MOHAMMED SATHAK A J COLLEGE OF ENGINEERING

Siruseri IT park, OMR, Chennai - 603103

LESSON PLAN

Department of Science & Humanities -Mathematics

Name of the Subject	STATISTICS AND NUMARICAL METHODS	Name of the handling Faculty	
Subject Code	MA3251	Year / Sem	I/II
Acad Year	2022-23	Batch	2022-2026

Course Objective

This course aims at providing the necessary basic concepts of a few statistical and numerical methods and give procedures for sol numerically different kinds of problems occurring in engineering and technology.

To acquaint the knowledge of testing of hypothesis for small and large samples which plays an important role in real life problem

To introduce the basic concepts of solving algebraic and transcendental equations.

To introduce the numerical techniques of interpolation in various intervals and numerical techniques of differentiation and integr plays an important role in engineering and technology disciplines.

To acquaint the knowledge of various techniques and methods of solving ordinary differential equations.

Course Outcome-On successful completion of this course, the student will be able to

Apply the concept of testing of hypothesis for small and large samples in real life problems.

Apply the basic concepts of classifications of design of experiments in the field of agriculture.

Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation an for engineering problems.

Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.

Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with enginee

Lesson Plan

Sl. No.	Topic(s)	T / R* Book	Periods	Mode of Teaching	Blooms Level	CO
	UNIT I-TESTING OF HYPOTHESIS					
1	Large sample test -Sigle Mean	T2	1	BB	L2	CO1
2	Large sample test -Differnece of Means,Propotion	T2	1	BB	L2	CO1
3	Large Sample-Difference of Propotion	T2	1	BB	L2	CO1
4	Tutorial -Large Sample	T2	1	BB	L2	CO1
5	Small Sample-Single Mean	T2	1	BB	L2	CO1
6	Small Sample-Difference of Means	T2	1	BB	L2	CO1
7	Chi Square test Single Variance-Goodness of fit	T2	1	BB	L2	CO1
8	Chi Square test-Independence of Attributes	T2	1	BB	L2	CO1
9	Tutorial -Small Sample & Chi Square Test	T2	1	BB	L2	CO1
10	F distributions for testing means and variances	T2	1	BB	L2	CO1
11	F distributions for testing means and variances	T2	1	BB	L2	CO1
12	Tutorial-F-distribution	T2	1	BB	L2	CO1
Suggested Activity: Assignment given						
Evaluation method: Evaluation of Assignment						
	UNIT II-DESIGN OF EXPERIMENTS					
13	Introduction-Analysis of Variance	T2	**1**	BB	L2	CO2
14	One way classification (Completely Randamized Design-CRD)	T2	1	BB	L2	CO2
15	One way classifications (Completely Randamized Design-CRD)	T2	1	BB	L2	CO2

16	Tutorial-CRD	T2	1	BB	L2	CO2
17	Two way classifications (Randomized block Design-RBD)	T2	1	BB	L2	CO2
18	Two way classifications (Randomized block Design)	T2	1	BB	L2	CO2
19	Tutorial-RBD	T2	1	BB	L2	CO2
20	Latian Square Design	T2	1	BB	L2	CO2
21	Latian Square Design	T2	1	BB	L2	CO2
22	Tutorial-Latin Square Design	T2	1	BB	L2	CO2
23	2^2 factorial design	T2	1	BB	L2	CO2
24	2^2 factorial design	T2	1	BB	L2	CO2
Suggested Activity: Assignment given						
Evaluation method: Evaluation of Assignment						
UNIT III-SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS						
25	Introduction-Fixed Point Iteration Method	T1	1	BB	L3	CO3
26	Newton-Raphson method-Problems	T1	1	BB	L3	CO3
27	Tutorial Fixed point & NR-Method	T1	1	BB	L3	CO3
28	Solution of Linear System of Equation-Gauss Elimination method.	T1	1	BB	L3	CO3
29	Gauss-Jordan methods	T1	1	BB	L3	CO3
30	Tutorial-Gauss Elimination & Gauss Jordan	T1	1	BB	L3	CO3
31	Iterative methods - Gauss-Jacobi	T1	1	BB	L3	CO3
32	Iterative methods- Gauss-Seidel	T1	1	BB	L3	CO3
33	Tutorial-Gauss Elimination & Gauss Jordan	T1	1	BB	L3	CO3
34	Eigenvalues of a matrix by Power method .	T1	1	BB	L3	CO3
35	Eigenvalues of a matrix by Power method .	T1	1	BB	L3	CO3
36	Jacobi's method for Symmetric Matrices	T1	1	BB	L3	CO3
Suggested Activity: Assignment given						
Evaluation method: Evaluation of Assignment						
UNIT IV- INTERPOLATION, NUMERICAL DIFFERENTIATION AND NUMERICAL INTEGRATION						
37	Lagrange's and Newton's divided difference interpolations	T1	1	BB	L3	CO4
38	Newton's forward and backward difference interpolation and class test	T1	1	BB	L3	CO4
39	Newton'x backward difference	T1	1	BB	L3	CO4
40	Tutorial -DD,NF,NB	T1	1	BB	L3	CO4
41	Approximation of derivates using interpolation polynomials	T1	1	BB	L3	CO4
42	Approximation of derivates using interpolation polynomials	T1	1	BB	L3	CO4
43	Tutorial-Derivatives	T1	1	BB	L3	CO4
44	Numerical single integrations using Trapezoidal and Simpson's 1/3 rules.	T1	1	BB	L3	CO4
45	Numerical single integrations using Trapezoidal and Simpson's 1/3 rules.	T1	1	BB	L3	CO4
46	Numerical double integrations using Trapezoidal and Simpson's 1/3 rules.	T1	1	BB	L3	CO4
47	Numerical double integrations using Trapezoidal and Simpson's 1/3 rules.	T1	**1**	BB	L3	CO4
48	Tutorial -Trapezoidal & Simpson's Rules	T1	**1**	BB	L3	CO4
Suggested Activity: Assignment given						
Evaluation method: Evaluation of Assignment						

UNIT V-NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS						
49	Taylor's series method ,	T1	1	BB	L3	CO5
50	Euler's method,	T1	1	BB	L3	CO5
51	Modified Euler's method	T1	1	BB	L3	CO5
52	Tutorial-Taylor's,euler's, modified euler's method	T1	1	BB	L3	CO5
53	Fourth order Runge-Kutta method for solving first order equations	T1	1	BB	L3	CO5
54	Fourth order Runge-Kutta method for solving first order equat	T1	1	BB	L3	CO5
55	Milne's predictor corrector methods for solving first order equations	T1	1	BB	L3	CO5
56	Milne's predictor corrector methods for solving first order equations	T1	1	BB	L3	CO5
57	Tutorial-4th order RK method,Milne's method	T1	1	BB	L3	CO5
58	Adam's Bashforth predictor corrector methods for solving first order differential equations	T1	1	BB	L3	CO5
59	Adam's Bashforth predictor corrector methods for solving first order differential equations	T1	1	BB	L3	CO5
60	.	T1	1	BB	L3	CO5
	https://www.youtube.com/watch?v=6Caoj4oQxfU					
	https://www.youtube.com/watch?v=Qwdl8AtrrRw					

Text Books

1	Grewal B.S., "Higher Engineering Mathematics", 43rd Edition, Khanna Publishers, New Delhi, 2014.
2	Narayanan S., Manicavachagom Pillay.T.K and Ramanaiah.G "Advanced Mathematics for Engineering Students", Vol. II Publishers Pvt. Ltd, Chennai, 1998.

Reference Books

1	Burden, R.L and Faires, J.D, "Numerical Analysis", 9th Edition, Cengage Learning, 2016.
2	Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 8th Edition, 20
3	Gerald. C.F. and Wheatley. P.O. "Applied Numerical Analysis" Pearson Education, Asia, New Delhi, 7th Edition, 2007.
4	Spiegel. M.R., Schiller. J. and Srinivasan. R.A., "Schaum's Outlines on Probability and Statistics ", Tata McGraw Hill E Edition, 2012.
5	Walpole. R.E., Myers. R.H., Myers. S.L. and Ye. K., "Probability and Statistics for Engineers and Scientists", 9th Edition Education, Asia, 2010.

Blooms Level

Level 1 (L1) : Remembering	Lower Order Thinking	Fixed Hour Exams	**Level 4 (L4) : Analysing**	Higher Order Thinking
Level 2 (L2) : Understanding			**Level 5 (L5) : Evaluating**	
Level 3 (L3) : Applying			**Level 6 (L6) : Creating**	

Mapping syllabus with Bloom's Taxonomy LOT and HOT

Unit No	Unit Name	L1	L2	L3	L4	L5	L6	LOT	HOT
Unit 1	TESTING OF HYPOTHESIS	6	0	0	0	0	0	6	0
Unit 2	DESIGN OF EXPERIMENTS	0	0	0	0	7	0	0	7
Unit 3	SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS	0	8	0	0	0	0	8	0

Unit 4	INTERPOLATION, NUMERICAL DIFFERENTIATION AND NUMERICAL INTEGRATION	0	0	0	7	0	0	0	7
Unit 5	NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS	0	0	6	0	0	0	6	0
Total		6	8	6	7	7	0	20	14
Total Percentage		17.65	24	17.6	20.59	20.59	0	58.824	41.1765

CO PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1
CO1	3	2	1	-	-	-	-	-	-	-	-	-	1
CO2	3	3	3	-	-	-	-	-	-	-	-	-	2
CO3	3	3	1	-	-	-	-	-	-	-	-	-	3
CO4	3	3	3	-	-	-	-	-	-	-	-	-	2
CO5	3	3	3	-	-	-	-	-	-	-	-	-	2
Avg	3	2.8	2.2	0	0	0	0	0	0	0	0	0	2

Justification for CO-PO mapping

CO1	are taken out of unmanageably huge populations.The student would be able to calculate mean and proportions (small samp make Important decisions from few samples which are taken out of unmanageably huge populations.
CO2	Highly Mapped with PO6 because subject need basic engineering knowledge to understand the terms and definitions & Hig with PO10 because with out proper communication skills it is difficult to understand the concept
CO3	Moderately mapped as students apply the knowledge of engineering fundamentals and gauss –Jordan technique method._
CO4	Highly Mapped with PO4 because subject well engineering knowledge to understand the terms and concepts & Highly Ma PO10 because with out proper communication skills it is difficult to understand the concept
CO5	Highly Mapped with PO4 because subject well engineering knowledge to understand the terms and concepts & Highly Ma PO10 because with out proper communication skills it is difficult to understand the concept

3	**High level**	**2**	**Moderate level**	**1**	Low le

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