

Computer-Aided Engineering & Lab: Fall 2011
Course #MEC K231 and K232
Technologies Department

Course Description:

(MEC K231) This course introduces the use of computers to conduct engineering analysis, a systematic process of analyzing and understanding problems that arise in the various fields of engineering. Students will carry out engineering numeric computations using Microsoft EXCEL™ and the MATLAB™ and LabView™ software packages. Graphing, data acquisition & analysis, fitting equations to data and solving equations will be covered. The class will be conducted in a “learning laboratory” style in which students exercise a self paced individual learning experience through the completion of weekly assignments and quizzes.

(MEC 232) In this lab, students will apply the fundamentals of engineering analysis using Microsoft EXCEL™ and the MATLAB™ and LabView™ software in an IBM-PC environment. Topics given in the lecture will be learned and reinforced through solving application problems on the computer.

Lecture and Lab Outcomes:

- Students will demonstrate the ability to use appropriate mathematical and computational skills needed for engineering technology applications.
- Students will illustrate an ability to think critically and identify, evaluate and solve complex technical and non-technical problems; demonstrate creativity in designing problem solutions; and conduct and interpret experimental data and outcomes.
- Students will recognize the need to be lifelong learners.

Lecture & Lab Performance Criteria:

The above outcomes will be assessed using these performance criteria:

- Mathematical and computational skills-
 - ✓ Ascertain problem conditions by identifying known and unknown quantities in formulating a problem for solution
 - ✓ Demonstrates the correct selection and application of pertinent formulae, principles and concepts.
 - ✓ Pursue solutions in a methodical, logical manner with results correctly explained with sufficient detail and properly documented
 - ✓ Submit problem solutions with a minimum of computational errors, identifying and selecting the correct dimensional units
- Critical thinking-
 - ✓ Show the ability to evaluate the credibility of sources of information
 - ✓ Demonstrate the ability to refine generalizations, establish rational & pertinent assumptions, and avoid oversimplifications
 - ✓ Exhibit the ability to generate, analyze / evaluate, and assess multiple engineering problem solution options
 - ✓ Produce documentation that reflects organization and application of engineering principles in specifying solution to an engineering problem
- Lifelong learning-
 - ✓ Demonstrate an awareness of what needs to be learned; formulate questions based on research need
 - ✓ Develop a research plan appropriate to the investigative method
 - ✓ Identify, retrieve and organize information
 - ✓ Use a variety of methods and emerging technologies to keep current in the field

Instructor:

PROF Patrick H. Knowles Jr. Room C-160 ph: 885-2379 pknowles@trcc.commnet.edu

Text Book:

1. *Engineering Computations: An Introduction Using MATLAB and EXCEL* (isbn 978-07-338016-2)

Procedure:

The course will consist of a lecture followed by a lab. Both the lecture and lab will consist of open discussion, which the student is encouraged to ask questions and relate their own experiences. The discussions will be conducted around the reading assignments and the homework/laboratory problems.

Instructor Assistance:

Seeking help from the instructor outside of class is encouraged if you are having difficulty understanding course material. Feel free to Email/call for an appointment during office hours.

Academic Integrity:

Academic integrity is essential to a useful education. Failure to act with academic integrity severely limits a person's ability to succeed in the classroom and beyond. Furthermore, academic dishonesty erodes the legitimacy of every degree awarded by the College. In this class and in the course of your academic career, present only your own best work; clearly document the sources of the material you use from others; and act at all times with honor.

Attendance:

Attendance will be taken and although it is not intended to be used for grading purposes, it may be used for decision on the part of the final grade.

Course Work Portfolio:

The course work portfolio is a collection of copies of all work performed in the class. The portfolio should be broken into the following sections: (1) homework, (2) quizzes/exams, (3) project. The portfolio is due on 16May and should be contained in a binder or folder. Grading will be based on completeness & organization.

Homework is not mandatory in the sense that it will be collected daily/weekly. However, completing homework has been found to be extremely helpful in understanding and reinforcing the concepts covered in class. Those who attempt and complete (to the best of their ability) the ALL of the homework using the proscribed format can expect to receive a "homework bonus" up to 7.5% added to the final average (after quizzes & exams). Homework is due on the assigned due date at the beginning class. Late homework will not receive credit. To receive the "homework bonus", students will be allowed to miss no more than one assignment. There will be no "prorating" of the bonus percentage for missing more than one assignment.

You may work with others on nightly/weekly homework assignments to determine analysis methods, but you must indicate on your paper from whom you have received assistance.

Grading Policy:

Several exams will be given during the semester. The dates of the exams are noted in the Lecture Schedule. Approximately one hour of the class meeting will be devoted for each exam. Final grades will be based on a normal distribution of all students taking the course based on the following weighting:

Homework	15%
Quiz/Exam Average	45%
Project Average	25%
Course Portfolio	15%

Homework is due the class period after being assigned. Homework may be turned in no more than two weeks after the assignment date for a maximum credit of 60%.

The multi-part project will be handed out during the semester with salient details included in the handout.

The course portfolio is a collection of copies of all work performed in the class. The portfolio should be broken into the following sections: (1) homework, (2) quizzes/exams, (3) project. The portfolio is due on 10December.

Withdrawal:

A student who finds it necessary to discontinue a course must complete a "Withdrawal Request Form" available in the Registrar's office within the time limits of the semester calendar. Students who do not withdraw, but stop attending will be assigned an "F" signifying a failing grade. The last day to withdraw from classes is 09December2011.

Disabilities Statement:

If you have a question regarding a disability that may affect your progress in this course, please contact one of the college's Disability Service Providers as soon as possible. Chris Scarborough (892-5751) generally works with students who have learning disabilities or attention deficit disorder. Kathleen Gray (885-2328) generally works with students who have physical, visual, hearing, medical, mobility, and psychiatric disabilities. Matt Liscum (860/383-5240) also works with students who have disabilities.

If you will need accommodations for this class, you must contact the Disabilities Counseling Services. To avoid any delay in the receipt of accommodations, you should contact the counselor as soon as possible. *The instructor cannot provide accommodations until an accommodation letter from the Disabilities Counselor is received.*

Date	Class #	Topic	Reading	Assignment
26-Aug	1	Chap 1: Computing Tools Chap 2: EXCEL Fundamentals	Pg 3-54	1.2; 1.6; 2.3
2-Sep	2	Chap 2: EXCEL Fundamentals	Pg 21-54	2.12; 2.16; 2.19
9-Sep	3	Quiz: EXCEL Chap 3: MATLAB Fundamentals	Pg 63-98	3.4; 3.11; 3.13; 3.16; 3.20
16-Sep	4	Chap 3: MATLAB Fundamentals Chap 4: MATLAB Programming	Pg 63-132	3.22; 3.23; 4.6; 4.8; 4.10
23-Sep	5	Chap 5: Plotting Data Quiz: MATLAB	Pg 105-132	5.1; 5.4; 5.5; 5.14; 5.18
30-Sep	6	Chap 6: Finding Roots of an Equation	Pg 143-214	6.3; 6.12; 6.15
7-Oct	7	EXAM: MATLAB/EXCEL		
14-Oct	8	Chap 7: Matrix Mathematics	Pg 221-230	
21-Oct	9	Chap 8: Solving Simultaneous Equations	Pg 221-230	
28-Oct	10	EXAM: Matrices & Finding Roots		
4-Nov	11	Chap 9: Numerical Integration	Pg 239-276	
18-Nov	12	Chap 10: Optimization	Pg 287-317	
2-Dec	13	LabView I		
9-Dec	14	LabView II		
16-Dec	15	Take-Home EXAM: Simultaneous Equations & Integration		<i>course portfolio due</i>