Kadi Sarva Vishwavidyalaya

Master of Computer Application (MCA)

Year – I (Semester – II) (W.E.F. August 2014)

Subject Name: Computer Oriented Numerical and Statistical Methods – MCA 204

Sub Total Credit	Teaching scheme (per week)		Examination scheme				
			MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
3	3	0	25	25	50	0	100

Rationale (Course Objective) :

- To solve linear and non linear algebraic equations, perform operations of calculus, fit curves and solve differential equations, also using a computer.
- To appreciate problems due to rounding errors and convergence.
- To develop familiarity with the different statistical methods used in problem solving and decision making.

Learning Outcome: At the end of the course,

- Students will get acquainted with the different numerical methods used in problem solving.
- Students will develop logical understanding through the concepts learned in the class, which is the base of computer science.
- Students will get acquainted with essential ideas and reasoning of applied statistics like data analysis, distributions and inference theory.
- Students will learn a statistical techniques through different tools and apply it to case studies using the concepts learned in the class

Instructional Strategies:

Generally lecture method would be applied for classroom teaching, where how to solve problems related to every numerical method would be demonstrated. Also tests would be given to strengthen the concepts, at regular intervals of time.

Course Content :

Unit 1: Computer Arithmetic & Iterative Methods (20%)

Floating Point representation of numbers, Normalized floating point numbers, Errors in numbers, Solution of Linear and transcendental equations, False Position, Newton Raphson methods.

Unit 2: Interpolation and Approximation (20%)

Lagrange's interpolation, Forward difference, backward difference, Inverse interpolation, Linear Regression and Non-Linear Regression (Least square Curve fitting)

Unit 3: Solution of Simultaneous Equations & Ordinary Differential Equations (20%)

Gauss Elimination method ,ill conditioned equations,Gauss Seidal iterative method, Euler's Method, Runge-Kutta method second and fourth order methods, Predictor – Corrector methods Numerical Differentiation and Numerical Integration: Numerical Differentiation using Newton's forward and backward difference formulae, Concept of Numerical Integration, Trapezoidal rule, Simpson's 1/3 rule& 3/8 rules.

Unit 4: Measures of Central tendency ,dispersion and Probability (20%)

Introduction to measures of central tendency - mean, median, mode, measures of dispersion - range, standard deviation, Probability ,addition rule,mutually exclusive events, multiplication rule, probability under statistical independence, probability under statistical dependence, conditional probability, Baye's rule. Probability distributions-binomial,poisson and normal distribution

Unit 5: Statistical inference theory (20%)

Sample distributions,Testing of hypothesis ,one tail and two tail tests, tests of significance, Parametric &non-parametric tests,Tests of Significance:Chi square test,chi-square goodness of fit,t and,ANOVA

Text Books:

1. "Numerical Methods" – E. Balaguruswamy (TMH publications)
2 Srimanta Pal, "Numerical Methods", Oxford University Press
3 Richard Levin, David Rubin, "Statistics for Management", 7th edition, PHI
4 S.P Gupta,''Statistical Methods'',Himalaya Publication

Chapter –

Book1:.

Ch4, articles 4.1-4.9,Ch-6,articles 6.1-6.5-6.8, Ch9,articles 9.1-9.5,9.7,Ch-10, articles 10.1-10.4,Ch-7,articles 7.1-7.6,8.1-8.3,.Ch-13, articles 13.1,13.3,13.6,Ch-11,articles 11.1,11.3,.Ch-12,articles 12.1,12.3,12.4,12.5

Book2:

Ch-3, articles 3.1-3.12, Ch-5, articles 5.1-5.4, 5.10, Ch-12, articles 12.1-12.3, articles 12.7-12.8.2 2. Ch-6, articles 6.1-6.3, 6.4.1, Ch-15, articles 15.6.1,15.8.1,15.8.4,15.10,Ch-14,articles 14.1-14.3

Book3:

Ch-3, article 3.1,3.2,3.5-3.10,Ch-4,articles 4.1-4.7,Ch-5,articles 5.1-5.7,Ch-6,articles 6.1-6.4, Ch-8,articles 8.1-8.4,8.6,8.7,9.1-9.5,Ch-11,articles 11-11.4

Book4:

Vol-I:-Ch-7,pg178-205,pg 212-219,Ch-8 pg 282 ,Vol-II:-Ch-1,pg 751-767,Ch-2 pg 805-819,pg 826-834,pg836-853,Ch-3,pg882-886,pg901-913,Ch-4,pg 953-958,1009

Reference Books:

1. "Computer Oriented Numerical Methods" – C. K. Kumbharana & Dr N. N. Jani
2. "Numerical Methods – Problems and Solutions" – M. K. Jain and R. K. Jain
3. "Introductory Methods of Numerical Analysis" - S. S. Sastry (PHI publications)
4. "Computer Oriented Numerical Methods" – V. Rajaraman (PHI publications)