

SYE8101: SPECIAL TOPICS IN QUANTITATIVE METHODOLOGIES

Effective Term

Semester A 2025/26

Part I Course Overview

Course Title

Special Topics in Quantitative Methodologies

Subject Code

SYE - Systems Engineering

Course Number

8101

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

Nil

Equivalent Courses

SEEM8101 Special Topics in Quantitative Methodologies (offered until 2021/22)/ ADSE8101 Special Topics in Quantitative Methodologies (offered until 2023/24)

Exclusive Courses

Nil

Part II Course Details

Abstract

This course aims to develop PhD/MPhil students the knowledge and skills of one or two specialized quantitative analysis techniques in statistics, operations research, and other relevant areas. After completing this course, students should be able to - and use these techniques in their research.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Understand theories and concepts of some specialized quantitative analysis techniques	20	x		
2	Critique relevant literature relating to the specialized quantitative analysis techniques	40		x	
3	Apply the specialized quantitative analysis techniques and tools in their research	40		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	Class (Lecture)	Class activities are made up of lectures and groupwork. The latter is used as platform for reflective and interactive learning among the students and the lecturer. Activities include presentation, group discussion.	1, 2, 3	39 hours/sem (6 hours per week in summer with 7 weeks)

Assessment Tasks / Activities (ATs)

ATs	CILO No.	Weighting (%)	Remarks ("- for nil entry)	Allow Use of GenAI?
1	Coursework (Assignment, presentation and group discussion)	100	-	No

Continuous Assessment (%)

100

Examination (%)

0

Minimum Continuous Assessment Passing Requirement (%)

30

Assessment Rubrics (AR)

Assessment Task

1. Coursework 2. Quiz (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

The assessment includes the student's coursework assignments, presentation, and quiz.

Pass (P)

(P) Pass

Failure (F)

(F) Fail

Assessment Task

1. Coursework 2. Quiz (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

The assessment includes the student's coursework assignments, presentation, and quiz.

Pass (P)

(P) Pass

Failure (F)

(F) Fail

Part III Other Information

Keyword Syllabus

This course is for students who wish to pursue research in a particular area of quantitative analysis methodologies. It is designed to provide students with the necessary background training in some specialized quantitative techniques for their MPhil/PhD research. Student will learn the theories and concept, principles and development of theory and empirical research in one or more selected topics in quantitative analysis. Topics vary depending on the interests and students and availability of lecturers. Examples of topics are: Modern Data Mining Modeling, Bayesian Statistics; Optimization Techniques; Analytic Hierarchy Process; Dynamic Programming; Integer programming; Game Theory, etc.

Reading List

Compulsory Readings

Title	
1	NIL

Additional Readings

Title	
1	NIL