

SYE8103: ADVANCED DESIGN OF EXPERIMENTS AND TAGUCHI METHOD

Effective Term

Semester A 2025/26

Part I Course Overview

Course Title

Advanced Design of Experiments and Taguchi Method

Subject Code

SYE - Systems Engineering

Course Number

8103

Academic Unit

Systems Engineering (SYE)

College/School

College of Engineering (EG)

Course Duration

One Semester

Credit Units

3

Level

R8 - Research Degree

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

Nil

Precursors

Basic Probability and Statistics

Equivalent Courses

SEEM8103 Advanced Design of Experiments and Taguchi Method (offered until 2021/22)

ADSE8103 Advanced Design of Experiments and Taguchi Method (offered until 2023/24)

Exclusive Courses

Nil

Part II Course Details

Abstract

This course aims to further develop students' understanding and application of the theories and methods of statistical modelling of observational data and design of experiment. Contents covered include linear models, regression models, and analysis of variance models.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Understand the statistical hypothesis testing	10	x		
2	Explain the needs for design of experiments in manufacturing and other applications	15	x	x	
3	Apply design and analysis of experiments methods to characterize and improve systems and processes	25		x	
4	Explain robust design, Taguchi method etc	25		x	
5	Apply DOE and Taguchi Method to real life problems	25		x	

A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Learning and Teaching Activities (LTAs)

LTAs		Brief Description	CILO No.	Hours/week (if applicable)
1	Lecture & Tutorial	- large class activity - questions and discussion	1, 2, 3, 4, 5	39 hours/sem (in-class) 66 hours/sem (ex-class)

Assessment Tasks / Activities (ATs)

ATs		CILO No.	Weighting (%)	Remarks ("- for nil entry)	Allow Use of GenAI?
1	Group Project	2, 3, 4, 5	40	-	No
2	Individual Coursework	1, 3, 4	25	-	No
3	Mid Term Test	2, 3, 4	35	-	No

Continuous Assessment (%)

100

Examination (%)

0

Minimum Continuous Assessment Passing Requirement (%)

30

Minimum Examination Passing Requirement (%)

0

Assessment Rubrics (AR)

Assessment Task

Group Project (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Application of class materials and teamwork

Excellent

(A+, A, A-) High

Good

(B+, B, B-) Significant

Fair

(C+, C, C-) Moderate

Marginal

(D) Basic

Failure

(F) Not even reaching marginal levels

Assessment Task

Individual Coursework (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Understanding of class materials

Excellent

(A+, A, A-) High

Good

(B+, B, B-) Significant

Fair

(C+, C, C-) Moderate

Marginal

(D) Basic

Failure

(F) Not even reaching marginal levels

Assessment Task

Mid Term Test (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Understanding of class materials

Excellent

(A+, A, A-) High

Good

(B+, B, B-) Significant

Fair

(C+, C, C-) Moderate

Marginal

(D) Basic

Failure

(F) Not even reaching marginal levels

Assessment Task

Group Project (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

Application of class materials and teamwork

Excellent

(A+, A, A-) Excellent

Good

(B+, B) Good

Marginal

(B-, C+, C) Marginal

Failure

(F) Failure

Assessment Task

Individual Coursework (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

Understanding of class materials

Excellent

(A+, A, A-) Excellent

Good

(B+, B) Good

Marginal

(B-, C+, C) Marginal

Failure

(F) Failure

Assessment Task

Mid Term Test (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

Understanding of class materials

Excellent

(A+, A, A-) Excellent

Good

(B+, B) Good

Marginal

(B-, C+, C) Marginal

Failure

(F) Failure

Part III Other Information**Keyword Syllabus**

- Data collection, data analysis, and model prediction
- Design and analysis of Experiments
- Analysis of Variance modelling
- Full factorial and fractional factorial designs
- Process characterization and improvement
- Robust design and parameter design
- Taguchi Method

Reading List**Compulsory Readings**

Title	
1	Applied Linear Statistical Models by Kutner, Nachtsheim, Neter, and Li, 5th edition, McGraw Hill 2005.
2	Lecture notes

Additional Readings

Title	
1	NIL