4047

~~5054~~ - METROLOGY & QUALITY CONTROL EDIT

Teaching Schedule Per Week			Progressive Assessment		Examination Schedule (Marks)			
Lectures	Practical	Credits			Theory		Practical Ex.	Total
3	2	5	25	25	3 Hrs.	100	0	150

Pre-requisite	Source	U
Nil	MEC	

Semester	Theory	Test	Total	TW	PR	Gr Total
	75	25	100	25	–	125

Rationale: This subject is classified as a core technology. It is intended to teach the students facts, concepts, principles and procedures of measurement of different elements of machine at production stage as well as inspection of machine tools so that he can work as an inspector or supervisor in manufacturing system on shop floor of Quality Control Department effectively and efficiently.

COURSE CONTENTS	Hrs.	Mks
1. BASIC CONCEPT OF METROLOGY Definition Of metrology, Need of inspection in industries, Precision and accuracy, 1.4 Sources of errors	2	6
2. LINEAR AND ANGULAR MEASUREMENTS Definition of standards, Line and end standards, End and length bars, Instruments used for angular measurements, a) Vernier and Optical Bevel Protractor, b) Sine bars Angle gauges, Clinometer, Angle Dekkor, Auto Collimator	4	8
3. LIMITS- FITS- GUAGES & COMPARATORS, Definitions of – Tolerance of parts, Fits, Deviations, Basic shaft and hole, Taylor's principle, Limit gauges, Elementary study of gauges design, Gauges tolerances, Definition of comparators, 3 a) Classification, Advantages, Disadvantages, Different types of Comparators a) Mechanical, Electrical, Electronics, Optical, Pneumatic, Requirements of good dial indicators, Classification of dial indicators, Working mechanism, Advantages of dial indicators	10	16
4. STRAIGHTNESS:FLATNESS, SQUARENESS: Parallelism & Measurement of surface finish, Testing the straightness by using spirit level, Procedure for determining, Flatness, Squareness, Checking parallelism of Simple parts, Holes , Sides, Faces, Meaning of surface texture, Surface roughness, Terminology as per Indian Standards, Methods of measuring surface finish, Stylus probe instruments, Tomlinson surface meter, Root mean square valve, Center line average valve, Symbols for designating the surface roughness on drawings.	5	10
5. METROLOGY OF SCREW THREADS AND GEARS Terminology of screw, Errors in threads, Drunken threads, Pitch errors, Effect of pitch errors, Study of screw measurement of various element of Thread, Study of screw, thread measurement instruments, Terminology of Gear Tooth, Sources of errors in gear measurement, Measurement of individual element of Gear	5	10
6. BASIC CONCEPT OF QUALITY CONTROL Quality Control, Meaning of quality control, Purpose, Set up, policies and objectives, Quality of design and conformance, Specification of quality, Cost and value of quality, Measuring and balance of it, Planning of process control, Responsibility, Organisation for quality acceptance, Preservation: Assurance and Co-ordination.	8	20
7. STATISTICAL QUALITY CONTROL a) Quality mindedness, Budgeting, Inspection, Planning, Scheduling, Vendor quality rating, Study of process capability, Field Complaints, Analysis of field complaints	14	30

and its organisations, Quality audit system, Importance of statistical methods in quality control, Operation Chart, Curves for acceptance sampling, Sampling Planes, Producers and Consumers risk, Control charts, Application for Attributes and Variables, Sampling plans, Single Sampling, Double Sampling, Fraction defectives and defects, Acceptance quality level, Average outgoing quality limit Sample size		
Total	48	100

TERM WORK

Study and use of various measuring instruments such as different types of calipers; surface plate, angle plate, "V" block, straight edges. Micrometers and Vernier callipers of different types, and actual measurements of machine parts.

Use of comparator(Mechanical) with the help of slip gauges, Use of sine bars, Use of dial indicators, Use of Gear tooth Vernier, Use of optical flats, Screw thread measurement, Study of optical profile projector, Study and demonstration of Tool-makers Microscope, Normal distribution, Process capability of machine, X-R chart preparations, Operation characteristics curves.

REFERENCE BOOK

1. Engineering Metrology by R.K.Jain
2. Engineering Metrology by I.C.Gupta
3. Statistical Quality control by R.C.Gupta
4. Industrial Engineering by S. Kumar