

Name of Course : ENGG. MEASURING EQUIPMENTS & QUALITY CONTROL

COURSE CONTENTS

THEORY

- Terminology used in Metrology
- Standards of length and gauges blocks
- Principles of comparators
- Limits, Fits and Tolerance
- Measurements of straightness, flatness & roundness
- Sources of errors in measurements
- Care, use and maintenance of instruments
- Surface texture measurements
- Quality control and SQC techniques
- Calibration of measuring instruments

PRACTICALS

- Dimensional checking with various instruments
- Exercise on MECHANICAL, OPTICAL, ELECTRICAL & PNEUMATIC COMPARATORS
- Profile measurement by using video measuring system and PROFILFE PROJECTORS
- Thread measurements using PITCH MICROMETER, PROFILE PROJECTOR, FLOATING CARRIAGE MICROMETER & HORIZONTAL METROSCOPE
- Dimentionsional measurements by using 2D micro height.
- Measurement of surface roughness by surface texture measuring equipment
- Roundness measurement by ZFISS make CNC roundness measuring M/C.
- Coordinate measurement by TESA make CMM.

Name of Course : CALIBRATION OF DIMENSIONAL MEASURING INSTRUMENTS AND GAUGES

COURSE CONTENTS

THEORY

- Terminology used in metrology
- Environmental conditions for calibration / testing lab(NABL)
- Calibration procedure for VERNIER CALIPER (IS-3651) and EXTERNAL MICROMETER (IS-2967)
- Calibration procedure for VERNIER HEIGHT GAUGES (IS-2921) and PLUNGER DIAL GAUGES (IS-2092), LEVER TYPE DIAL GAUGE (IS-11498)
- Calibration procedure of RING RADIUS GAUGES (IS-5273)
- Calibration of Thread plug gauges
- Calibration of Bevel Protractor

PRACTICALS

- Calibration of VERNIER CALIPER
- Calibration of MICROMETER (INTERNAL & EXTERNAL)
- Calibration of HEIGHT GAUGES
- Calibration of RADIUS GAUGES
- Calibration of BEVEL PROTRACTOR
- Calibration of DEPTH MICROMETER
- Calibration of THREAD plug gauges

Name of Course : INSPECTION TECHNIQUES OF DIMENSIONS AND SURFACE ROUGHNESS OF PRECISION COMPONENTS

COURSE CONTENTS

THEORY

- Terminology used in metrology
- Standards of length and gauge blocks
- Care, use and selection of instruments
- Source of measuring errors
- Principle of surface texture measurement
- Methods of checking angles

PRACTICALS

- Dimensional checking with standard instruments
- Exercise on PROFILE PROJECTOR and video measuring system
- Angular measurement by CLINO METER, BEVEL HEADS
- Exercise on surface texture measuring equipment
- Exercise on 2D micro height and mechanical CMM

Name of Course : INSPECTION TECHNIQUES OF PROFILES OF TAPERD & THREADED COMPONENTS

COURSE CONTENTS

THEORY

- Terminology used in metrology
- Standards of length and gauge blocks
- Limits fits and tolerances
- Types of errors in measurement
- Methods of checking Taper, threads and profiles

PRACTICALS

- Dimensional checking with various instruments
- Thread measurement by PITCH MICROMETER
- Thread measurement by PROFILE PROJECTOR
- Thread measurement by FLOATING CARRIAGE MICROMETER
- Thread measurement by HORIZONTAL MICROSCOPE
- Thread measurement by CLINOMETER and BEVEL HEADS,...
- Profile measurement by video measurement system (VMS- ARCS make, Malaysia) and PROFILE PROJECTOR

Name of Course : INSPECTION TECHNIQUES OF GEOMETRIC FEATURES

COURSE CONTENTS

THEORY

- Terminology used in metrology
- Standards of length and slip gauges
- Methods of measuring straightness and flatness
- Measurement of roundness (circularity), cylindricity, perpendicularity and parallelism by using geometrical measurement software
- Sources of measuring error

PRACTICALS

- Dimensional checking with various instruments
- Checking of straightness of STRAIGHT surface by using SPIRIT LEVEL and AUTO COLLIMATOR, CNC roundness measurement M/C
- Checking flatness of SURFACE PLATE by using SPIRIT LEVEL and AUTO COLLIMATOR, CNC roundness measurement M/C
- Roundness (circularity) checking by DIAL GAUGES, V-BLOCK and CNC roundness measurement
- Checking flatness of selected surfaces by using MONOCHROMATIC LIGHT and OPTICAL FLAT
- Checking of perpendicularity by using mechanical CMM
- Checking of parallelism by using mechanical CMM

Name of Course : CMM AND ITS APPLICATIONS

COURSE CONTENTS

THEORY

- Terminology of measurement
- Introduction to CMM
- Types of CMM
- Types of PROBES
- CMM SOFTWARE
- Geometrical features
- Calibration of CMM different methods
- Care and maintenance of CMM
- Environmental condition required

PRACTICALS

- Demonstration of CMM and parts
- Probe calibration
- Linear and angular measurements
- Sequence to measure ISO parameters, such as flatness, straightness etc
- Calibration of CMM

Name of Course : COMPUTER BASED SPC (STATISICAL PROCESS CONTROL)

COURSE CONTENTS

THEORY

- Variation, types of variation using histogram how to measure
- Statistical measure of variation, mean, range and standard deviation, preparation of normal curve and the 68%, 95% and 99.7% rule.
- Control Charts- why they are used, common element of all control charts, out of control pattern. Variable and attributes control charts
- Calculating and plotting s data and interpretation of the chart
- Calculate control limits and estimating basic line, setting up of Up, P, np C and U control charts
- Process, what and why, Cp and Cpk
- How to conduct process capability study, how to collect the data, calculation and what to do if the process is not

PRACTICALS

- On all the above by using SPC online data capturing system with 600 no. of components