KADI SARVA VISHWAVIDYALAYA
BCA- SEMESTER II
BCA-204 Computer Oriented Numerical & Statistical Method

RATIONALE:

Computer Oriented Numerical & Statistical methods provides the understanding of various concepts of numerical and statistical methods like Numerical errors in calculations, Finding root of non linear equations, Interpolation, Curve Fitting, Numerical Integration, Numerical Differentiation, Measures of Central Tendency, Measures of Dispersion, Correlation and Regression.

Learning Outcomes:

1. Primary and secondary sources of data and their analysis.
2. Concept cause & consequence of errors in the application of numerical computing.
3. Numerical techniques for solving various problems.
4. Applications of statistics in real life domain.

Teaching and Evaluation Scheme:

Teaching Scheme would consist of classroom board based teaching as well as practical work with Group activity, Role play and Problem solving of relevant real time data.

The objective of evaluation is not only to measure the performance of students, but also to motivate them for better performance. Students are evaluated on the basis of internal examinations which consist of Term Work such as class test, quizzes, class participation, home assignments, presentation, Regular Attendance (i.e. Minimum 85%), Internal marks which consist of 40 (20 Term Work + 20 Sessional Exams) marks and External marks which consist of 60 for University examination.

Sr. No./ Subject Code	Subject Title	Teaching Scheme		Exam Scheme					
		Cr.	Theory/Practical + Tutorial	Theory		Practical		Term Work + Sessional Marks	Total Marks
				Hrs.	Max Marks	Hrs.	Max Marks		
BCA204	Computer Oriented Numerical & Statistical Method	4	3 + 1	3	60	-	-	40	100
BCA208	Practical(204)	2	2	-	-	1.5	25	25	50

Note: <u>The other part of BCA 208 is combined with Practical for BCA 203.</u>

Course content:

PART I CONM

Unit 1: Numerical Errors & Numerical solution of non-linear equations [20%]

Numerical Error, Different types of errors in numerical computation (Absolute, Relative, Truncation, Round Off, Percentage), Floating point numbers, Normalized Floating Point (addition, subtraction, multiplication, division, underflow, overflow), Numerical solution of non-linear equations (Bisection, False Position)

Practical Application (Bisection, False Position)

No of Lectures: - 10
No of Practicals: - 02

Unit-2 Interpolation and curve fitting [25%]

Interpolation, Extrapolation, Forward Differences, Backward Differences, Newton's Forward and Backward Difference Interpolation Formulas, Lagrange Interpolation Formula and Inverse Interpolation Formula.

Method of Least Square (Fitting a straight line, Parabola)

Practical Application (Newton Forward, Newton Backward, Straight Line)

No of Lectures:- 12
No of Practicals:- 03

Unit-3 Numerical Integration and Differentiation [15%]

Numerical Integration and Differentiation, Simpson's (1/3) rule, Simpson's (3/8) rule, Euler's method, Modified Euler's method, RK 2^{nd} order method, RK 4^{th} order method.

Practical Application (Simpson's 1/3, Simpson's 3/8)

No of Lectures:- 07
No of Practicals:- 02

PART II COSM

Unit-4 Frequency Distribution and Central Tendency [20%]

Collection of Statistical Data and Analysis, Different Types of Data (Simple, Discrete, Continuous), Measures of Central Tendency for all types of Data (Mean, Median, Mode), Measures of Dispersion for all types of Data (Variance, Standard Deviation, Coefficient of Variance)

Practical Application (Mean, Median, Mode, Variance, Standard Deviation, Coefficient of Variance for all types of data)

No of Lectures:- 10
No of Practicals:- 18

Unit-5 Correlation and Regression [20%]

Correlation, Types of Correlation, Scatter Diagram, Karl Pearson's Method, Spear Man's Rank Method, Regression, Difference between Correlation and Regression, Regression lines.

Practical Application (Karl Pearson's Correlation, Spearman's Correlation)

No of Lectures: - 10
No of Practicals:- 02

Total No of Lectures: 49 Hrs.
Total No of Practicals: 27 hrs (Based on "C" programming Language)

References:

1. Computer Oriented Numerical Methods: By R. S. Salariya - Khanna Publication
2. Statistical Methods: By S. P. Gupta - S.Chand
3. Introductory methods of Numerical Analysis: By S.S. Shasrti - Prentice Hall of India
4. Mathematics for Computer Students: By Rex Wilton – BPB
5. Numerical Methods: By Dr. V. N. Vedamurthy – Vikas Publication
6. Computer Oriented Numerical Methods: By V. Rajaraman - Prentice Hall of India

Instructional Strategies:

- Building Background to sharpen the existing knowledge.
- Classroom teaching and practical demonstration with variants to make mathematics and statistics easy to learn.
- Integrate topics and concepts.
- Independent Practice to develop the art of self learning.
- Demonstration using technology tools.
- Provide examples to transfer learning.
- Problem solving of relevant real time data.

List of Practicals:

1. Practicals based on Error and numerical Methods (Methods-Bisection, False Position)
2. Practicals based on Forward Difference table, Backward Difference table and Fitting of a straight line.
3. Practicals based on numerical integration. (Simpson's rule - 1/3, 3/8)
4. Practicals based on Central Tendency and Dispersion.
5. Practicals based on Correlation and Regression.

Teaching and Examination Scheme

UNIT	Examination Scheme %weightage	Teaching Scheme No of	
		Lecturer	Practicals
Unit 1	20	10	02
Unit 2	25	12	03
Unit 3	15	07	02
Unit 4	20	10	18
Unit 5	20	10	02
TOTAL	100%	49	27