



In addition to Part I (General Handout for all courses appended to the time table) this portion further gives specific details regarding the course.

**Course No.** : MF F220  
**Course Title** : Metrology and Quality Assurance  
**Instructor-in-Charge** : Tribeni Roy  
**Tutorial Instructor** : Radha Raman Mishra  
**Laboratory Instructor** : Girish Kant Garg

### 1. Course Description:

Metrology and Quality Assurance are the tools which equip engineers to ensure a defect free and precise product during its production. The present course covers various aspects of Metrology and Quality Assurance such as importance of metrology, calibration, limits fits and tolerances, design of gauges, linear and angular measurement, inspection of surface quality, features inspection, coordinate measuring systems, application of vision, interferometry, laser, and other non-contact measuring systems, various case studies on measurement systems used for automated production systems; quality management: practices, tools and standards, statistical techniques in quality control, statistical process control using control charts, control charts for attributes, and variables, process capability analysis, measurement system analysis, acceptance sampling plan, reliability assessment of systems and use of commercial software for statistical quality control (SQC)

### 2. Scope and Objective of the Course:

This course is designed to impart knowledge on the basics of metrology and quality assurance (QA). Metrology bridges the gap between designer's vision and the actual product. Knowledge of QA or quality control will enable the students to statistically determine the number of defects in manufactured products and ways to avoid them. This course provides laboratory demonstration of various metrology tools for inspection and application of statistical tools for problem solving.

### 3. Text Books:

- i) Connie L. Dotson, "**Fundamentals of Dimensional Metrology**", Cengage Learning, 6th Ed., 2016 (**T1**)
- ii) Amitava Mitra, "**Fundamentals of Quality Control and Improvement**", Wiley, 3<sup>rd</sup> Edition, July 2008 (**T2**)

### 4. Reference books

- i) Gaylor Shotbolt and Sharp, "**Metrology for Engineers**", O R.Cassel, London, 1993 (**R1**)
- ii) Douglas C. Montgomery, "**Introduction to Statistical Quality Control**", John Wiley & Sons, 3rd Ed., 2001 (**R2**)





## 5. Course Plan:

Module	Lecture Session	Learning Outcome	References
M1	(L1-4) Basics of measurement and concepts in metrology	To understand the importance of metrology	T1, R1
	(L5-7) Limits, fit and tolerances	To understand differences between designer's vision and actual product	T1, R1
	(L8-11) Measurement techniques	To learn about measurement of various objects	T1, R1
	(L12-14) Inspection of surface quality	To know about various surface attributes and their importance	T1, R1
	(L15-17) Measurement systems and case studies	To learn various measurement systems	T1, R1
M2	(L18-20) Fundamentals of quality management	To know the basics of quality management	T2, R2
	(L21-30) Statistical quality control and Control charts	To learn about quality control and quality monitoring of processes	T2, R1, R2
	(L31-34) Process capability and measurement system analysis	To learn about process capability measures and analysis of measurement systems	T2, R2
	(L35-38) Acceptance sampling plan and reliability assessment	To learn about inspection with respect to acceptance or rejection of products	T2, R2
	(L39-40) Use of commercial software for SQC	Demonstration of software for SQC	--

## 6. Lab Practical:

Various experimentations about metrology and quality assurance will be conducted in virtual mode.

## 7. Evaluation Scheme:

Components	Duration (minutes)	Weightage (%)	Date	Remarks
Mid-semester test	90	30	Will be announced by AUGSD-AGSRD	OB
Assignments/Projects/Seminars/Quiz	--	20	To be announced in the class	OB
Lab quiz/viva	--	15	To be announced in the class	OB





Comprehensive Examination.	120	35	Will be announced by AUGSD-AGSRD	CB/OB
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## 8. Chamber Consultation Hours:

To be announced in the first class.

## 9. Notices:

All notices related to this course will be put on the Nalanda/Google Classroom/email.

## 10. Make-up Policy:

Make-up will be granted ONLY in genuine cases with prior permission as per the institute rules.

Instructor- in-Charge  
MF F220

