

<b>Computational Mathematics</b>				
CLASS S.E ( INFORMATION TECHNOLOGY)				
SEMESTER IV				
HOURS PER WEEK	LECTURES	:	04	
	TUTORIALS	:	--	
	PRACTICALS	:	02	
			HOURS	MARKS
EVALUATION SYSTEM:	THEORY		3	100
	PRACTICAL		-	--
	ORAL		-	--
	TERM WORK		-	25

### 1. Numerical Methods:

? Errors: Types and Estimation.

? Solutions to Transcendental and polynomial equations: Bisection method, Newton-

Raphson method, Secant method

? Numerical Integration: Trapezoidal Rule, Simpson's 1/3 rd and 3/8 th rules.

? Solution to system of linear algebraic equations, Gauss elimination method, Gauss-

Jordan elimination method, Gauss-Siedel iteration method.

? Interpolation: Linear interpolation, Higher order interpolation using Lagrange's &

Newton's method, Finite difference operators and difference tables

### 2. Statistics:

? Probability

? Random variables: Discrete & Continuous random variables, Probability density

function, Probability distribution of random variables, Expected value, Variance,

Moments & moment generating functions, Relation between Raw moments & Central

moments.

? Binomial, Poisson & Normal distributions for detailed study, Central Limit theorem (statement only) & problems based on this theorem.

? Fitting of curves: Least square method, Fitting the straight line & parabolic curve, Correlation, Covariance, Karl Pearson's coefficient & Spearman's Rank

correlation coefficient, Regression coefficients & lines of regression.

### **3. Sampling Theory:**

? Sampling distribution, Test of Hypothesis, Level of Significance, Critical Region, One Tailed & Two Tailed Test, Interval Estimation of Population Parameters, Test of Significance for large Samples & small Samples, Student's 't' Distribution & its properties, Chi-Square Distribution & its properties, Test of the Goodness of Fit & Independence of Attributes, Contingency Table, Yates Correction

### **4. Mathematical Programming:**

? Linear optimization problem, Formulation & Graphical solution, Basic solution & Feasible solution, Primal Simplex Method.

### **5. SCILAB Applications:**

? Programming of Numerical Methods.

? Use of Scilab for solving system of linear equations.

? Use of Scilab in Curve Fitting.

?Use of Scilab for finding coefficient of correlation & regression coefficient.

QUESTION ON SCILAB SHOULD NOT BE ASKED IN UNIVERSITY (THEORY) EXAMINATION.

TEXT BOOKS:

- 1 P.N.Wartikar and J.N.Wartikar, "Elements of Applied Mathematics"  
Volume 1 and 2 , A.V.Griha,Pune
2. S.S.Shastri, "Engineering Mathematics" Vol-2,PHI,2<sup>nd</sup> Edition ,1994.
3. S.S.Shastri, "Introductory Methods of Numerical Methods", Vol-2, PHI,  
Second  
Edition, 1994
- 4.
6. Robert J.Schilling & Sandra L.Harris, "Applied Numerical Methods for  
Engineers  
using SCILAB & C " , Thomson Brooks/Cole
- 7 S.C.Gupta, V.K.Kapoor, "Fundamentals of Mathematical Statistics"

**REFERENCES:**

- 1. Shantinarayan, "Matrices",S.Chand Publication House , Delhi**
- 2. T.Veerarajan, "Probability and Statistics",TMH**
3. Dr.B.S.Grawal, "Higher Engineering Mathematics", Khanna Publications
4. Erwin Kreyszing, "Advanced Engineering Mathematics",Wiley India, 8<sup>th</sup>  
Edition
5. John S. Mathews, "Numerical Methods for Mathematics,Science &  
Engineering"

TERM WORK:

Marks

1. Attendance (Theory and Practical)

05

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|---|----|
| 2. Assignments & practical using SCILAB | 10 |
| 3. Test (atleast one)                   | 10 |

The final certification and acceptance of TW ensures the satisfactory performance of Term Work and Minimum Passing in the TW.

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