

MET 224: Inspection and Quality Control

(Required)

Course Description: MET 224: Inspection and Quality Control. LT: 1 LB: 3 CR:2
This course deals with industrial inspection and quality control methods for manufactured parts, and covers topics on inspection procedures, the use of standards, specifications, sampling techniques, statistical quality control (SQC), and the construction of X - and R - control charts. Laboratory activities cover inspection techniques for linear and geometrical tolerances (flatness, squareness, roundness, . . . etc.) and the use of inspection gauges and comparators. The course introduces the students to modern inspection techniques and provides training in co-ordinate measuring machine, profile projector, toolmaker's microscope and high speed motion analysis.

Prerequisite: MET 102 - Mechanical Measurements
MET 201 - Mechanical Drafting
MET 221-Machining Processes II

Textbook: C.W. Kennedy, et. al., Inspection and Gaging, Industrial Press Inc., 1987

References: J.B. Kennedy and A.M. Neville, Basic Statistical Methods, Harper & Row Publisher Inc., 1986

Objectives: To introduce the students to;

1. The need and purpose of industrial inspection, the relationship between specifications, standards, and inspection.
2. The connections between quality, accuracy, and their costs.
3. the principles of statistics in process and quality control, the construction and use of industrial quality control charts and the in-process monitoring and quality control

Course Outline:

[I] Modules:

Module	Topic	Duration
1.	Industrial Inspection.	1 Week
2.	Classification of inspection.	2 weeks
3.	Interchangeability Concepts.	1 Week
4.	Geometrical Variations.	2 weeks
5.	Specifications and Standards.	2 weeks
6.	Inspection and Implicit Conditions.	2 weeks
7.	Quality.	1 Week
8.	Statistical Quality Control.	2 weeks
9	In process monitoring and quality control.	1 Week

[II] Laboratory Work/Projects:

Exercise	Topic	Duration
1.	Inspection of Linear Dimensions Using Vernier Depth Gauge	1 Week
2.	Inspection of Round Shafts Using Vernier Caliper	1 Week
3.	Inspection of Dimensions with Dimensional Tolerances Using Bench Comparator	1 Week
4.	Inspection of Dimensions with Dimensional Tolerances Using Limit Gauges	1 Week
5.	Inspection of Machined Surface for Geometrical Tolerances	1 Week
6.	Inspection of Surface Finish Using Standard Micro finish Comparators	1 Week
7.	Inspection of Surface Finish Using Surface Finish Apparatus	1 Week
8.	Checking of Roundness:	1 Week
9.	Quality Control of Machined Parts	1 Week
10	Inspection of machined part using profile projector	1 Week
11	Inspection, using Toolmaker's microscope	1 Week
12	Co-ordinate measuring machine	1 Week
13	Inspection using high speed camera	1 Week

Evaluation Methods:

1. Major exams and a final exam.
2. Homework and quizzes.
3. Lab work, mid and final lab exams.

Course Learning Outcome:

The expected outcome is that the students will be able to:

1. Demonstrate basic understanding of industrial inspection, interchangeability concepts, geometrical variations, specifications and standards, quality, statistical quality control, in-process monitoring and quality control.
2. Demonstrate ability to perform inspection using limit gauges, vernier depth gauge, bench comparator, surface finish apparatus, profile projector, form testing apparatus and coordinate measuring machines.

Prepared by:

Dr. Saji Varghese

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