

GUJARAT TECHNOLOGICAL UNIVERSITY

Diploma in Mechatronics Engineering

Semester: 4

Subject Name **MEASUREMENT PRACTICE**

LABORATORY EXPERIENCES:

Experience Type	Experience Number	DESCRIPTION OF LABORATORY EXPERIENCE
PREPE-RATORY ACTIVITY	1	a. S.I. basic, supplementary and derived units and their conversions. b. Study surface plate-material, alignment and applications. c. Various drafting, surface finish and geometrical symbols. d. Axis, centre, angles, plane, solid angle.
STUDY	2	Coordinate Measuring Machine.
	3	Control systems.
DEMONSTRATION AND STUDY	4	Slip gauges.
	5	Various surface textures, manufacturing processes and surface finish achieved. Use microscope and /or surface roughness tester .Compute typical profile of surface roughness.
	6	Various transducers and sensors.
	7	Potentiometer sensor
	8	Piezoelectric sensors and light sensors.
PERFORMANCE	9	Measure external , internal and depth dimensions with the help of vernier caliper.
	10	Measure external dimensions with the help of outside micrometer.
	11	Measure internal dimensions with the help of inside micrometer.
	12	Measure internal dimensions with the help of telescopic gauge.
	13	Compare external and internal measurement done by vernier caliper, vernier dial caliper and outside / inside micrometer.
	14	Measure angle between different planes by using bevel protector.
	15	Measure angle between two planes with the help of sine bar and slip gauges.

	16	Measure straightness.
	17	Measure flatness.
	18	Measure roundness of circular bar with dial gauge and draw a polar diagram.
	19	Measure and /or derive from basic measurement various elements of external screw threads. Use 1. Two and three wire methods. 2. Thread micrometer method 3. Optical / projection method. 4. Screw thread ring gauge
	20	Measure and /or derive from basic measurement various elements of internal screw threads. Use screw thread plug gauge also.
	21	Measure different elements of gear by using Gear tooth vernier caliper.
	22	Measure flow with venturimeter.
	23	Measure temperature of hot body with the help of thermocouple.
	24	Inspect similar fifty pieces by plug gauge / snap gauge.
	25	Calibrate vernier caliper and outside micrometer.
SEMINAR PRESENTATION AND GROUP DISCUSSION	26	a) 10 minutes individual seminar presentation on given topic. b) Group discussion on given topic.
SCHOOL WITHIN SCHOOL	27	Guiding / Sharing /Mentoring the know-how by meritorious students to lower performing students.
SELF LEARNING AND LITURATURE SURVEY	28	1. Contact with field expert ,seniors, alumni and get further know-how individually or in a group. 2. Read /refer related book / magazine / article / literature / product pamphlets-catalogues and share the content. 3. Surf internet and download related movies/articles and share the content. 4. Visit individually any exhibition/industry and share the content.
PAPER SOLUTION	29	Given model paper by concerned teacher,(Not old papers), prepare solution.
ASSIGNMENT	30	Solve given assignments.
INDUSTRIAL VISIT	31	Visit at least 2 to 3 related industries.

NOTES :

1. Prepare term work report for each experience.
2. Term work report content of each experience should also include following. (As applicable).
 - a.Experience description / data and objectives.
 - b.Skill/s which is / are expected to be developed in student after completion of experience.
 - c.Drawing of experience / setup / instruments with labels/nomenclature to carry out the experience
 - d.The specifications of machines / equipments / devices / tools / instruments /items/elements which is / are used to carry out and to check experience
 - e. Process parameters / setup settings' values applied to carry out experience.
 - f. Steps / process description to execute experience.
 - g. Information on recent machines / equipments / devices / tools / instruments /items available in market to carry out the experience.
 - h. Problems occurred/faced ,their causes and solution/s applied.
 - i. Special / Additional notes or remarks.
3. Distance Learning manual, photocopies, printed content, etc. are not permitted in term work report of student of regular mode. Focus should be on developing the term work as original efforts of students.
4. Term work content of industrial visit report should also include following.
 - a.Brief details of industry visited.
 - b.Type ,location, products, rough layout, human resource, etc of industry.
 - c.Details, description and broad specifications of machineries/processes observed.
 - d.Safety norms and precautions observed.
 - e.Student's own observation on Industrial environment, culture and attitude.
 - f.Any other details / observations asked by accompanying faculty.
5. Term work includes experience logbook duly certified by subject teachers.

REFERENCE BOOKS:

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|-----|---|----------------------------------|
| 1. | Engineering Metrology | R.K.Jain |
| 2. | Mechanical and Industrial Measurement | R.K.Jain |
| 3. | Metrology and Instrumentation | Tahir |
| 4. | Metrology and Instrumentation | Gupta |
| 5. | Mechanical Measurement | R.S.Sirohi
& H.C.Radhakrishna |
| 6. | Handbook of Dimensional Measurement | Francis T. Fargo |
| 7. | Gear Metrology | C.A.Scoks |
| 8. | Practical Engineering Metrology | K.W.B.Sdarp, Pitman |
| 9. | Industrial Instrumentation | Donald A. Eckman |
| 10. | Instrumentation - Pressure & Liquid level | F.E. Doyle. |
| 11. | Mechanical measurements and instrumentation | R.K.Rajput (KATSON) |
| 12. | Mechatronics | W.Bolten (PEARSON) |
| 13. | Mechatronics | HMT |
| 14. | Fundamentals of Fluid Mechanics | Dr.D.S.Kumar (KATSON) |
| 15. | Fluid Mechanics | Douglas (PEARSON) |