

THEORY AND DESIGN FOR MECHANICAL MEASUREMENTS

ME 435

Summer 2006

(50886 ME 435-01 LEC 3:00PM-5:50PM M 9-305)

COURSE OUTLINE: Generalized measurement system, statistical analysis of experimental data, harmonic analysis characteristics and response of systems, sensors, signal conditioning, data acquisition and processing, pressure, temperature, flow, force, torque, motion, and vibration measurements

PREREQUISITES: C- or better in ME 313L and ME 340

CO-REQUISITE: ME 435L

INSTRUCTOR: Dr. Kevin R. Anderson
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OFFICE HOURS: Check web-site for latest office hours.

REQUIRED TEXTS: “Mechanical Measurements”, 6th Ed, Beckwith, Maragoni, and Lienhard, 2006, Prentice Hall

“LabView™ Student Edition 7.1”, Prentice Hall

Supplemental Notes of the overheads/handouts used in class will be distributed to each student enrolled in ME 435, please bring them to class each day

COURSE GRADING:

Midterms (2 @ 30% each)	60%
Final Exam	40%

HOMEWORK: Refer to attached schedule for homework due dates. Homework is spot checked.

MIDTERMS: Two exams given during the quarter. Make-up exams will not be given for unexcused absences. Please arrange for make-ups in advance.

FINAL EXAM: The final exam will be comprehensive, open book, notes and handouts. Make-ups must be arranged in advance.

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ATTENDANCE: Strongly encouraged, ME 435 is a course which contains a wide diversity of subject matter, most of which will be a first time exposure for many of you. It is suggested that you regularly attend class throughout the quarter

CHEATING & PLAGIARISM: Cheating is the act of behaving dishonestly for personal gain. Cheating during quizzes, mid-terms or the final exam will result in immediate failure of the course and the violators will be reported to the university administration. Plagiarism is the act of taking the intellectual property of another and claiming it as your own. Plagiarism during quizzes, mid-terms or the final exam will result in immediate failure of the course and the violators will be reported to the university administration. **Use of solutions manuals and/or old exams are considered acts of plagiarism.** Refer to pages 52-53 of the Cal Poly Pomona 2005-07 Catalog regarding Academic Integrity. Refer to attached ME Dept. and COE Policy regarding academic integrity.

CLASSROOM ETIQUETTE: Please turn off cell phones during class. Please be on time and do not walk in late while the instructor is lecturing.

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WEEK	DATE	TOPIC(S)	READING	SUGGESTED HOMEWORK
1	6/19/06	Course Introduction Measurement Terminology Error Types/Calibration/Standards	Ch1	
2	6/26/06	Uncertainty Analysis R-S-S Propagation of Uncertainty Method <i>t</i> -Distribution, Least Squares Fit	Ch 5	1.14,1.17,1.22,1.33,1.37,1.50
3	7/3/06	Fourier Analysis, FFT, Sampling Rate, Spectral Leakage Nyquist Frequency/Sampling Theorem/ Windowing	Ch 2/Ch 7	4.27, 4.33, 5.10, 5.12, 5.17, 5.19, 5.32, 5.37, 5.47, 8.26, 9.15
4	7/10/06	EXAM 1		2.13, 2.14 2.20, 2.27, 2.28, 2.30, 2.32
5	7/17/06	Sensors & Transducers	Ch 12	8.8, 8.21, 8.22, 9.9, 9.36, 10.30, 10.32 12.5, 12.6, 12.9, 12.12, 12.19.12.20
6	7/24/06	System Response ME 340 Review $\tau, k, m, c, \zeta, \omega_n$	Ch 3	3.2, 3.13,3.20, 3.24, 3.25, 3.39, 3.41, 9.18
7	7/31/06	EXAM 2		6.3, 6.23,6.16, 6.18, 6.26, 7.33,12.1
8	8/7/06	Mechanical/Electrical Analogy Electrical Circuits / Operational Amplifiers Filters and Filtering/ Wheatstone Bridges	Ch 6/Ch7	6.6, 6.9, 11.7, 11.9, 11.11, 11.14
9	8/14/06	A/D, D/A Conversion Data Acquisition Boards PC Based Data Acquisition	Ch 6/ Ch 11	7.14, 7.17, 7.18, 7.26, 7.38, 7.40,10.25
10	8/21/06	Dr. Anderson out of town, no class		
		FINAL EXAM Monday 3:50-5:50 PM 8/28/06		