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

2023 - 2024 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; Quality philosophies and foundation,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 proces 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 (benchmarketing, brainstorming, target analysis, faillure modes and effect analysis),Quality techniques (house of quality function deployment, design of experiment),Continuous improvement technqiues (TQM, Kaizen),Continuous improvement techniques (Six sigma, DAMIC, SWOT, Deming circle),Project Presentations.

Course Learning Outcomes	**Teaching Methods**	**Assessment Methods**
1. Defines the basic concepts of quality and and examine the effect of quality philosophy on engineering practices.	10, 12, 16, 2, 9	A, E, F
2. Makes calculation and summarize/map the obtained data to make inferences for improvement.	10, 16, 6, 9	A, E
3. Analyzes the appropriate quality tools and techniques for engineering applications and analyzes control charts for the quality monitorigng and improvement.	10, 16, 9	A, E, F
4. Utilize knowledge of statistics, acceptance sampling and process control for high quality production in engineering applications.	10, 14, 9	A, F
5. Plan experiments to improve product properties and process performance, conduct research as a team, prepare scientific reports, organize and present the results.	10, 16, 9	A, F

Teaching Methods	10: Discussion Method, 12: Problem Solving Method, 14: Self Study Method, 16: Question - Answer Technique, 2: Project Based Learning Model, 6: Experiential Learning, 9: Lecture Method
Assessment Methods	A: Traditional Written Exam, E: Homework, F: Project Task

Lecture Schedule

Sequence	**Topics**	**Preliminary Preparation**
1	Quality philosophies and foundation	Lecture Notes
2	Engineering and quality, principles of TQM, development of TQM, Gurus of TQM	Lecture Notes
3	Principles of leadership, communication, organization, communication skills, vision, mission, strategy	Lecture Notes
4	Quality system and documentation, cost of quality	Lecture Notes
5	Data collection, sampling, statistical process control	Lecture Notes
6	Statistical proces control (control charts: X-R, X-S)	Lecture Notes
7	Statistical process control (np, p, c, u charts)	Lecture Notes
8	Designing quality properties, use of quality tools (flow charts, pareto analysis, cause-effect analysis, histogram, scattering diagrams)	Lecture Notes
9	Quality management and planning tools (affinity diagram, tree diagram, matrix, relation diagrams, critical assessment analysis	Lecture Notes
10	Quality techniques (benchmarketing, brainstorming, target analysis, faillure modes and effect analysis)	Lecture Notes
11	Quality techniques (house of quality function deployment, design of experiment)	Lecture Notes
12	Continuous improvement technqiues (TQM, Kaizen)	Lecture Notes
13	Continuous improvement techniques (Six sigma, DAMIC, SWOT, Deming circle)	Lecture Notes
14	Project Presentations	Project Presentations

Evaluation Methods	**Weight(%)**
Midterm Exam	30
General Exam	70

Resources

D.C.S. Summers, Quality, 2nd Editon, Prentice Hall Inc, 2000, ISBN 0-13-099924-5.
D.C. Montgomery, Introduction to Statistical Quality Control, 7th Edition, John Wiley&Sons Singapore Pte. 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
Crosby PB. Quality is free. McGraw-Hill, NewYork, 1979, ISBN 978-0070145122