The University of Jordan
School of Engineering
Industrial Engineering Department
1st semester 2024/2025

Course name:	Quality Control and Reliability (QC&R)
Course code:	0906763
Credits hours	3 hr.
Contact hours& room\office hours:	16:30-18:00 Sun., Tue., and Tuesday Office hours: 11:30 – 12:30 (in person) Sunday, Tuesday, and Thursday.
Course instructor's name, E-mail, and phone:	Prof. Dr. Mohammad D. AL-Tahat altahat@ju.edu.jo Phone: 22933
Course Coordinator:	Prof. Dr. Mohammad D. AL-Tahat
Textbook:	• D.C. Montgomery (2012). Statistical Quality Control, A Modern Introduction, 7th edition, John Wiley & Sons, New York • Chapter 19 of; Behnam Malakooti, (2014) Operations and production systems with multiple objectives, 1st edition, John Wiley & Sons, New York
Other reference(s):	• D. C. Montgomery, Jennings, and Pfund. Managing controlling and Improving Quality1st edition, John Wiley & Sons, New York • Recorded videos (by instructor)
Course Description:	As stated in the approved study plan. The course objective is to present the students with quality engineering in light of designing, managing, controlling, and improving the quality of products, processes and systems. Specifically, the following topics will be covered: The role and position of quality and reliability, quality costs, the concept of loss function, statistical process control, and control-chart based process analysis, gage and process capability, and acceptance sampling. Also, reliability mathematics and models, design for reliability, maintainability analysis, availability, and hazard analysis will be covered.
Providing Department:	Industrial Engineering
Prerequisite Course:	0936702 Applied Engineering Statistics
Course type	Required (Mandatory)

Assessment Methods:	Method	Weight %	Date
	General activities Quizzes, and Project	30	
	Mid Exam	30	
	Final Exam	40	Will be determined by Reg.

Course Learning Outcomes:	#	After successful completion of this course, the student will be able to	SO		
	CLO1	Understand what quality and quality management is			
	CLO2	Describe the concept of loss function			
	CLO3	Understand how to design variables control charts			
	CLO4	Understand how to design attributes control charts			
	CLO5	Investigate and analyze process capability			
	CLO6	Know how acceptance sampling is used			
	CLO7	Explain Reliability Concepts			
	CLO8	Apply Multicriteria Analysis for System Reliability			
	CLO9	Develop Effective Maintenance Strategies			
	CLO10	Conduct Replacement Analysis in Practical Scenarios			

Topics		
	Week #	Topic
	1 -2	**Understand Quality Systems and Management Principles:** Explain the foundational principles of quality systems and quality management and describe their importance in maintaining standards and improving organizational processes.
	3	**Define and Apply the Concept of Loss Function:** Describe the loss function in quality management and analyze how it relates to deviations from target performance and the associated costs of poor quality.
	4-5	**Design and Interpret Variables Control Charts:** Develop variables control charts to monitor process stability, detect variations, and make decisions based on statistical analysis for continuous process improvement.
	5-6	**Design and Interpret Attributes Control Charts:** Create and interpret attributes control charts to manage and assess the quality of processes involving categorical data and defect rates.
	7	**Investigate and Analyze Process Capability:** Assess and analyze process capability using statistical methods and interpret results to determine if processes meet specified requirements consistently.
	7-8	**Understand and Apply Acceptance Sampling Techniques:** Explain the principles of acceptance sampling and apply sampling methods to decide on the acceptance or rejection of product lots based on quality standards.
	9	**Define and Explain Reliability Concepts:** Define reliability and understand its implications on single, and multiples units' system performance over time, emphasizing the importance of reliability measurements in achieving consistent quality.
	10-11	**Multicriteria analysis for multiunit system:** Apply multicriteria analysis for multiunit system for evaluating and improving the reliability, operational efficiency, and cost.
	12-13	**Single-Objective Maintenance Policy and Mult objective Maintenance Policy** Correlate reliability with maintenance strategies to predict and to optimize system performance and design cost-effective maintenance plans that maximize operational uptime.
	14-15	**Replacement Analysis in Real-world Applications:** Conducting a Multicriteria analysis for single-objective, and multi objective replacement models, and distinguish between quality control and reliability and assess real-world implications of reliability through case studies to understand the impact of component failure and system design on operational outcomes.
	16	**Final Examinations**
Important Notes:	a. Do not hesitate to ask questions. b. You are required to bring a notebook and take notes in classes. c. Students are expected to attend every class session, and they are responsible for all material, announcements, schedule changes, etc., discussed in class. d. Discuss the assignments among yourselves. e. Don't Cheat; direct copying of others work will NOT be allowed or tolerated and will result in a reduction of grade. If you are found to be cheating in any way, on an exam or assignment, even signing the roll sheet for another student, you will be given an "F" for the course. There will be no exceptions. f. All cases of academic dishonesty will be handled in accordance with university policies and regulations. g. Students are expected to be ready to take a quiz any time they have a class. There will be no make-up quizzes or homework. h. Any students with disabilities who need accommodations in this course are encouraged to speak with the instructor as soon as possible to make appropriate arrangements for these accommodations.	