

ME 250 Precision Machine Design					
Fall 07					
Instructor: Ray Ellis, Mechanical Engineering Manager for Product Development, Ultratech rellis@ultratech.com					
Reading: Complete prior to class					
Homework: Due at beginning of class on day indicated.					
Website: http://www.engr.sjsu.edu/rellis/courses/ME250/					
Version: 2 (revised 8/24/07)					
Date	Day	Class	Subject	Reading and Homework Assignments	Homework Due
23-Aug	Thursday	1	Introduction to the course and subject	SC 1, 3,5	
28-Aug	Tuesday	2	Accuracy, repeatability, precision, resolution, cosine error, Geometric Dimensioning and Tolerancing (GD&T) for Design and Metrology.	HW #1 Sine and Cosine error ME250 Course Materials page HW #2 GDT exercises #1	
30-Aug	Thursday	3	Geometric Dimensioning and Tolerancing (GD&T) for Design and Metrology. Introduce measurement tools lab.	ME250 Course Materials page HW # 3 GDT exercises #2 Log on to http://www.wisc-online.com/objects/index_tj.asp?objid=MSR801 Take the quiz and print out score sheet	HW #1
4-Sep	Tuesday	4	Lab #1: Metrology Tools, Measurements and Error	Lab1 procedure http://www.efunda.com/DesignStandards/gdt/introduction.cfm	on-line gauge block quiz HW #2 GDT exercises #2
6-Sep	Thursday	5	Discussion / quiz 1 / Introduce part inspection lab		HW #3 GDT exercises #1
11-Sep	Tuesday	6	Lab #2: Part inspection		Lab #1 Report
13-Sep	Thursday	7	Discussion of measurement lab. Introduce CMM measurement. Michael Miranda, guest speaker	HW #6, create test procedure for measuring part on CMM using Lab and manual.	
18-Sep	Tuesday	8	Kinematic constraint, semi-kinematic constraint, kinematic coupling	SC 3 Blanding chapter 1,2 HW #4: Create 2 models demonstrating kinematic constraint principles with no more than 2 DOF.	Lab #2 Report
20-Sep	Thursday	9	Flexures	SC 4, Kittell p.1-21	
25-Sep	Tuesday	10	Review / quiz 2 kinematic constraint	HW #5 analyzing data, design of flexures	HW #4
27-Sep	Thursday	11	Clamps and adjustments	SC 6, Kittell p. 22 - 39	
2-Oct	Tuesday	12	Application examples, quiz 3 on flexures and adjustments		HW #5
4-Oct	Thursday	13	Bearings for precise linear and angular motion	SC 9	
9-Oct	Tuesday	14	Sensors for sub micron measurement. Capacitance, inductance, LVDT, interferometers.		
11-Oct	Thursday	15	Lab #3: Advanced measurement techniques		HW #6
16-Oct	Tuesday	16	Bearings for precise linear and angular motion	SC 9	
18-Oct	Thursday	17	Introduce straightness measurement techniques, autocollimator, interferometer, and reversal	HW #7, reversal calculations and straightness calculations	Lab #3 report
23-Oct	Tuesday	18	Frames, structural loop, measurement loop, metrology frames, datums	SC 3.4, Blanding chapter 3	
25-Oct	Thursday	19	Tour: Ultratech, Inc. , Ray Ellis, 3050 Zanker Road, San José, 95134 http://www.ultratech.com/		
30-Oct	Tuesday	20	Ultratech follow up / quiz 4 on sensors, bearings, and frames.		HW #7
1-Nov	Thursday	21	HW and Quiz review. Prepare for 4 lab set		
6-Nov	Tuesday	22	Pre-lab demonstration	Read lab material and prepare	
8-Nov	Thursday	23	Lab #4		
13-Nov	Tuesday	24	error budgets, mechanical and thermal errors, compensation, self-calibration	HW #8	
15-Nov	Thursday	25	Lab #5		Lab #4 report
20-Nov	Tuesday	26	Troubleshooting and data analysis / Quiz		HW #8
22-Nov	Thursday	27	Thanksgiving Holiday		
27-Nov	Tuesday	27	Lab #6		Lab #5 report

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29-Nov	Thursday	28	Actuators for precision applications, Dynamic considerations	SC 5, 7.1, 7.2, 7.3 paper by Evans, et. Al HW#9 selecting actuators and Sensors SC 10 Kittell p. 40-43	
4-Dec	Tuesday	29	Lab #7		Lab #6 report
6-Dec	Thursday	30	Material considerations for precision design	SC 8	HW #9
11-Dec	Tuesday	31	Review (optional)		Lab #7 report
18-Dec	Tuesday	32	Final Examination 5:15-7:30 pm		