IE 339: Quality Engineering 3(2,1,2)

Catalog Data An understanding of the basic concepts of quality, An appreciation of the functions served by a quality management system; the ability to design quality into products so as to satisfy both internal and external customer The study of frequency distributions and probability models in quality control. Preparation and use various control charts. Construction of different sampling plans. Methods to quality improvement and analysis of quality costs. Application of computer in the above area.

Prerequisite STAT 324

Co-requisites IE 352

Level 6

Textbook Quality Planning & Analysis, 5th ed., Frank M. Gryna, McGraw-Hill, 2007.

Reference Introduction to Statistical quality control, 4th ed., D. C. Montgomery, John Wiley & Sons, Inc., 2001.

Learning Objectives To introduce students to the use of statistical methods and other problem-solving techniques required in the area of quality control. The ability to control process performance using appropriate statistical tools. The ability to diagnose quality problems and develop sustainable improvement. To enable students to know how to measure the quality characteristics. In addition, to introduce students to apply the quality improvement tools. In additional to road map to enterprise quality. Overview of quality management methodologies.

Topics (classes)

1.	Introduction to quality control	1 classes
2.	Fundamentals of statistics for quality control	2 classes
3.	The basic concepts of quality	2 classes
4.	Control charts for variables	3 classes
5.	Control charts for attributes	3classes
6.	Processes capability	3 classes
7.	Acceptance sampling	3 classes
8.	Design quality into products so as to satisfy both internal and external customers	3 classes
9.	Methods of quality improvement	2 classes
10.	Quality costs	3classes
11.	An appreciation of the functions served by a quality management system;	3 classes 2 classes
12.	Introduction to Total Quality Management (TQM), Six Sigma, Balance Score Card (BSC), ISO 9001, and Kazien.	3 classes

Laboratory Topics

1 Measurement of different dimensions (length, width and height) of a job and using of computer program for:
   - a- construction of frequency distribution of the data
   - b- construction of mean and range charts with the data
   - c- constructing variable control charts

2 Experiments for measuring surface roughness , roundness, and alignment

3 Testing and inspection of different work pieces.

4 Construction of p and c charts

Project work Group project for study and evaluate the quality conditions at manufacturing and service sectors.

Computer Usage Minitab software package

Learning outcomes

1. Describe the history and importance of quality control [a]
2. Learn the statistical tools need to use in the quality control area [a, e,]

3. Learn the main differences between variable and attribute control charts [a]
4. Learn how to construct the different types of control charts and how to interpret them. [a, e]
5. Learn how to use control charts to monitor the processes [a, c]
6. Learn how to determine the capability of the process and how to use the findings to analyze the control limits of the process .[a, c, e]
7. Learn how to perform the qualification tests for the process.[c ,e]
8. Understand the Operating Characteristic Curve and prepare the acceptance sampling plan.[c, e]
9. Learn how to prepare the acceptance samples for control charts.[a , c, e]
10. Diagnose quality problems and develop sustainable improvement. [c ,e]
11. Describe the main principals of the TQM, BSC, ISO9001 and Kaizen [a ,e]
12. Learn and understand how to use Minitab software package in the quality area.[a ,e ,c]
13. Work in teams and communicate effectively through class discussions, real case project from industrial, and presentation. [a, b, e, g]

Estimated Category Content Engineering Science : 2 credit hours or 67%
Engineering Design: 1 credit hour or 33%

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