ENGR-1201-101CL

Introduction to Engineering

Fall 2021
MW 09:30AM to 11:20AM

Instructor Information: Tareq Ismail, Ph.D., tismail@com.edu, (409) 833-8772

Student hours and location:
Monday through Thursday 1pm-3pm
Location: STEM 127

Required Textbook/Materials:
An Introduction to Engineering
Publisher: Cengage Learning; 6th edition (January 15, 2019) ISBN-13: 978-1337705011

Course Description: An introduction to Engineering profession with emphasis on technical communication and team-based engineering design. Prerequisite: Math 1314 with grade of C or better.

Course requirements: To reinforce the engineering design process through hands-on activities that will lead to building an autonomous robot which will challenge other robots created by other members of this course.

Course Requirements		
1. Engineering Calculations	Solving practical technical problems using scientific and mathematical tools when available and using experience and intuition otherwise.	Linearization – Finding Roots of Functions – Solving Systems of Equations – Optimization
2. Creativity in Design	Engineers start by clearly defining the and formulating different ideas and approaches to a solution. They create designs based on these ideas, selecting the approaches that are most likely to succeed and easy to implement. Designs lead to the construction of prototypes, which are then tested to ensure effectiveness. The final goal of the design process is production, where the product faces approval.	Through the application of creative thinking using scientific and mathematical principles.
3. Ethics and professionalism	Engineers shall act in professional manners for each employer or client as faithful agents or trustees	Using their knowledge and skill for the enhancement of human welfare; II. being honest and

	and shall avoid conflicts of interest and shall build their professional reputation on the merit of their services and shall not compete unfairly with others. Engineers shall act in such a manner as to uphold and enhance the honor, integrity and dignity of the profession.	impartial, and servicing with fidelity the public, their employers and clients; III. striving to increase the competence and prestige of the engineering profession; and IV. supporting the professional and technical societies of their disciplines
4. Laboratory & machine shop	The journey to Machine Shop Excellence starts by identifying the highest priorities of the shop.	Hands-on experience in manufacturing methods and assembly.
5. Sketching, dimensioning, brainstorming, decision trees, decision matrices, and P.C. software packages	To know about different types of lines & use of different types of pencils in an Engineering Drawing. To know projection of points, straight lines, solids etc. To know development of different types of surfaces. To know about isometric projection. To know different angle of projection.	A complete understanding of the object should be possible from the drawing. If the isometric drawing can show all details and all dimensions on one drawing, it is ideal. One can pack a great deal of information into an isometric drawing.

Determination of Course Grade/Detailed Grading Formula: (methods of evaluation to be employed to include a variety of means to evaluate student performance)

ASSIGNMENTS AND GRADING POLICY

Attendance: 5%
Textbook Reading, Paper Assignments, quizzes, and/or Homework: 15%
Exams I: 15%
Exams II: 15%
Final Exam: 20%
lab report: 10%
Final Design Project: 20%

TOTAL 100 %*

*NOTE: All writing assignments must be completed and evaluated in order to pass this course.

GRADING POLICY:
Letter grades will be based on the following scale:

- 87 -100 A
- 70-86.99 B
- 57-69.99 C
- 40-56.99 D
- 0 - 39.99 F

Lab Reports:
• Each student is responsible for submitting a lab report in his/her own words
• Reports must be submitted at the start of class on the scheduled due date. If class is not held as the result of a holiday than submit your report at the start of the next class meeting after the holiday. will not be accepted more than one week late.
• All reports are to be word processed with 1" margins, 1.5 line spacing, and 11-point font size.
• All reports must contain the following sections:

- ✓ One Cover page – Provide the title of report, Report number, Course number, Department STEAM, College of Mainland and
- ✓ Introduction – Provide background information regarding the experiment/exercise.
- ✓ Body – Provide detailed information about the experiment/exercise and the steps performed
- ✓ to reach the desired goal of the experiment/exercise.
- ✓ Conclusion – Describe the results of the experiment/exercise. Was the desired goal
- ✓ achieved? Explain. What would you change?
- ✓ Please proofread and spell check before submitting.

Late Work, Make-Up, and Extra-Credit Policy:
Late HW and lab reports are accepted at a penalty of 50% and cannot be submitted after one week (One week has Monday through Sunday) form due date. Reports. Extra credit will be given to students as I see it fit within the class time frame.

Attendance Policy:
Students are expected to attend all classes as scheduled. Attendance is taken starting the first day of the semester. Teacher has the right to count student absent if he/she arrives late to class or leave class early.

Communicating with your instructor: ALL electronic communication with the instructor must be through your COM email. Due to FERPA restrictions, faculty cannot share any information about performance in the class through other electronic means. (Faculty may add additional statement requiring monitoring and communication expectations via Blackboard or other LMS)

Student Learner Outcome
Engineering profession and engineering ethics, including professional practice and licensure. Using their knowledge and skill for the enhancement of human welfare; II. being honest and impartial, and servicing with fidelity the public, their employers, and clients; III. striving to increase the competence and prestige of the engineering profession; and IV. supporting the professional and technical societies of their disciplines
Use technical communication skills to explain the analysis and results of introductory laboratory exercises in engineering and computer science. Technologists and technicians obtain a basic knowledge of engineering and scientific principles in a specific field and develop certain manual skills that enable them to communicate technically with all members of the technology team. Some tasks commonly performed by technologists and technicians include drafting, estimating, model building, data recording and reduction, troubleshooting, Page 6servicing, and specification. Often, they are the vital link between the idea on paper and the idea in practice.
Explain the engineering analysis and design process. Recognize the importance of collecting, recording, plotting, and interpreting technical data for engineering analysis and design. The design process encompasses the following activities (all of which must be completed): 1. Define the problem to be solved. 2. Acquire and assemble pertinent data. 3. Identify solution constraints and criteria. 4. Develop alternative solutions. 4. Select a solution based on analysis of alternatives. 5. Communicate the results.
Analyze data collected during laboratory exercises designed to expose students to the different engineering disciplines. Put into practice methods for graphical presentation of scientific data and graphical analysis of plotted data. Develop the ability to graph data using uniform and nonuniform scales. Apply methods of selected points and least squares for determining the equation that gives the best-fit line to the given data. Determine the most appropriate family of curves (linear, power, or exponential) that gives the best fit to the given data.
Describe the impact engineering has had on the modern world. A passion for helping solve modern-day challenges (e.g., renewable, nonpolluting energy; abundant clean water; modern health care; sustainable agriculture and manufacturing; safe roads and bridges; designs for natural and man-made disasters)
As part of a team, design a simple engineering device, write a design report, and present the design. For any engineering accomplishment, successful team performance requires cooperation that can be realized only through an understanding of the functions of the technology team. The technology team is one part of a larger team that has the overall responsibility for bringing a device, process, or system into reality.
Demonstrate computer literacy. Certain problems suggest the use of a computer or spreadsheet for solution. These are open-ended or “what-if” problems. Depending on the students’ prior work with programming or spreadsheets, additional instruction may be required before attempting these problems.

Academic Dishonesty: Any incident in violation of academic policy will be dealt with in accordance with college policy and Student Handbook. Academic dishonesty (i.e., cheating on exams) is an extremely serious offense and will result in a **grade of zero** on that exam and the student may be referred to the Dean of Students for the appropriate discipline action.

Plagiarism: Plagiarism is using someone else's words or ideas and claiming them as your own and is a very serious offense. Plagiarism includes paraphrasing someone else's words without giving proper citation, copying directly from a website and pasting it into your paper, using someone else's words without quotation marks. Any assignment containing plagiarized material will receive a **grade of zero** and the student may be referred to the Dean of Students for the appropriate discipline action. **Link(s) to resource(s) about avoiding plagiarism:** https://owl.english.purdue.edu/owl/resource/589/01/

Student Concerns: If you have any questions or concerns about any aspect of this course, please contact me using the contact information previously provided. If, after discussing your concern with me, you continue to have questions, please contact Dean of Academic Programs, Dr. Barney at (409)933-8727 or rbarney@com.edu.

Classroom Conduct Policy:

College of the Mainland requires that students enrolled at COM be familiar with the Standards of Student Conduct, which can be found in the on-line Student Handbook. http://www.com.edu/student-services/student-handbook.php . Students should act in a professional manner at all times. Disruptive students will be held accountable according to college policy. Any violations of the Code of Conduct will result in a referral to the Office for student Conduct and may result in dismissal from this class.

Behavioral Expectations Each student is entitled to an environment conducive to learning. Any situation that prevents students from learning or the instructor from teaching is considered to be a disruption. Please be respectful of your fellow students and the instructor by adhering to the following:

1. Cell phones can be used sparingly during class, but if the use begins to be a disruption to yourself, other students, or the instructor, you will be asked to put the device away. Certain devices can be used to view content on the internet; however, this is at the discretion of the instructor. Laptops are ONLY permitted during class to take notes. Surfing the internet or checking email from your laptop is not permitted. ***During exams, no electronics will be allowed out. Items not allowed include, but are not limited to, cell phones, laptops, tablets, ear buds, headphones. If the student has any of these devices out during an exam, the exam will be taken from the student, and they will receive a zero for that exam.***
2. Students can be removed from the class if they are exhibiting disruptive behavior as deemed by the instructor. Repeated incidents will result in automatic withdrawal from the class. Students who display this conduct will be removed from the class and a Conduct Referral Form may be submitted to the Dean of Students.

Success tips for Students:

Build Rapport If you find that you have any trouble keeping up with assignments or other aspects of the course, make sure you let your instructor know as early as possible. As you will find, building rapport and effective relationships are key to becoming an effective professional. Make sure that you are proactive in informing your instructor when difficulties arise during the semester so that they can help you find a solution.

10 Tips to Succeed in Class

1. Come to class. In some courses all you have to do is read the book; that's not the case here. The lecture will key you into what is important and what isn't; it will also provide a framework to stuff all the facts into. If you must miss class, get the notes from a fellow student or the web, and then go over the notes with someone who was present at the live lecture.
2. Take notes. Everything that really matters will be discussed in class; the book is really just for back up. The PowerPoints are posted online to help you fill in anything you missed. Taking notes helps you pay attention in class and remember the material. 3. Form a study group or partnership. Don't try to do it alone. Study groups are generally good because they help you go over the material, give you an opportunity to practice explaining your answers, and provide moral support.
4. Do the problems. Seriously and carefully. Do the problems at the back of each chapter
5. Make diagrams, pictures, summary charts, concept maps, etc. The ones in the book (and the ones handed out in class) may be good, but for best results, you should make your own.
6. Keep up. The current material is always based on what came before, so once you get behind it is very difficult to catch up. Some students find it is very helpful to quickly look over the notes of the previous lecture right before the current one.
7. Read one of the texts before class if the material is new to you. It is very hard to follow the lecture if every word and concept is unfamiliar.
8. Ask questions. If you don't understand something, ASK. The more effort you put into asking questions, the more you will get out of the answers.
9. Master the vocabulary. The stress in this course may be on *using* the vocabulary, but you won't get anywhere until you learn it first. So, try to master all new terms as fast as possible.
10. A word or two about grades In this course you have to know how to use the material, not just repeat it or explain it in your own words. If you think your performance on the exam does not reflect your knowledge, it often means you have memorized the facts but have not practiced enough at selecting the right ones and applying them to whatever problem is presented to you.

Course outline:

FALL 2021 TENTATIVE COURSE OUTLINE			
Week	**DAY**	**Lecture/Lab Topic(s)**	**Due Dates for Course Assignment(s)**
1	8/23	Chapter 1: Introduction to the Engineering Profession	HW1 is due on September 5, 2021
	8/25	Chapter1: Introduction to the Engineering Profession	
2	8/30	Chapter 2: Preparing for an Engineering Career Lab: Introduction to robot Digital Designer	HW2 is due on September 12, 2021
	9/1	Chapter 2: Preparing for an Engineering Career	

		Lab: Introduction to robot Digital Designer	
3	9/6	Chapter 3: Introduction to Engineering Design Kit Check-Out - TriBot Propulsion Exercise	HW3 is due on September 19, 2021 Lab Due: Week 4 (Literature & Patent Search)
	9/8	Chapter 3: Introduction to Engineering Design Lab: Kit Check-Out - TriBot Propulsion Exercise	
4	9/13	Chapter 4: Engineering Communication Lab: Understanding the Light Sensor	HW4 is due on September 26, 2021
	9/15	Chapter 4: Engineering Communication Lab: Understanding the Light Sensor	
5	9/20	Chapter 5: Engineering Ethics Lab**:** Using the Sensor Blocks/ Obstacle Avoidance Exercise	HW5 is due on October 03, 2021 Lab Due: Week 7 (Constraints & Design Criteria)
	9/22	Chapter 5: Engineering Ethics Lab**:** Using the Sensor Blocks/ Obstacle Avoidance Exercise	
6	9/27	**Review for Exam I** Chapter 1 through 4 Chapter 6: Fundamental Dimensions and Systems of Units Lab: Understanding the Touch Sensor/ Object Detection Exercise	Exam I due October 3, 2021 HW6 is due on October 10, 2021 Lab due: Week 10 (Alternative Solutions)
	9/29	**Exam 1** Chapter 1 through 4 Chapter 6: Fundamental Dimensions and Systems of Units Lab: Understanding the Touch Sensor/ Object Detection Exercise	
7	10/4	Chapter 7: Length and Length-Related Variables in Engineering Lab: Using Blocks from the Data Palette	HW7 is due on October 17, 2021 Lab Due: Week 12 (Decision)

	10/6	Chapter 7: Length and Length-Related Variables in Engineering Lab: Using Blocks from the Data Palette	
8	10/11	Chapter 9: Mass and Mass-Related Variables in Engineering Lab: Understanding Gear Ratios	HW8 is due on October 24, 2021
	10/13	Chapter 9: Mass and Mass-Related Variables in Engineering Lab: Understanding Gear Ratios	
9	10/18	Chapter 10: Force and Force-Related Variables in Engineering Lab: Create/Execute Parallel Lines of Code	HW9 is due on October 31, 2021
	10/20	Chapter 10: Force and Force-Related Variables in Engineering Lab: Create/Execute Parallel Lines of Code	
10	10/25	**Review for Exam II** Chapter 5, 6, 7, & 9 Chapter 11: Temperature and Temperature-Related Variables in Engineering Lab: Test/Debug Sumo Robot Hardware & Software	Exam II due on November 7, 2021 HW10 is due on November 7, 2021
	10/27	**Exam II** Chapter 5, 6, 7, & 9 Chapter 11: Temperature and Temperature-Related Variables in Engineering Lab: Test/Debug Sumo Robot Hardware & Software	
11	11/1	Chapter 13 Energy and Power Lab: Test/Debug Sumo Robot Hardware & Software	HW11 is due on November 14, 2021 Lab Due: Week 15 (Design Project Presentation)
	11/3		

		Chapter 13 Energy and Power Lab: Test/Debug Sumo Robot Hardware & Software	
12	11/8	Chapter 16: Engineering Drawings and Symbols Lab: Test/Debug Sumo Robot Hardware & Software	HW12 is due on November 21, 2021
	11/10	Chapter 16: Engineering Drawings and Symbols Lab: Test/Debug Sumo Robot Hardware & Software	
13	11/15	Chapter 17: Engineering Materials Lab: Work on Final Report • Work on Final Presentation	HW13 is due on November 28, 2021 (Extra credit)
	11/17	Chapter 17: Engineering Materials Lab: Work on Final Report • Work on Final Presentation	
14	11/22	Lab: Work on Final Report • Work on Final Presentation	
	11/24	Lab: Work on Final Report • Work on Final Presentation	
	11/25	**THANKSGIVING HOLIDAY**	
15	11/29	Lab: SUMO ROBOT COMPETITION Check-In Lego Mindstorms NXT Kits	Design Project Presentation SUMO ROBOT COMPETITION
	12/1	Lab: SUMO ROBOT COMPETITION Check-In Lego Mindstorms NXT Kits	
16	12/6	**FINAL EXAM** Chapter 10, 11, 13, 16, & 17	

Institutional Policies and Guidelines

Grade Appeal Process: Concerns about the accuracy of grades should first be discussed with the instructor. A request for a change of grade is a formal request and must be made within six months of the grade assignment. Directions for filing an appeal can be found in the student handbook.<https://build.com.edu/uploads/sitecontent/files/student-services/Student_Handbook_2019-2020v5.pdf**.** *An appeal will not be considered because of general dissatisfaction with a grade, penalty, or outcome of a course. Disagreement with the instructor's professional judgment of the quality of the*

student's work and performance is also not an admissible basis for a grade appeal. https://build.com.edu/uploads/sitecontent/files/student-services/Student_Handbook_2019-2020v5.pdf

Academic Success & Support Services: College of the Mainland is committed to providing students the necessary support and tools for success in their college careers. Support is offered through our Tutoring Services, Library, Counseling, and through Student Services. Please discuss any concerns with your faculty or an advisor.

ADA Statement: Any student with a documented disability needing academic accommodations is requested to contact Holly Bankston at 409-933-8520 or hbankston@com.edu. The Office of Services for Students with Disabilities is located in the Student Success Center.

Counseling Statement: Any student needing counseling services is requested to please contact Holly Bankston in the student success center at 409-933-8520 or hbankston@com.edu. Counseling services are available on campus in the student center for free and students can also email counseling@com.edu to set up their appointment. Appointments are strongly encouraged; however, some concerns may be addressed on a walk-in basis.

Textbook Purchasing Statement: A student attending College of the Mainland is not under any obligation to purchase a textbook from the college-affiliated bookstore. The same textbook may also be available from an independent retailer, including an online retailer.

Withdrawal Policy: Students may withdraw from this course for any reason prior to the last eligible day for a "W" grade. Before withdrawing students should speak with the instructor and consult an advisor. Students are permitted to withdraw only six times during their college career by state law. The last date to withdraw from the 1st 8-week session is October 6. The last date to withdraw from the 16-week session is November 19. The last date to withdraw for the 2nd 8-week session is December 2.

F_N Grading: The F_N grade is issued in cases of *failure due to a lack of attendance*, as determined by the instructor. The F_N grade may be issued for cases in which the student ceases or fails to attend class, submit assignments, or participate in required capacities, and for which the student has failed to withdraw. The issuing of the F_N grade is at the discretion of the instructor. The last date of attendance should be documented for submission of an F_N grade.

Early Alert Program: The Student Success Center at College of the Mainland has implemented an Early Alert Program because student success and retention are very important to us. I have been asked to refer students to the program throughout the semester if they are having difficulty completing assignments or have poor attendance. If you are referred to the Early Alert Program you will be contacted by someone in the Student Success Center who will schedule a meeting with you to see what assistance they can offer in order for you to meet your academic goals.

COVID-19 Statement: All students, faculty, and staff are expected to familiarize themselves with materials and information contained on the College of the Mainland's Coronavirus Information site at www.com.edu/coronavirus. In compliance with Governor Abbott's May 18 Executive Order, face coverings/masks will no longer be required on COM campus. Protocols and college signage are being updated. We will no longer enforce any COM protocol that requires face coverings. We continue to encourage all members of the COM community to distance, when possible, use hygiene measures, and get vaccinated to protect against COVID-19. Please visit com.edu/coronavirus for future updates.

Course policies are subject to change, and it is the student's responsibility to check Blackboard for corrections or updates to the syllabus.