

MECH 305/306 — *Data Analysis & Mechanical Engineering/Mechatronics Laboratories*

Winter 2008-2009 Term 2

Instructor: Jon Mikkelsen, Senior Instructor
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Lecture Schedule: Tuesday & Thursday, 9:30 to 10:50; CEME 1202

Lab Schedule: Monday & Wednesday, 2:00 to 5:00; KAIS1160/1180

Office Hours: Wednesday 11:00am, Thursday 11:00am or by appointment.

Course Objectives:

Mechanical Engineering 305/306 introduces you to the principles and theories that enable you to gather, organize, present, and analyze data collected from various sources, e.g. physical, chemical, biological, or economic. We will cover probability theory, distributions, descriptive statistical techniques, sampling theory, error propagation, inferential statistical techniques, regression, and correlation. The laboratories will cover materials related to fluid mechanics, heat transfer, solid mechanics, and design.

Required Textbook and Materials:

Montgomery, Runger and Hubele, *Engineering Statistics*, Fourth edition, John Wiley, 2007.

MECH 305/6 Laboratory Manual, cost \$20

A standard scientific calculator is a minimum requirement. A calculator that can perform statistical functions can be used, but is not required. Some calculators, like the Texas Instruments TI-83 Plus, have pre-programmed financial functions. Some calculators can download financial functions from the internet. We will also use Excel to solve problems and to present data sets graphically. On exams, you must show the techniques you used to obtain your answers, i.e. you must show the formulas and/or the calculator steps you used to obtain your results.

Reference Textbook:

Navidi, William, *Statistics for Engineers and Scientists*, Second edition, McGraw-Hill, 2008.

Course Requirements and Evaluation:

The course grade will be composed from the Data Analysis curriculum and Engineering Laboratories will be determined as follows:

Lab Reports: 35% (each lab has equal weighting)
Assignments 10%
Midterm Examinations 15%
Final Examination 40%

Examinations will be both closed book and open book. Calculators will be allowed. You are responsible for all the assigned readings and the recommended end-of-chapter problems. Grade weightings are subject to changes.

Course Site:

Instructional resources will be distributed via Vista (Blackboard). You will be registered automatically (access is via www.vista.ubc.ca). All important course-related announcements and due dates will be delivered in class and on this site.

Course Schedule (tentative, subject to change):

Week 1 Experimentation Topics
Week 2 Data Summary and Presentation
Week 3 Sampling and Descriptive statistics
Week 4-5 Probability Distributions
Week 6-7 Hypothesis Testing
Week 8-10 Confidence intervals and Decision Making
Week 11 -12 Regression Analysis
Week 13 Statistical Process Control