هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission
اعتماد
NCAAA
2024
TP-153

Course Specification
(Bachelor)

Course Title :	**Quality Control**
Course Code:	**STA 1471**
Program:	**Bachelor of Science in Applied Statistics**
Department:	**Mathematics and Statistics**
College:	**Science**
Institution:	**Imam Mohammad Ibn Saud Islamic University**
Version:	**2024 – V1**
Last Revision Date:	**2 October 2024**

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours:					
3 (2 Lectures, 1 Lab, 1 Tutorial)					
2. Course type:					
A.	☐University	☐College	☒ Program	☐Track	☐Others
B.	☐ Required		☒ Elective		
3. Level/year at which this course is offered:					
Level 7 / Year 4					
4. Course General Description:					
The course will comprise a balanced blend of the statistical quality control concepts and hands-on training in the methods, standards and guidelines currently being used for industrial quality control. The course will enable the student to gain a firm grasp of statistical quality control methods and enable him/her to not only analyze and improve existing quality control processes, but also design and implement new quality control processes in industrial settings.					
5. Pre-requirements for this course (if any)**:**					
STA 1332					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
A comprehensive coverage of modern quality control techniques to include the design of statistical process control systems, acceptance sampling, and process improvement.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	**60**	**%100**
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	**30**
2.	**Laboratory/Studio**	**15**

3.	**Field**	**0**
4.	**Tutorial**	**15**
5.	**Others (specify)**	**0**
Total		**60**

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	**To define quality assurance system and total quality management.**	**K1, K2**, K3	**3 lecture hours\week**	**Direct: Regular Exams**
1.2	**To define quality costs and Statistical Quality Control.**	**K1, K2, K3**	**1 tutorial hours\week 1 lab hours\week Self-study**	**Direct: Short Quizzes**
2.0	**Skills**			
2.1	**To define quality assurance system and total quality management.**	**S3, S1**	**Self-study Real-life problems**	**Direct: Participations Short Quizzes**
2.2	**To explain the importance of high-performance teams to promote quality.**	**S4**	**Real-life problems**	**Direct: Short Quizzes**
2.3	**To examine and discuss the concepts of strategic management for performance.**	**S1, S2**	**Self-study**	**Direct: Participations**
2.4	**To use effective tools, techniques and statistical software for quality design and control.**	**S5**	**Self-study Real-life problems**	**Direct: Regular Exams Participation Short Quizzes**
3.0	**Values, autonomy, and responsibility**			
3.1	**To employ ethical concepts and rules to determine viable alternatives in any given situation.**	**V1, V3**	**Personal questions**	**Direct: Participation**
3.2	**To operate meaningfully and productively with others.**	**V1, V2**	**Teamwork and class discussions.**	**Direct: Homework Mini projects**

C. Course Content

No	List of Topics	Contact Hours
1.	**Quality Improvement in the Modern Business Environment:** The Meaning of Quality and Quality Improvement, Brief History of Quality Control and Improvement, Statistical Methods for Quality Control and Improvement, Management Aspects of Quality Improvement.	**9**
2.	**The DMAIC process:** Overview of DMAIC, The Define Step, The Measure Step, The Analyze Step, The Improve Step, The Control Step, Examples of DMAIC.	**11**
3.	**Methods and philosophy of statistical process control:** Chance and Assignable Causes of Quality Variation, Statistical Basis of the Control Chart, The Rest of the Magnificent Seven, Implementing SPC in a Quality Improvement Program, Applications of SPC.	**10**
4.	**Control Charts for Variables:** Control Charts for $\bar{x}$ and R Control Charts for $\bar{x}$ and S Control Charts for The Shewhart Control Chart for Individual Measurements, Applications of Variables Control Charts.	**10**
5.	**Control Charts for Attributes:** The Control Chart for Fraction Nonconforming, Control Charts for Nonconformities (Defects), Choice between Attributes and Variable Control Charts.	**10**
6.	**Process and Measurement System Capability Analysis:** Process and Measurement System Capability Analysis, Process Capability Ratios.	**10**
Total		**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	**Homeworks, Quizzes, Mini-projects**	**During the term**	**10%**
2.	**First Midterm**	**Week 5-6**	**25%**
3.	**Second Midterm (lab Exam)**	**Week 10-11**	**25%**
4.	**Final Exam**	**Week 15**	**40%**

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	***Introduction to Statistical Quality Control, 6th Edition***, Douglas C. Montgomery, John Wiley & Sons, 2008. **(Main Reference)**

Supportive References	1- ***Statistical Quality Control, 6th Edition***, E.L. Grant and R.S. Leavenworth, McGraw-Hill, 1988. 2- ***Principles of quality control***, J. Banks, John Wiley & Sons, 1989.
Electronic Materials	**Course Website: Learning Management Systems (Blackboard)**
Other Learning Materials	**None**

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	▪ **Each class room should be equipped with a whiteboard and a projector.** ▪ **Laboratories should be equipped with computers and an internet connection.**
Technology equipment (projector, smart board, software)	**The rooms should be equipped with data show and Smart Board.** **All computers should be equipped with the following software:** - **Microsoft Excel** - **IBM SPSS** - **R-Project** - **MATLAB**
Other equipment (depending on the nature of the specialty)	**See the Attached File**

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	**Student and teaching staff**	**Surveys and Questionnaires**
Effectiveness of Students assessment	**Course Coordinator**	**Peer Reviews**
Quality of learning resources	**Students and teaching staff**	**Classroom Observations**
The extent to which CLOs have been achieved	**Student Representatives**	**Student Performance Evaluations (exams, projects) CLOs Excel sheet.**
Other	**None**	

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**MATHEMATICS AND STATISTICS DEPARTMENT COUNCIL**
REFERENCE NO.	**8/1446**

DATE	(08/10/2024) 05/04/1446