

Bangladesh Polytechnic Institute

Technology: **Mechanical**

Semester: 6th

Sub. Name: METROLOGY (7064)

T P C: 3 3 4

Course Outline

Teacher Name: Md. Mominul Islam

Mob.No: 01740 91 87 34

Class No.	Discussion and Explanation of Topics/ Titles	Remarks
Class-1	<ul style="list-style-type: none"> ❖ <u>Understand metrology.</u> ➤ Define metrology. ➤ Mention the objectives of metrology. ➤ Describe different types of inspection techniques. ➤ Relate accuracy and cost of inspection. ➤ Explain the characteristics to be considered in selection of instruments in eliminating errors in measurement. 	
Class-2	<ul style="list-style-type: none"> ❖ <u>Understand metrology.</u> ➤ Explain the effect of temperature and alignment on precision measuring instruments and ISO inspection room temperature. ➤ Describe the general care of measuring instruments and calibration techniques. ➤ Describe use and care of surface plate, angel plate and V-Block 	
Class-3	<ul style="list-style-type: none"> ❖ <u>Understand non-precision measuring instruments.</u> ➤ Define non-precision measuring instruments. ➤ Describe the construction and uses of straight edge, spirit level, radius gauge, angle gauge, feeler gauge, combination set. ➤ Describe the uses of tool maker's flat. 	
Class-4	<ul style="list-style-type: none"> ❖ <u>Understand precision measuring instruments.</u> ➤ Describe different types of vernier caliper. ➤ Identify the scales and graduations on the vernier caliper. ➤ Determine the vernier constant of the vernier caliper 	
Class-5	<ul style="list-style-type: none"> ❖ <u>Understand precision measuring instruments.</u> ➤ Mention the common uses for vernier instruments. ➤ Explain the working principle of vernier height gauge, vernier bevel protractor, vernier depth gage, gear tooth vernier and dial gage. 	
Class-6	 <u>Feedback</u>	
Class-7	 <u>Feedback</u>	
Class-8	<ul style="list-style-type: none"> ❖ <u>Understand precision measuring instruments.</u> ➤ Define micrometer. ➤ Identify the different parts of a micrometer. ➤ Explain the working principle of outside, inside, depth, screw, pipe, vernier, bench, digital and dial micrometers. 	
Class-9	<ul style="list-style-type: none"> ❖ <u>Understand precision measuring instruments.</u> ➤ Describe different types of gauges and the Taylor's principle of gauges. 	

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	<ul style="list-style-type: none"> ➤ Mention the uses of gauge and Taylor's principles of gage. ➤ Describe the construction of slip, telescopic, hole, plug, ring, snap and length gauges. ➤ Mention the uses of slip, telescopic, hole, plug, ring, snap and length gauges. 	
Class-10	<ul style="list-style-type: none"> ❖ <u>Understand the angular measuring instruments</u> ➤ Mention the uses of angle gauge, protractor, vernier bevel protractor and sine bar. ➤ Explain the principle of sine bar. ➤ Calculate the angles by using slip gauges and sine bar . 	
Class-11	 Feedback	
Class-12	 Feedback	
Class-13	<ul style="list-style-type: none"> ❖ <u>Understand the angular measuring instruments.</u> ➤ Describe the procedure of using sine bar, sine center and sine table. ➤ Calculate angles of dovetail groove, V-groove and tapered hole. ➤ Calculate the size of dovetail groove, V-groove and tapered hole. 	
Class-14	<ul style="list-style-type: none"> ❖ <u>Understand the optical instruments used in surface inspection.</u> ➤ Describe the procedure of checking flatness by using optical flat. ➤ Describe the procedure of checking flatness by using a monochromatic light source. ➤ Describe the procedure of checking flatness by interferometer, 	
Class-15	<ul style="list-style-type: none"> ❖ <u>Understand the optical instruments used in surface inspection.</u> ➤ Mention the uses of an auto-collimator or alignment telescope. ➤ Describe the working principle of auto-collimator. ➤ Explain the construction of an optical comparator. ➤ Describe the working principle of an optical comparator. 	
Class-16	<ul style="list-style-type: none"> ❖ <u>Understand the importance of limits, fits and tolerances of mating parts.</u> ➤ State the terms: basic size, nominal size, deviation, tolerances, clearance, allowance, limits of size, fits, interchangeability, selective assemblies and zero line. 	

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Class-17	<p>❖ <u>Understand the importance of limits, fits and tolerances of mating parts.</u></p> <ul style="list-style-type: none"> ➤ Explain the ISO system of limits and fits. ➤ Solve problems related to limit, fits, clearance, allowance etc. 	
Class-18	<p>❖ <u>Understand surface inspection and measurement.</u></p> <ul style="list-style-type: none"> ➤ Explain types of surface texture produced by various machine tools. ➤ Define roughness, waviness, flaws and lay and ISO method of indicating surface finish. 	
Class-19	<p>❖ <u>Understand surface inspection and measurement.</u></p> <ul style="list-style-type: none"> ➤ Describe the surface inspection by comparison method. ➤ Describe the surface inspection by direct measuring methods using macro-interferometer, profilometer and diamond stylus analyser. 	
Class-20	<p>📌 <u>Feedback</u></p>	
Class-21	<p>📌 <u>Class test-1</u></p>	
	<p>📌 <u>Mid Term Exam</u></p>	
Class-22	<p>❖ <u>Understand the importance of checking accuracy of machine tools.</u></p> <ul style="list-style-type: none"> ➤ Identify the need for correct alignment. ➤ Explain the accuracy checking procedure of lathe, drill, milling machine. ➤ Describe the accuracy of checking procedure of shaper and grinding machines. 	
Class-23	<p>❖ <u>Understand the non-destructive tests.</u></p> <ul style="list-style-type: none"> ➤ Define non-destructive test. ➤ Describe the methods of non-destructive test. ➤ Describe the procedure of magnetic particle inspection. 	
Class-24	<p>❖ <u>Understand the non-destructive tests.</u></p> <ul style="list-style-type: none"> ➤ Describe the inspection process of engineering parts by x-ray. ➤ Describe the inspection procedure of engineering parts performed by radiography. ➤ Describe the procedure of ultrasonic inspection. 	

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Class-25	<ul style="list-style-type: none">❖ <u>Understand the measuring method of different types of screw thread.</u>➤ Explain the methods used in screw thread measurement with micrometer.➤ Explain the methods used in screw thread measurement with Prism➤ Determine effective diameter of a screw with two/three wires method.	
Class-26	<ul style="list-style-type: none">❖ <u>Understand the quality control.</u>➤ Explain the necessity of quality control in engineering production.➤ Describe the statistical method of quality control.➤ Describe sample inspection.	
Class-27	<ul style="list-style-type: none">❖ <u>Understand the quality control.</u>➤ Describe different types of sampling.➤ Describe average control chart and deviation control chart.➤ Describe acceptance of sampling.	
Class-28	<ul style="list-style-type: none">❖ <u>Understand the recent trends in engineering metrology.</u>➤ Identify recent trends in metrology by using electro-optical inspection and LASER (light amplification of stimulated emission & radiation) technology.➤ Mention the uses of electro-optical inspection.	
Class-29	<ul style="list-style-type: none">❖ <u>Understand the recent trends in engineering metrology.</u>➤ Describe the advantages of laser telemetric system.➤ Explain the working principle of laser and LEP based distance measuring instruments.	
Class-30	 <u>Feedback</u>	
Class-31	 <u>Feedback</u>	
Class-32	 <u>Class test-2</u>	