



COURSE OUTLINE

Course Number AMT 122	Course Title Quality Control	Credits 3
Hours: Lecture/lab 3/0	Co-or Pre-requisite MAT 125, AMT 103	Implementation Fall 2022

Catalogue Description

Introduces students to the subject of statistical process control (SPC). Course focus on basic concepts that includes process flowcharting, check sheets/tally charts, histograms, graphs, Pareto analysis, cause and effect analysis, scatter diagrams, control charts and process capability.

General Education

Category:
Not GenEd

Course coordinator:

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Required Text: Introduction to Statistical Quality Control, 8th Edition
By Douglas C. Montgomery
Publisher: Wiley

Student Learning Outcomes (SLO):

Course Competencies/Goals

Students will be able to:

1. Define terms such as quality, process, control, design quality, conformance quality and quality-related costs. **(ILG, 11, PLO,8)**
2. Describe the various techniques of block diagramming and flowcharting and to show their use in process mapping, examination and improvement. **(ILG, 1,11, PLO,8)**
3. Identify the types of data and how data should be recorded. **(ILG, 10,11, PLO,8)**
4. Choose the best method of presenting data in particular bar charts, histograms and graphs. **(ILG, 1,2,10,11, PLO,8)**
5. Identify different causes of variation and explain the difference between accuracy and precision, as well as measures of accuracy and precision. **(ILG, 2,10,11, PLO,8)**
6. Use mean and range charts in the real-time control of processes. **(ILG, 1,2,10,11, PLO,8)**

Institutional Learning Goals (ILG)

Institutional Learning Goal 1 Written and Oral Communication in English: Students will communicate effectively in both speech and writing.

Institutional Learning Goal 2 Mathematics: Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.

Institutional Learning Goal 3 Science: Students will use the scientific method of inquiry, through

the acquisition of scientific knowledge.

Institutional Learning Goal 4 Technology: Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.

Institutional Learning Goal 10 Information Literacy: Students will recognize when information is needed and have the knowledge and skills to locate, evaluate, and effectively use information for college level work.

Institutional Learning Goal 11 Critical Thinking: Students will use critical thinking skills understand, analyze, or apply information or solve problems.

Program Learning Outcomes (PLO)

1. Maintain a safe and organized workspace.
2. Interpret blueprints to manufacture parts.
3. Apply shop and tool room mathematics as needed.
4. Complete part inspection using appropriate instruments such as micrometers, calipers, and scales.
5. Set up and operate a manual drill press, lathe, milling machine, grinder and press brake.
6. Set up and operate CNC machines (lathe and mill).
7. Use NC programming (G and M codes) to control movement and cutting processes.
8. Understanding of statistical quality control.
9. Understanding of the broad spectrum of manufacturing technologies.
10. Pursue NIMS certification.

Unit Objectives

Unit I Introduction to quality process and control (SLO 1,2,3)

The student will be able to:

1. Define the subject of statistical process control (SPC).
2. Define terms such as quality, process and control.
3. Differentiate design quality and conformance quality.
4. Identify quality-related costs.
5. Define customer–supplier relationships; processes; standardizing processes; designing/modifying processes; improving processes.
6. Use various techniques of block diagramming and flowcharting and to show their use in process mapping, examination and improvement.
7. Present data through bar charts, histograms and graphs.
8. Identify causes of variation and define accuracy and precision.
9. Use normal distribution in understanding process variation and capability.

Unit II Process control (SLO 4,5,6)

The student will be able to:

1. Use the mean and range charts for the control of process accuracy and precision.
2. Calculate process control limits.
3. Identify various types of attribute data.
4. Use control charts for attributes.

Unit III Process capability (SLO 6)

The student will be able to:

1. Define and measure process capability.
2. Calculate and interpret process capability indices.

3. Use of process capability analysis in a service environment.

Method of Instruction

Learning will take place via classroom instruction, demonstrations, and student activities, as well as through textbook reading and homework assignments.

Student Evaluation

Students' achievement of the course objectives will be evaluated through the use of the following:

- Three-unit tests assessing students' comprehension of terminology, calculations and practices related to the unit objectives.
- In class participation, homework and attendance.

Evaluation Tools	Percentage of Grade
3 Unit Tests	75%
Attendance and participation	10%
Homework / In-Class Assignments	15%
Total	100%