

# ENGR 1140: Computational Engineering Methods

## Biological and Agricultural Engineering Department

Fall 2008

*The course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary.*

### **Instructor**

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*Office hours: 10-11 Tuesday, 2-3 Wednesday, or appointments by e-mail*

### **UGA Bulletin Course Description**

Computer programming and matrix techniques used in the analysis of engineering problems

<b><u>Offered Class</u></b>	<b><u>Credits</u></b>	<b><u>Level</u></b>	<b><u>Weekly Meeting Pattern</u></b>
Fall & Spring	2	Undergrad	Two, 75 minute classes

### **Course Co-requisite**

MATH 2200 (Analytic Geometry and Calculus) or MATH 2250 (Calculus I for Science and Engineering)

### **Text**

Gilat, Amos, MATLAB: An Introduction with Applications, 3<sup>rd</sup> ed. Wiley, 2008.  
ISBN: 978-0-470-10877-2

### **Optional text**

Bourg, David M., Excel Scientific and Engineering Cookbook, O'Reilly, 2006.  
ISBN: 0-596-00879-1

### **Required Supplies**

A flash drive or other portable media device

### Optional Software:

If you have access to a personal computer, and plan to do work at your dorm or off campus you may wish to buy copies of the following software. This software is available in the classroom and in the computer lab and a personal copy is NOT REQUIRED.

*Alice 2.0.* Available for free at [http://www.alice.org/index.php?page=downloads/download\\_alice](http://www.alice.org/index.php?page=downloads/download_alice).

*Microsoft Excel.* Available at the bookstore for a discounted price of \$119.98 for Microsoft Office with a free 2Gb flash drive (see <http://www.journeyed.com/home.asp>). A free alternative is OpenOffice, which is available at <http://www.openoffice.org/>.

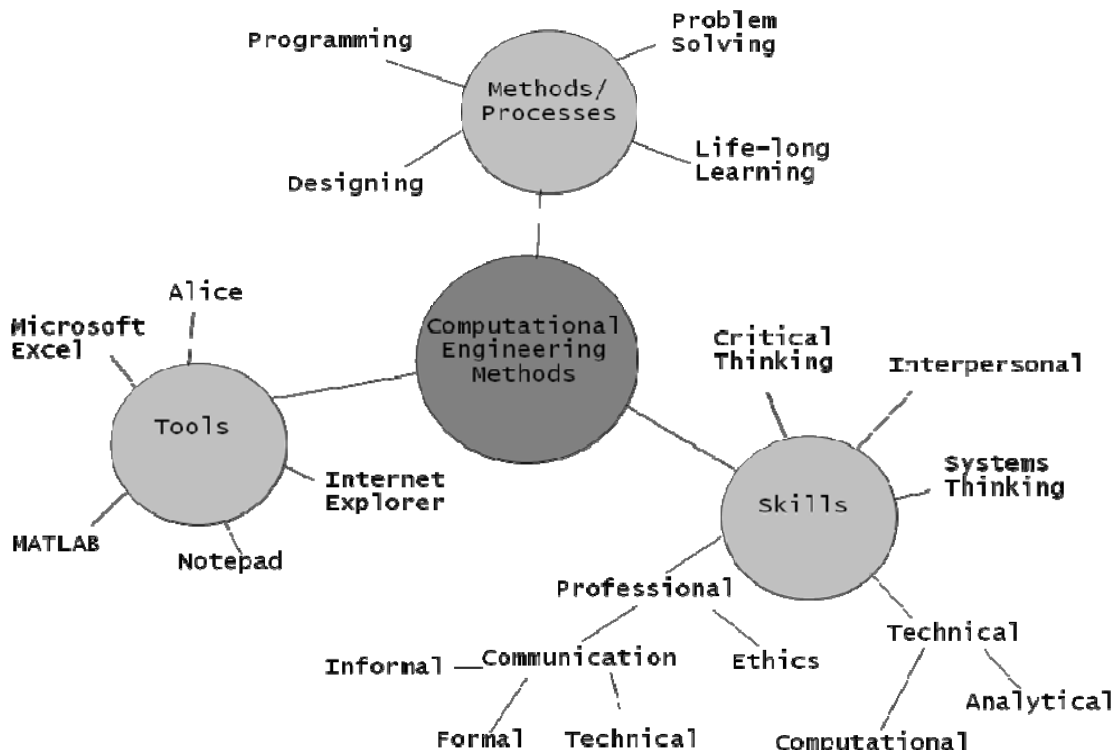
*MATLAB & Simulink Student Version Release 2007a (MATLAB 7.4).* Available for \$99 at [http://www.mathworks.com/academia/student\\_version/](http://www.mathworks.com/academia/student_version/) or at the bookstore.

### Lab Resources

The computers in Room 209 are available for use in this course. There are 30 MATLAB licenses available in the department, so during the other section's class hours MATLAB may be unavailable in the computer lab.

Students are required to store their files on a flash drive (or other portable media device). Do not leave your files on the computer's hard drive or printed copies on the desk, as they may be available for other students to copy. If another student copies your work, you will also be reported to the Academic Honesty Office (see academic integrity section for more information).

### Topical Graphic and Outline



Introduction to Engineering  
Technical Communication  
    Graphs and figures  
    Presentations  
    Reports  
    Writing (Formal and Informal)  
Spreadsheet Fundamentals  
    Graphing data  
    Mathematical operations  
    Equation solving  
    Plotting  
    Curve fitting  
    Matrix operations  
    Problem solving using spreadsheets  
Matlab Fundamentals  
    Linear Algebra  
    Mathematics Operations  
    Matrix Operations  
    Curve Fitting  
    Plotting  
Programming Fundamentals  
    Input/ Output  
    Scripting  
    Branching  
    Looping

**Exams (dates subject to change)**

Exam #1—September 9  
Exam #2—October 2  
Exam #3—October 28  
Exam #4—November 20

Final Exam for 12:30 class—December 16, 12-3

Final Exam for 3:30 class—December 16, 3:30-6:30

**Final Project**

Art exhibit will be held during the final exam period.

**Important Dates**

See [http://www.reg.uga.edu/or.nsf/html/Academic\\_Calendar](http://www.reg.uga.edu/or.nsf/html/Academic_Calendar)

**ABET EC-2000 Criterion 3 Program Outcomes**

- a) an ability to apply knowledge of mathematics, science, and engineering
- b) an ability to design and conduct experiments, as well as to analyze and interpret data
- c) an ability to design a system, component, or process to meet desired needs
- d) an ability to function on multi-disciplinary teams
- e) an ability to identify, formulate, and solve engineering problems
- f) an understanding of professional and ethical responsibility
- g) an ability to communicate effectively
- h) the broad education necessary to understand the impact of engineering solutions in a global and societal context

- i) a recognition of the need for, and an ability to engage in life-long learning
- j) a knowledge of contemporary issues
- k) an ability to use techniques, skills, and modern engineering tools necessary for engineering practice

**Overall Course Contribution to Program Outcomes**

a .....extensive	e      some	i ..... some
b .....moderate	f .....some	j ..... extensive
c .....some	g .....extensive	k ..... extensive
d .....extensive	h ..... some	

**Course Learning Objective Matrix**

Course Learning Objectives	Course Assessment Methods*	Extent of Coverage of Program Outcomes** (ABET Criterion 3)
Upon successful completion of this course, the student will be able to:		
1. Be able to communicate effectively in formal and informal settings. Demonstrate these communication skills through written emails, written reports, oral communication activities, and oral presentations.	A, C, D	c-x, d-xxx, e-x, g-xxx, i-x
2. Be able to perform engineering and mathematical computations using spreadsheets and MATLAB. The students will demonstrate a proficiency in plotting, solving equations, performing mathematical operations, and programming.	A, B, C, D	a-xxx, b-xx, c-x, e-x, g-x, k-xxx
3. Design and implement programs and spreadsheets within engineering contexts.	A, B, C, D	c-x, e-x, f-x, g-xx, h-x, i-x, j-x, k-xxx
4. Be able to work effectively in problem-solving teams and carry out meaningful performance assessments of individual team members.	D	d-xxx, f-xx, g-xxx
5. Develop an appreciation of the impact of engineering on cultural, social, and environmental aspects of today's society.	A, C, D	c-x, f-xx, g-x, h-xxx, j-xxx

\*Course Assessment Methods: A-Homework/Classwork; B-Exams; C-Final Project; D-Student Evaluation

\*\*Extent of Coverage: x-some; xx-moderate; xxx-extensive

**Grading** Course grades will be based upon performance on four tests, participation, and the two projects. A weighted average grade will be calculated as follows:

Tests (4) .....	50%
Projects (2) .....	30%
Participation (class assignments, homework assignments, and pop-quizzes).....	20%
Attendance (subtract 2.5% for every absence beyond the allowed 4 excused or unexcused absences)	

The final class grades will be based on the following scale:

92-100	A
89-91	A- or B+
82-88	B
79-81	B- or C+

72-78	C
69-71	C- or D+
60-68	D
<60	F

*Tests.* There will be four tests during the semester.

*Grading Mistakes.* If you believe an error has been made in grading on an assignment or test, bring it to me during office hours within one week of the test being returned. If you believe that you should have gotten more points, write a statement making your case and drop it off at my office within one week.

*Make-up Exams.* If you miss a test without a verified medical excuse or prior instructor approval, you will receive a zero for that test. Tests missed with verified medical excuses or prior instructor approval will be dealt with individually. Please notify the instructor of any issues as soon as possible.

*Attendance Policy.* Students who miss a class should work with other students in the course to make up any missed work. Documented medical excuses should be presented to the instructor as soon as possible, but no later than a week after the missed classes. Students with excused absences will be able to make up class assignments and will not be penalized for pop quizzes missed. Make-up class assignments must be turned in within two weeks of absence. Excused absences will be counted towards the total number of absences.

If a student is late, it is their responsibility to check with me to make sure that they are counted as present. A student greater than 20 minutes late will be considered absent. Students are allowed four excused or unexcused absences with no penalty. Being late three times (less than 20 minutes) counts as one unexcused absence. If a student misses more than four courses, 2.5% will be subtracted from their final grade for each additional class missed. A missed course is an excused absence, an unexcused absence, or absences due to being late. For example, if a student with six excused and unexcused absences has a final grade of 90, they will receive a 85 ( $90 - 2 \times 2.5$ ).

**Engineering Professionalism Policy** Engineers make great contributions to society. Engineering is a very satisfying profession that provides many rewards but is demanding and requires hard work. The engineering profession is governed by a code of ethics. Engineering faculty at UGA expect students to act in a professional manner at all times and develop the work ethics required for a successful engineering career. Engineering students at UGA are responsible for maintaining the highest standards of professionalism and professional practice.

**Departmental Grading Policy Regarding Communication Skills** Thirty percent of the grade on all written assignments (lab reports and papers) and oral presentations will be based on quality of communication. Spelling, grammar, punctuation, and clarity of writing are evidence of written communication quality. Enunciation, voice projection, clarity and logical order of the presentation, and effective use of visual aids are evidence of oral communication quality.

**Academic Integrity** All academic work must meet the standards contained in "A Culture of Honesty." Please be familiar with A Culture of Honesty policy and handbook. Since much of the work in this class will be done on computers, and working together is encouraged, it is important that students understand the difference between working together and cheating. Much learning takes place as

students discuss and work together, however, each student must do their own work and turn in their own work. While students may discuss ideas about how to do things, exchanging spreadsheets or simply sitting next to someone else and copying their spread sheet is expressly prohibited and will be treated as a violation of the academic honesty policy. All forms of academic dishonesty will be prosecuted.

All suspicions of academic misconduct will be submitted to the Academic Honesty Office. If you are found guilty of academic misconduct you will be given a zero for that assignment and may have one of the following consequences: final course grade of "F", placement of a dishonesty transcript notation, suspension, dismissal, or expulsion. If you have a second case of academic misconduct (over the course of your time at UGA) you will receive placement of a dishonesty transcript notation and one of the following consequences as determined by a review board: suspension, dismissal, or expulsion. **If you are unsure of whether something may be considered academic misconduct please discuss your dilemma with me or with someone at the academic honesty office before turning in the assignment.** See <http://www.uga.edu/honesty/> for more details.

**Instructor's commitment** You can expect me to be courteous, respectful, and punctual; be well organized and prepared for lecture and other class activities; answer questions clearly and in a non-negative fashion; be available during office hours or notify you beforehand if I am unable to keep them; provide a suitable guest lecturer when I am on travel status; and grade uniformly and consistently according to posted guidelines.

**Consulting with the instructor** Questions concerning course material are encouraged both during class and in my office. I am available to help you during office hours and by appointment. Please do not hesitate to approach me about setting up an appointment if you need help outside of office hours. You can set up appointments after class, by e-mail, or by phone. I check and respond to email in the afternoon daily. Please check with your course documents to determine if you already know the answer to a question (notes, powerpoints, WebCT documents) prior to asking me. Additionally, please write your emails in a professional manner with an introduction, closing (with your full name), and complete sentences (no shorthand).