SDSC3102: QUALITY TECHNOLOGIES

Effective Term
Semester B 2024/25

Part I Course Overview

Course Title
Quality Technologies

Subject Code
SDSC - Data Science
Course Number
3102

Academic Unit
Data Science (DS)

College/School
College of Computing (CC)

Course Duration
One Semester

Credit Units
3

Level
B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
MA2506 Probability and Statistics or MA2510 Probability and Statistics

Precursors
Nil

Equivalent Courses
ADSE3102 Quality Engineering or SYE3102 Quality Engineering

Exclusive Courses
Nil

Part II Course Details

Abstract
This course aims to provide students with a broad knowledge of quality systems as well as knowledge in concepts, methodology and tools of quality engineering. Upon completion of the course students will be equipped with the ability to

apply the knowhow of systems thinking to quality engineering and management problems in their future work. Students will be able to construct models for the analysis and improvement of quality in manufacturing and service environments.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Understand basic concepts, principles, and methods of quality management	10		x	
2	Understand the statistical foundation for change detection	20		x	
3	Be familiar with different types of control charts and their suitable circumstances	30		x	x
4	Apply concepts and methods learned in class to solve quality-related problems	40	x	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	Formal lectures	1, 2, 3, 4	39 hours/semester including group projects
2	Tutorial	Exercises to provide students with the opportunities to i) familiarize and apply the tools learned during the lectures through practical problem solving and ii) appreciate the use of software to analyse data for quality control.	2, 3, 4	13 hours/semester (included in the lecture hours)

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Homework assignments	1, 2, 3, 4	30	
2	Group project	1, 2, 3	30	

Continuous Assessment (%)
60

Examination (%)
40

Examination Duration (Hours)
2

Additional Information for ATs
Note: To pass the course, apart from obtaining a minimum of 40% in the overall mark, a student must also obtain a minimum mark of 30% in both continuous assessment and examination components.

Assessment Rubrics (AR)

Assessment Task
Course work

Criterion
The course work includes two assignments

Excellent (A+, A, A-)
High

Good (B+, B, B-)
Significant

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Not reach marginal levels

Assessment Task
Group projects

Criterion
Based on presentation and submitted written work to evaluate understanding of subject matter, evidence of knowledge base, capacity to analyse and synthesize, and evidence of original and critical thinking.

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
Examination

Criterion
A test

Excellent (A+, A, A-)
High

Good (B+, B, B-)
Significant

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Not reach marginal levels

Additional Information for AR
Course work and test will be numerically marked and grades awarded accordingly.

Part III Other Information

Keyword Syllabus
Quality engineering introduction
Six Sigma and DMAIC methodology
Statistical process monitoring
Change detection
Control charts for continuous data
Attribute control charts
CUSUM and EWMA control charts

Reading List

Compulsory Readings

	Title
1	Lecture notes

Additional Readings

	Title
1	D.C. Montgomery. Introduction to Statistical Quality Control, 7th edition, 2013
2	Quality Management. DL Goetsch and SB Davis, Pearson, 7th edition, 2013