

School of Engineering and Natural Sciences / Industrial Engineering (English)

2022 - 2023 Academic Year

QUALITY ENGINEERING

Syllabus

Course Description					
Name	Code	Semester	T+A Hour	Credit	ECTS
QUALITY ENGINEERING	IND3110786	Fall Semester	3+0	3	6
Prerequisites Courses					
Recommended Elective Courses					
Language of Instruction	English				
Course Level	First Cycle (Bachelor's Degree)				
Course Type	Required				
Course Coordinator	Assoc.Prof. Melis Almula KARADAYI				
Name of Lecturer(s)	Assoc.Prof. Billur Deniz KARAHAN				
Assistant(s)					
Aim	The aim of the course: 1. Discussion about the concept of quality; 2. Understanding the philosophy of quality, quality assurance, quality control systems, and application of a quality system; Examination of the systematic approach to implement quality in a company and apply ISO 9000 series standards; presenting information to improve the quality of a product, method and human performance; 3. Explaining the efficient use of quality tools and techniques necessary to achieve high quality production (including design); 4. Learning the principles of seven quality management tools and techniques and discussing their results; 5. Providing basic information about the principles of quality strategies and quality improvement methods.				
Course Content	This course contains; Understanding 'quality' concept and philosophy, Engineering and quality, principles of TQM, development of TQM, Gurus of TQM, Principles of leadership, communication, organization, communication skills, vision, mission, strategy, Quality system and documentation, cost of quality, data collection, sampling, statistical process control, statistical process control (control charts: X-R, X-S), Statistical process control (np, p, c, u charts), Designing quality properties, use of quality tools (flow charts, pareto analysis, cause-effect analysis, histogram, scattering diagrams), quality management and planning tools (affinity diagram, tree diagram, matrix, relation diagrams, critical assessment analysis, Quality techniques (benchmarking, brainstorming, target analysis, failure modes and effect analysis), Quality techniques (house of quality function deployment, design of experiment), Continuous improvement techniques (TQM, Kaizen), Continuous improvement techniques (Six sigma, DAMIC, SWOT, Deming circle), Student presentations.				
Course Learning Outcomes			Teaching Methods	Assessment Methods	
			1, 10, 12, 15, 2, 3, 4, 8	A, C, D	
1. To understand the definitions of the basic concepts of quality, quality management and the development of quality in engineering applications 2. To use statistical tools to summarize quality data and make inferences 3. To select appropriate quality tools and techniques for engineering applications; to prepare and interpret control charts for quality surveillance and improvements; 4. To have knowledge about statistics, sampling procedure, process control and use this information for high quality production in engineering applications 5. To conduct research in teams for designing experiments to improve the product properties and process performance. To write scientific reports and present these results.					
Teaching Methods	1: Lecture, 10: Brainstorming, 12: Case study, 15: Problem solving, 2: Question - Answer, 3: Discussion, 4: Exercise, Practice, 8: Teamwork				
Assessment Methods	A: Written Exam, C: Homework, D: Project / Design				
Lecture Schedule					
Sequence	Topics	Preliminary Preparation			
1	Understanding 'quality' concept and philosophy				
2	Engineering and quality, principles of TQM, development of TQM, Gurus of TQM				
3	Principles of leadership, communication, organization, communication skills, vision, mission, strategy				
4	Quality system and documentation, cost of quality				
5	data collection, sampling, statistical process control				
6	statistical process control (control charts: X-R, X-S)				
7	Statistical process control (np, p, c, u charts)				
8	Designing quality properties, use of quality tools (flow charts, pareto analysis, cause-effect analysis, histogram, scattering diagrams)				
9	quality management and planning tools (affinity diagram, tree diagram, matrix, relation diagrams, critical assessment analysis)				
10	Quality techniques (benchmarking, brainstorming, target analysis, failure modes and effect analysis)				
11	Quality techniques (house of quality function deployment, design of experiment)				
12	Continuous improvement techniques (TQM, Kaizen)				
13	Continuous improvement techniques (Six sigma, DAMIC, SWOT, Deming circle)				
14	Student presentations				
Evaluation Methods		Weight(%)			
Midterm Exam		30			
General Exam		70			

Resources
D.C.S. Summers, Quality, 2nd Edition Prentice Hall Inc 2000 ISBN 0-13-099924-5 D.C. Montgomery, Introduction to Statistical Quality Control, 7th Edition John Wiley and Sons Singapore Ltd, 2013, ISBN 978-1-118-32257-4 M. Zahiri, Total Quality Management for Engineers, Woodhead Publishing, 1991 ISBN 9781855730243 G.P. Kanji, M. Asher 100 Method for Total Quality Management SAGE publications Ltd, 1996 ISBN 0803977476