

ENGR 1213 Engineering Physics Computing

Spring 2005

Department of Physics and Engineering

University of Central Oklahoma

Location	Howell Hall 101
Time	MWF 11:00 a.m. - 11:50 a.m.
Instructor	Evan Lemley, Ph.D.; Assoc. Prof., Department of Physics and Engineering
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Office Hours	MWF 9:00 a.m. - 10:00 a.m. or by appointment
Final	M May 2, 2005 from 11:00 a.m. - 12:50 p.m.

Course Description

This course introduces computational skills required by engineers in their profession including use of engineering spreadsheets, scientific programming and algorithms, and use of mathematical or other simulation packages to solve engineering problems. Team design projects are an integral component of the course.

Prerequisites

MATH 1593 or concurrent enrollment in MATH 1593.

Textbooks

Engineering with Excel, 2/E, Ronald W Larsen, ISBN: 0-13-147511-8, Prentice Hall, 2005.

Introduction to Matlab 7, Dolores Etter, David Kuncicky, Holly Moore, ISBN: 0-13-147492-8, Prentice Hall, 2005.

Objectives

The student will be able to:

- demonstrate the ability to use a spreadsheet to solve scientific and engineering problems using built-in and custom mathematical functions, statistics, and graphing including logarithmic scales and curve-fitting;
- demonstrate an understanding of programming control structures, and input/output of data to/from these programs;
- create programs that use basic algorithms to solve science, engineering, or mathematical problems;
- demonstrate the ability to use mathematical or other simulation software to aid in the solution of engineering problems;
- demonstrate the use of mathematical packages or programming to solve simultaneous linear equations that arise in science and engineering;
- demonstrate an understanding of the engineering design process;
- demonstrate the ability to prepare written engineering documents including reports and homework;
- demonstrate the ability to give an oral technical presentation on an engineering topic; and
- demonstrate the ability to function as part of an engineering design team by participating in team meetings and completing assigned tasks.

Calculator

You must own a scientific calculator – *see the list of allowed calculators for exams in the Department of Physics and Engineering.* **Please bring your calculator to class for each meeting.**

Engineering Paper

Engineering Paper -- available from the UCO bookstore, Thompson's Bookstore, and Triangle A&E at Broadway Ext. and 63rd. Please use engineering paper for all homework assignments.

Internet & E-mail

Access to the Internet and ability to send and receive E-mail. If you do not have a computer at home you can use machines on the UCO campus: Look at

<http://technology.ucok.edu/support/microcomplab.htm>

for a full list of available general use computers on campus.

Portable Electronic Devices (including cell phones)

Please turn off any portable electronic devices (esp. cell phones) during class. You may not access any portable electronic device during exams except calculators that are on the approved list for Physics and Engineering courses.

Instruction Techniques

Lecture will be used predominantly although sometimes recitation periods will be employed.

Class Policies

Attendance is not required, but you will be responsible for any announcements or notes from class (and quizzes).

Attendance is mandatory for all exams or other graded activities (e.g. project competitions or presentations).

Cheating or academic dishonesty of any kind will not be tolerated.

Homework

Working HW problems in a timely manner is the best way to do well on exams and in the class as a whole.

Homework is due at the beginning of the class period on the due-date or due-day. Homework should be neatly written on only one side of your paper, folded length-wise with your name written on the outside of the folded pages before turning it in. Each problem should fit all of the following criteria: clearly labeled, **one problem per sheet of paper**, legible and organized. HW papers that do not fit these criteria will be penalized accordingly. See the attached HW Format section for details on the presentation of HW problems. You may also visit the following site for an electronic version of the homework format requirements:

http://engrphys.lemley.org/courses/hwk_format.php

Each HW problem you turn in is worth ten points. Some problems will be graded on detailed solutions and others will be graded on effort. I will **not** tell you ahead of time which or how many problems will be graded relative to a detailed solution, but on the returned and graded HW paper a check mark next to the problem number will indicate full effort (or ten points) and a numerical score (e.g. 8/10) next to the problem number will be used on those problems under more scrutiny.

Project

There will be Team Design Projects in this course. Projects will constitute a significant portion of your grade. More information will be given to you as project assignments are made.

Grading Policies (Modified on 18APR05 because of rampant copying/file-sharing of homework)

The following table shows the breakdown of credit for the course.

HW (effort only)	10%
Exam	25%
Project	30%
Final	35%
Total	100%

Tentative Grading Scale

90-100% -- A, 80-90% -- B, 70-80% -- C, 60-70% -- D, <60% -- F

STUDENT INFORMATION SHEET / SYLLABUS ATTACHMENT

See separate handout or go to: <http://www.busn.ucok.edu/academicaffairs/FORMS/StudentINFOFall04.pdf>

Tentative Class Schedule for Engr. Phys. Comp. Spring 2005				
Week #	Day	Date	Topic	Covered
1	M	01/10/04	Syllabus and Introduction	
	W	01/12/04	Basic Engineering Calculations – rounding and significant digits	
	F	01/14/04	Basic Engineering Calculations – can you really use your calculator?	
2	M	01/17/04	Martin Luther King Day - NO CLASS	
	W	01/19/04	Basic Engineering Calculations – basic statistics	
	F	01/21/04	Basic Engineering Calculations – more statistics	
3	M	01/24/04	Dimensional Analysis – Units review and help-sheets	
	W	01/26/04	Dimensional Analysis – Buckingham – Pi Theorem	
	F	01/28/04	Dimensional Analysis - Examples	
4	M	01/31/04	Dimensional Analysis – More Examples	
	W	02/02/04	Engineering Reports – Styles and examples	
	F	02/04/04	Engineering Reports – Technical Details	
5	M	02/07/04	Engineering Reports – Equation Editing, etc...	
	W	02/09/04		
	F	02/11/04	Excel – basic spread-sheeting // cheat sheet handouts, formatting	
6	M	02/14/04	Excel – more basics // absolute and relative references	
	W	02/16/04	Excel – tables & charts, engineering calculations with Excel	
	F	02/18/04	Excel – engineering calculations with Excel, precision, built-in functions	
7	M	02/21/04	Excel – more functions	
	W	02/23/04	Excel – advanced science and engineering graphs	
	F	02/25/04	Excel – more advanced science and engineering graphs	
8	M	02/28/04	Excel – basics of writing your own functions	
	W	03/02/04	Algorithms – what are they and why do you need them?	
	F	03/04/04	Basic programming constructs – pseudo-code and flow charts	
9	M	03/07/04	Exam	
	W	03/09/04	Algorithm/Pseudo-Code/Flowchart Examples	
	F	03/11/04		
10	M	03/14/04	Spring Break – NO CLASS	
	W	03/16/04	Spring Break – NO CLASS	
	F	03/18/04	Spring Break – NO CLASS	
11	M	03/21/04		
	W	03/23/04	Algorithm/Pseudo-Code/Flowchart Examples	
	F	03/25/04	Project Assignment Two – Group assignments and project discussion	
12	M	03/28/04	Excel VBA/Procedural Programming	
	W	03/30/04	Excel VBA/Procedural Programming – Language intro - constructs	
	F	04/01/04	Excel VBA/Procedural Programming – input/output	
13	M	04/04/04	Excel VBA/Procedural Programming – arrays	
	W	04/06/04	Excel VBA/Procedural Programming – subroutines and using controls	
	F	04/08/04	Excel VBA/Procedural Programming – algorithm examples	
14	M	04/11/04	Excel VBA/Procedural Programming – multidimensional arrays and nested loops	
	W	04/13/04	MATLAB	
	F	04/15/04	MATLAB	
15	M	04/18/04	MATLAB	
	W	04/20/04	MATLAB	
	F	04/22/04	MATLAB	
16	M	04/25/04	MATLAB	
	W	04/27/04	MATLAB	
	F	04/29/04	Project Assignment Two Presentations & Reports Due	
17	M	05/02/04	Final Exam – 11:00 a.m. – 12:50 p.m. in Howell 101	