PARVATHANENI BRAHMAYYA
SIDDHARTHA COLLEGE OF ARTS & SCIENCE
Autonomous
Siddhartha Nagar, Vijayawada–520010
Re-accredited at 'A+' by the NAAC

23MAVAL102: Computational Mathematics

Offered to: ALL UG PROGRAMS **Course Type: Value Added Course**

Semester :I **45 hours** **Credits : 2**

UNIT-I : Matrix Algebra 15 Hours

Definition.- Types- addition, subtraction, scalar multiplication, multiplication of matrices- Adjoint and Determinant of a matrix (2x2 and 3x3) – Inverse of a matrix – Rank of a matrix- Eigen values and Eigen vectors of a matrix.

UNIT-II : Sequences & Series 15 Hours

Real numbers – introduction, Law of Trichotomy, properties.

Sequences – Definition , types – Convergence & Divergence – Definition, Uniform Convergence – Definition.

Series – Definition, types (convergent, divergent, alternating) – tests – simple problems – Special cases (Tylor's, Macularin's, Exponential and Logarthemic)

UNIT-III : Calculus 15 Hours

Integration – Formulae, Integration Byparts, Definite Integration, Simple problems – Double Integration – Simple Problems.

Differential Equations.

Order of a differential Equations, degree of a differential Equation , formation of a differential Equation, variable separable, exact and homogeneous methods of solving differential equations.

Activities: Seminar/ Quiz/ Assignments/ Problem Solving Sessions.

Reference Books :

1. A Text book of Matrices by Shanti Narayan & PK Mittal, S. Chand Publications
2. Integral Calculus by Shanti Narayan & PK Mittal, S. Chand Publications
3. Text book of Mathematics- VOL II , S. Chand Publications

Question Paper Pattern:

(a) Continuous Assessment: 15Marks

(b) Semester End Exam: 35 Marks

SEE Consists of two sections-

(i)Section A : Set 5 questions, atleast one question from each unit answer any Three out of 5 questions. Each question carries 5 Marks(5M X3=15)

(ii)Section B : Set 3 questions, one from each unit . Each question carries 10 Marks(10M X 2 =20)

MODEL QUESTION PAPER

23MAVAL102:Computational Mathematics

SEMESTER –I

Max. Marks: 35M **Max.Time: 2Hrs**

SECTION – A

Answer any THREE of the following **3 x 5 = 15 Marks.**

1. Find the rank of the matrix A = $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 1 & 0 \\ 0 & 1 & 2 \end{bmatrix}$

2. Define Convergence & Uniform convergence of a sequence.

3. Test for convergence $\sum \frac{1}{n} sin \frac{1}{n}$

4. Evaluate i) $\int_0^4 (x + e^{2x}) dx$ (ii) $\int_0^{\pi} sinx dx$

5 Find the differential equation of the family of circles having the centres on x – axis and passing through the origin.

SECTION – B

Answer any two of the following. **2x10=20 Marks**

6. Find the Eigen values and Eigen vectors of the matrix A = $\begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$

7. a) Test for convergence of series $\frac{1}{1.2.3} + \frac{3}{2.3.4} + \frac{5}{3.4.5} + \cdots \ldots \ldots \ldots$

   b) Test for convergence of $\sum(\sqrt{n^4 + 1} - \sqrt{n^4 - 1})$

8. a) Evaluate $\int_1^4 x\sqrt{x^2 - 1} dx$

   b) Solve $(e^y + 1)cosx dx + e^y sinx dy = 0$.

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