SCHEME OF COURSE WORK

Course Title	Design and Analysis OfExperiments		
Course Code	13ME2117	L T P C	4 0 0 3
Program	M.Tech.		
Specialization	CAAD		
Semester	II		

Course Outcomes (COs):

At the end of the course, the student will be able to

1	Conduct the experiment by using factorial and fractional factorialdesign
2	Fit the best model for the given experimental data
3	Check the adequacy of the regression model using ANOVA
4	Optimize using response surface method

Program Outcomes (POs):

To make the student learn

1. Acquire knowledge in latest computer-aided design and analysis tools.
2. Create 3D models of real-time components using latest CAD software.
3. Acquire technical skills to formulate and solve engineering and industrial problems.
4. Carry out analysis for the design of new products.
5. Have proficiency to solve problems using modern engineering design tools.
6. Have capability to work in multidisciplinary streams.
7. Apply project and finance management skills to organise engineering projects.
8. Prepare technical reports and present them effectively.
9. Engage in lifelong learning.
10. Realize professional and ethical responsibilities.
11. Conduct surveys, analyse data, plan, design and implement new ideas into action.

Course Outcome versus **Program Outcomes:**

COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
CO-1			S	S		S					
CO-2		M	S								
CO-3	S				S						
CO-4			S								

S - Strongly correlated, M - Moderately correlated, Blank - No correlation

Teaching - Learning and Evaluation

WEEK	TOPIC / CONTENTS	COURSE OUTCOMES	SAMPLE QUESTIONS	TEACHING - LEARNING STRATE	ASSESSMENT METHOD & SCHEDULE
1	guidelines for designing experiments, sampling and sampling distributions, hypothesis testing	CO1	1. What are the guidelines for designing experiments. 2. What is the importance of null hypothesis and define alternate hypothesis. 3. List out the assumptions of Normality.	Lectures	Assignments
2	testing, choice of sample size,analysis of variance, analysis of the fixed effects model	CO1			
3	model adequacy checking, sample computer output,regression approach to the analysis of variance.	CO1			
4	principles, advantage of factorials, two-factor factorial design, general factorial design	CO2	1. Explain Operating Characteristic Curves. 2. What do you mean by a Regression Model. 3. Explain Least Squares Estimation of the Parameters.	Lectures	
5	fitting response curves and surfaces.2^kfactorial design: 2^2design	CO2			
6	2^3 design, General 2^kdesign, single replicate of 2^k design.	CO2			
7	Mid - Test 1	CO1, CO2			
8	one-half fraction of 2^kdesign, one-quarter fraction of 2^kdesign	CO2	1. Write about one-half fraction of 2^kdesign. 2. Briefly explain confounding in 3^k factorial design	Lectures	
9	blocking replicated 2^kfactorial design, confounding in 2^kfactorial design	CO2			

10	3^k factorial design, confounding in 3^k factorial design	CO2			
11	fractional replication of 3^k factorial design, factorials with mixed levels.	CO2	1. Write about hypothesis testing in multiple regression. 2. What are the methods for estimation of parameters in linear regression models.	Lectures	Assignments
12	Linear regression models, estimation of the parameters	CO3			
13	hypothesis testing in multiple regression	CO3			
14	Confidence intervals in multiple regression	CO3			
15	prediction of new response observations, regression model diagnostics.	CO3	1. Write about steepest ascent method. 2. How do you analyse second order response surface. 3. What are the methods for prediction of new response observations.	Lectures	
16	Response surface methods: introduction, method of steepest ascent	CO4			
17	analysis of second-order response surface, experimental designs for fitting response surfaces	CO4			
18	Mid - Test 2	CO2, CO3, CO4			
19/20	END EXAM	All COs			