UNIT IV** **10 HRS**

Solution to Ordinary Differential Equations – Taylor's series, Runge-Kutta $2^{nd}$ and $4^{th}$ order methods.

Numerical Integration – Trapezoidal rule and Simpson's $1/3^{rd}$ and $3/8^{th}$ rule.

**UNIT V** **10 HRS**

Interpolation - Difference table, Newton's forward and backward interpolation formulas and Lagrange's interpolation formula.

**REFERENCES:**


1. I N Herstein. Topics in Algebra.Second edition.
2. J.H. Mathews. Numerical Methods for Mathematics, Science and Engineering. Prentice Hall of India .Second Edition
3. S.S. Sasthri. Introductory Method of Numerical Analysis.Prentice Hall of India.Third Edition.