U. A. Whitaker College of Engineering

Course name	: **Computational Tools for Engineers (EGN 1041C**)
CRN	: 11668
Semester	: Spring 2015
Credit hours	: 2
Time	: M/W 8:00 AM – 9:15 AM
Classroom	: AB7 – 127. *Please, no food or drink in the computer classroom*.
Final exam	: Friday, May 1, 2015, 7:30 AM – 9:45 AM
Canvas login	: http://canvas.fgcu.edu/. You should check the Canvas course site frequently for email, course preparation announcements, and course materials. *All course communications will be through Canvas*.
Prerequisite	: MAC 2311 & EGS 1006L with minimum grades of C. Completion of or concurrent enrolment in Physics I is recommended.

Course Description

Computational Tools is a course that introduces problem solving strategies (logical thinking) and computational tools used in the process of engineering. Our "languages" are *Microsoft Excel* , the most commonly used spreadsheet program, and *Matlab*, a high level computer programming language especially suited to math, science and engineering. Mastery of these programs will allow you to use *any* typical software package for data analysis, mathematical modeling and graphical presentation and interpretation of data.

Course Information

EGN 1041C Computational Tools for Engineers is a required course for B.S. in bioengineering, civil engineering, and environmental engineering degree programs. It is a 2-credit hour course that meets for three contact hours as an integrated lecture/lab course.

Instructor Information

Professor	: **Long Nguyen, Ph.D., P.E.**
Office	: Holmes Hall room 309
Telephone	: (239) 590-1488
Fax	: (239) 590-7304
E-mail	: lnguyen@fgcu.edu
Office hours	: M 2:00 – 3:30; W 9:15 – 10:45 and TH: 10:00 – noon; or by appointment

Course Materials

Two required books:

David C. Kuncicky and Ronald W. Larsen, *Introduction to Excel*, 5th Edition. Pearson/Prentice Hall, Upper Saddle River, NJ, 2013 (ISBN13: 978-0-13-308363-7)

A. Gilat. *MATLAB: An Introduction with Applications*, 4th Edition. Wiley, Hoboken, NJ, 2010 (ISBN13: 978-0-470-76785-6)

Other additional course materials will be posted by Dr. Nguyen on the course's Canvas site. Course software is also loaded onto computers in AB7 127, HE 203, the student computer lab in Holmes Hall, which is open from 9 am – 9 pm on Monday through Thursday and 9 am – 5 pm on

Friday. It will be closed during official university holidays. MATLAB is also available on "Virtual Machines" – campus wi-fi or campus computer access to selected Engineering Software available at any time on campus. Student versions/licenses can also be purchased if desired (at about $100 a deal!).

Course Learning Objectives

By the end of this course, students will be able to:

1. Use Excel to create spreadsheets, define and use functions, and display and analyze data and trends including 2-D plots;
2. Use Excel and MATLAB to solve systems of equations and to optimize solutions to problems given constraints
3. Use Excel and MATLAB to set up and solve a variety of fundamental engineering problems in a variety of disciplines;
4. Use MATLAB to visualize solutions to engineering problems by using 2-D and 3-D graphics;
5. Demonstrate introductory level engineering technical communication skills.

Attendance, Participation, and Professionalism

Regular attendance and active participation in classes are expected of all students. Most classes will include required in-class activities. Regularly missing class will result in grade deduction. Unavoidable absences do not excuse students from responsibility for course material. Absences may be excused with a written explanation from a medical professional, faculty member, administration, coach or athletic director. Students missing tests or assignments due to emergencies or illness must submit a satisfactory medical excuse or other appropriate documentation to the instructor prior to test date or assignment deadline.

Improper attire and disrespectful behavior towards anyone are unprofessional in nature as is acting in any way that interferes with the ability of other students to participate, concentrate, and learn. Issues that fall into this category include inappropriate use of computers during class (e.g all social media), cell phones ringing and/or conversations, use of iPods, mp3 players, and other such devices, disruptive classroom movement (such as *frequent* and loud leaving and re-entering the room), and other distracting behaviors.

Absences: Unexcused absences affect the final course grade according to the following schedule. Excused absences: Athletics events (at least one week notice), hospitalization, family emergency,

Unexcused absences:	
Up to **4** absences	No effect on final grade (but still responsible for missed work)
5 absences	Final grade lowered by ½ letter grade.
6 absences	Final grade lowered by 1 letter grade
7 or more absences	Final grade of 0 assigned (official withdrawal recommended).

Attendance is typically monitored using "sign-in sheets" for each class meeting. It is the responsibility of the student to sign-in during each class attended. *A student is considered absent if his or her signature does not appear on the sign-in sheet*. Forgery of signatures on a sign-in sheet is a violation of university Academic Integrity Policies and subject to disciplinary action.

Late Submission Policy
Students are expected to submit all in-class and homework assignments ***electronically*** by their due dates. Assignments submitted more than 24 hours late will receive a grade of 0. The CANVAS dropbox will close 24 hours past due date – no exceptions – no emailing to professor after deadline! Students who miss tests or miss assignment deadlines due to emergencies or illness must submit a satisfactory medical excuse or other appropriate documentation to the instructor.

Exam Absence Policy
All exams are required attendance. If you are going to miss an exam you must coordinate this with instructor prior to the exam period (medical documentation required). Students who have an unexcused absence from an exam will receive a zero for that exam.

Please note that a C in EGN 1041C is the minimum acceptable grade to satisfy the prerequisite requirement for several engineering courses, including EGN 3433C Design for Manufacturing, BME 3403C Human Physiology Engineers I, EGN 3331C Mechanics of Materials, and EES 3204C Environmental Chemistry for Engineers.

Thus, failure to progress from this course with a grade of C or higher acts as a roadblock to upper level courses. It is your responsibility to make sure you achieve this goal. Students earning a grade of C- or lower will not be able to progress in an engineering degree program until EGN 1041C has been repeated and an acceptable grade has been achieved – so get it right the first time!

Assessing Student Performance
Grading for this course includes in-class exercises, homework, and tests. The following weighting of grades will be used:

- Excel Test (Test 1) 25%
- MATLAB Tests (15% each) (Tests 2 and 3) 30%
- MATLAB Final Test 25%
- Homework 10% (done in groups of 1-2)
- In-class submissions 10%

Important notice: Regardless of your final course average, in order to earn at least a C, you must have the test (exam) average of at least 70%.

Grading scale

%	Grade	%	Grade	%	Grade
100 – 90.00	A	79.99 – 76.67	C+	Below 65	F
89.99 – 86.67	B+	76.66 – 73.34	C		
86.66 – 83.34	B	73.33 – 70.00	C-		
83.33 – 80.00	B-	69.99 – 65.00	D		

UNIVERSITY STATEMENTS
Disability Accommodations Services
Florida Gulf Coast University, in accordance with the Americans with Disabilities Act and the university's guiding principles, will provide classroom and academic accommodations to

students with documented disabilities. If you need to request an accommodation in this class due to a disability, or you suspect that your academic performance is affected by a disability, please see me or contact the Office of Adaptive Services. The Office of Adaptive Services is located in Howard Hall, room 137. The phone number is 590-7956 or TTY 590-7930. In addition to classroom and campus accommodations, individuals with disabilities are encouraged to create their personal emergency evacuation plan and FGCU is committed to providing information on emergency notification procedures. You can find information on the emergency exits and Areas of Rescue Assistance for each building, as well as other emergency preparedness materials on the Environmental Health and Safety and University Police Department websites. If you will need assistance in the event of an emergency due to a disability, please contact Adaptive Services for available services and information.

Student Observance of Religious Holidays
All students at Florida Gulf Coast University have a right to expect that the University will reasonably accommodate their religious observances, practices, and beliefs. Students, upon prior notification to their instructors, shall be excused from class or other scheduled academic activity to observe a religious holy day of their faith. Students shall be permitted a reasonable amount of time to make up the material or activities covered in their absence. Students shall not be penalized due to absence from class or other scheduled academic activity because of religious observances. Where practicable, major examinations, major assignments, and University ceremonies will not be scheduled on a major religious holy day. A student who is to be excused from class for a religious observance is not required to provide a second party certification of the reason for the absence. Please review University Policies concerning student observance of religious holidays at the following address: http://www.fgcu.edu/generalcounsel/policies-view.asp

Academic Behavior Standards and Academic Dishonesty
All students are expected to demonstrate honesty in their academic pursuits. The university policies regarding issues of honesty can be found in the FGCU Student Guidebook under ***the Student Code of Conduct*** and ***Policies and Procedures*** sections. All students are expected to study this document which outlines their responsibilities and consequences for violations of the policy." The FGCU Student Guidebook is available online at http://studentservices.fgcu.edu/judicialaffairs/new.html.

I expect you to maintain the highest standards of academic honesty and integrity while in this course and as a student at Florida Gulf Coast University. In addition to standard definitions of honesty, integrity, and plagiarism, this policy also prohibits you from using previous work products created for this course by other students and allowing persons outside your team to contribute to the creation of your team's work product. If you fail to maintain these standards as a student in this class I will pursue the fullest possible implementation of academic discipline for your offense.

Center for Academic Achievement
The Center for Academic Achievement (CAA) offers academic support services for any FGCU student. The services are at no extra charge to students and include: peer tutoring, Supplemental Instruction, Student Success Workshops, and individualized academic coaching. If you would like to participate in or learn more about these services, please visit the CAA in Library

103. You may also email the CAA at caa@fgcu.edu or call at (239) 590-7906. The CAA website is www.fgcu.edu/caa.

Turnitin.com
Students agree by taking this course all required papers may be subject to submission for textual similarity review to Turnitin.com for the detection of plagiarism. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of the Turnitin.com service is subject to the Terms and Conditions of Use posted on the Turnitin.com site.

Learning Support System
This course makes use of the Canvas on-line Learning Support System (http://canvas.fgcu.edu/).

Important Dates

Friday 1/9/15	Last day to drop/withdraw via Gulfline deadline 5:00pm (100% refund)
Friday 2/6/15	Last day to withdraw from ALL classes for 25% refund
Friday 3/27/15	Last day to completely withdraw without academic penalty
Friday 5/1/15	Final exam 7:30 AM – 9:45 AM

Tentative Course Schedule (Subject to Revision)

Class	Date	Topic	Required Preparation
1	1/5 M	Overview of the course; syllabus; faculty and student introductions; in-class survey of student preparation and interests; Introduction to engineering with Excel;	Kuncicky & Larsen, Chapters 1 and 2
2	1/7 W	Excel – spreadsheets and formatting, fill-handle	K&L, Chapters 2 and 3 (Skip Sections 3.4.3 & 4, 3.7.1-3, 3.8)
3	1/12 M	Excel – formulas and functions, absolute and relative referencing	K&L, Chapter 4, Sections 4.1 – 4.7
4	1/14 W	Excel – charts, graphs, secondary axes	K&L, Chapter 4, Section 4.8
	1/19 M	MLK Holiday observed – no class	
5	1/21 W	Excel – trend lines and error bars	K&L, Chapter 5, Sections 5.1 – 5.3
6	1/26 M	Excel – data analysis, linear regression, histograms	K&L, Chapter 5, Sections 5.4 – 5.7
7	1/28 W	Excel – Goal seek and solver	K&L, Chapter 5, Sections 5.8, 5.9.1 – 5.9.4)
8	2/2 M	Excel – solver, logical functions	
9	2/4 W	Review for Excel Test (Test #1)	Come prepared with questions!
10	2/9 M	**Test #1 Excel (Lessons # 1-9)**	

Tentative Course Schedule (Continued)

Class	Date	Topic	Required Preparation
11	2/11 W	MATLAB – Intro to the MATLAB environment, basic syntax, variables, built-in functions, applications Virtual Machines Demo in class	Gilat, Chapter 1 (pp. 1-27)
12	2/16 M	MATLAB – Creating arrays, vectors, matrices, mathematical operations, linear operations, applications	Gilat, Chapter 2 (pp. 33-55)
13	2/18 W	MATLAB – Mathematical operations, linear operations, applications with arrays	Gilat, Chapter 3 (pp. 63– 86)
14	2/23 M	MATLAB – Script files, output commands	Gilat, Chapter 4 (pp. 95-123)
15	2/25 W	MATLAB – Script files, output commands; Two-dimensional plots, plots with special graphics, applications	Gilat, Chapters 4 (pp. 95-123) & 5 (pp. 133-163)
	3/2-3/7 M-S	Spring Break – no classes	
16	3/9 M	MATLAB – Two-dimensional plots, plots with special graphics, applications	Gilat, Chapter 5 (pp. 133-163)
17	3/11 W	MATLAB – Three-dimensional plots	Gilat, Chapter 10 (pp. 323-341)
18	3/16 M	Review for Test #2. Introduction to programming	
19	3/18 W	**Test #2 MATLAB (Lessons # 11-16 & 18)**	
20	3/23 M	Introduction to programming and flow charts	Gilat, Chapter 6 (pp. 173-209)
21	3/25 W	Programming in MATLAB	Gilat, Chapter 6 (pp. 173-209)
22	3/30 M	Programming in MATLAB	Gilat, Chapter 6 (pp. 173-209)
23	4/1 W	MATLAB function files, comparison to script files	Gilat, Chapter 7 (pp. 219-228)
24	4/6 M	MATLAB function files	Gilat, Chapter 7 (pp. 219-228)
25	4/8 W	More programming in MATLAB	(Gilat, Ch. 6, 7)
26	4/13 M	Review for Test #3	(Gilat, Ch. 6, 7, 10)
27	4/15 W	**Test #3 MATLAB (Lessons #17 & 20-26)**	
28	4/20 M	MATLAB – Data Analysis, Import-Export	
29	4/22 W	MATLAB Review	Gilat: 1,2,3,4,5,6,7,10
30	4/27 M	MATLAB Review	Gilat: 1,2,3,4,5,6,7,10
31	5/1 F	**MATLAB Final Test (Lessons # 11- 29)**	