

Engineering 10: Introduction to Engineering

Section 10.61, Fall 2019

Instructor:	Raji Lukkoor
Class Days/Time:	Monday/Wednesday 6:30 PM – 7:45 PM Lecture; 7:50 PM - 10:05 PM Lab
Office Hour	6:00 PM – 6:30 PM, M/W
Location:	S48
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Course Description

Introduction to Engineering is designed to allow students to explore engineering through hands-on design projects. Students will learn about the various aspects of the engineering profession and acquire *both* technical and non-technical skills, in areas such as project proposal, project management, technical communication, teamwork, and engineering ethics. Students will learn about human factors and engineering design factors impacting design as well as understand how sustainability principles influence design. Students will also gain a deep understanding of the challenges surrounding the world's energy needs.

The format of the course will be strongly interactive. Emphasis will be placed on group problem solving and experiential learning.

Course Objectives

Specific objectives of the course include:

1. Introduce the student to the fundamentals of engineering;
2. Introduce the student to the various disciplines of engineering;
3. Introduce the student to the concepts of teamwork, project management, engineering ethics and technical communication;
4. Introduce the student to the principles of sustainability and how they affect design;
5. Introduce the student to communication tools such as Microsoft Word, PowerPoint and Excel, to help support engineering design and analysis.

During this course, as teams of two to three students, you will work on a design project that excites you and is of interest to you. The goal is to assess the need for the project, describe your solution, and explain why/how it is different from other solutions available. Each student team will write and submit a project proposal that outlines the project need, background, objectives, implementation plan, deliverables and resources. Concurrently, each student team will create and submit a PERT chart and a Gantt chart that highlight an estimated timeline of deliverables and important dates for the project. At the end of this course, each student team will deliver a PowerPoint presentation and conduct peer evaluations by providing constructive feedback on the project presentations. The design project and presentation constitute 50% of your course grade; participation is mandatory and a requirement to pass this course.

Text

(Recommended but not required).

Engineering Your Future: A Comprehensive Introduction to Engineering by William C. Oakes, PhD, 2009-2010 Edition.

A Whole New Engineering: The Coming Revolution in Engineering Education by David R. Goldberg and Mark Somerville, 2014 Edition.

Attendance

Attendance is mandatory. Ensure that vacations, doctor's appointments, social engagements, etc. do not interfere with attendance. Active class participation, including the completion of all class exercises, is key to achieving educational success. Class activities cannot be made up if the class is missed. If you are absent from class, the onus of checking on announcements made while you were absent is on YOU.

Classroom Protocol

Please arrive to class on time. If you do happen to arrive to class late, please enter and take your seat quietly. Expected classroom courtesies include: no text messaging, no emailing, no checking emails, or no gaming. Likewise, no recording of lecture, no in-class picture taking of lecture slides, no making/receiving phone calls. No copying or sharing of instructional material, including videos, PowerPoint slides, notes, handouts, problems, solutions, quizzes, tests, simulations, etc.

Note that any inappropriate or disruptive behaviors, including offensive/vulgar expressions, disrespecting others' viewpoints or disrespecting the instructor could lead to removal from the classroom and/or disciplinary action, as warranted.

Communication

Email communication is most appropriate for administrative matters (notification of illness, scheduling appointments, clarification of homework problems, etc.). With all communication, please maintain a high degree of respect and professionalism. Homework problems or other course materials are best discussed in person during scheduled office hours and not by email.

Coursework Expectation

Lecture presentations will be posted to *Canvas* at the start of each week. The *Introduction to Engineering Course Schedule & Calendar* is attached. Each student is responsible to check the calendar on a regular basis to see if there is a change in the schedule.

Note: All work submitted past the due date will be docked 50%.

Technical Papers:

Relevant technical papers will be assigned throughout the quarter. Note that papers might be added or deleted from the list as the quarter progresses. Where applicable, paper guidelines will be posted to *Canvas*.

Note: This is an individual effort.

Engineer Interview & Report:

This exercise consists of securing an engineer (any engineering major), writing a list of interview questions, scheduling & interviewing the engineer, and submitting the interview report.

Note: This is an individual effort.

Design Project:

Project Proposal, PERT & Gantt Charts

A project proposal, a PERT chart and a Gantt chart per team is required for your project.

Note: You must submit the above proposal and charts in order to complete the class and pass this course.

Project Demo & PowerPoint Presentation:

A final PowerPoint presentation per team is due for your project. All team members must be present and participate in the final demo and presentation; else, you will receive a zero.

Note: You must demonstrate your project and deliver the Final Presentation in order to complete the class and pass this course.

Teammate Evaluation:

To help ensure that all members contributed to the project in an equitable manner, you will evaluate the performance of your teammates. Use a paragraph for each teammate, consisting of no more than 3-5 sentences per paragraph.

Note: Failure to submit an evaluation will result in a loss of points for you.

Evaluation & Grading:

Project		
Proposal	Team	10%
PERT & Gantt Charts	Team	10%
Final Demo & PowerPoint Presentation	Team	27%
Teammate Evaluation	Individual	3%
Engineer Interview & Report	Individual	20%
3 Technical Papers – Teamwork (9 pts), Ethics (9 pts), Sustainability (12 pts)	Individual	30%

Note: The above weighting is subject to change, with fair notice given in class.

The final course grades will be assigned according to the following grading scale, with standard decimal rounding (i.e. 0.5 and greater rounded up):

A+ = 100-98%	A = 97-93%	A- = 92-90%
B+ = 89-87%	B = 86-83%	B- = 82-80%
C+ = 79-76%	C = 75-70%	
D+ = 69-68%	D = 67-63%	
F = 59-0%		

Note: The above grading rubric is subject to change, with fair notice given in class.

Introduction to Engineering Course Schedule & Calendar

* Note that the schedule below is subject to change with fair notice given in class.*

Week	Date	Lecture/Lab Topic	Assigned	Due Date
1	Sep 23	Lec: First Day of Class History of Engineering Lab: Examples of previous projects		
	Sep 25	Lec: Engineer Interview Guidelines Lab: Form team, select project		
2	Sep 30	Lec: Engineering Design Lab: Proposal writing	Class Project Proposal	
	Oct 02	Lec: Engineering Disciplines Lab: Start writing Class Project Proposal	Interview Report	
3	Oct 07	Lec: Class Project Proposal Lab: Interview Questions Review		
	Oct 09	Lec: Human Design Factors Lab: Class Project Proposal review		Class Project Proposal
4	Oct 14	Lec: Excel Basics; PDCA, PERT & Gantt charts Lab: Excel exercises Purchase all the parts	Class Project PERT/Gantt Charts	
	Oct 16	Lec: Teamwork Lab: Interview Questions Review	Teamwork Paper	
5	Oct 21	Lec: Technical Communication I Lab: Work on PERT/Gantt charts		Class Project PERT/Gantt Charts
	Oct 23	Lec: Sustainability I Lab: Bring in the parts and work on Class Project	Sustainability Paper	
6	Oct 28	Lec: Sustainability II Lab: Bring in the parts and work on Class Project Work on Teamwork Paper		
	Oct 30	Lec: Energy Lab: Work on Class Project Work on Teamwork Paper		Teamwork Paper
7	Nov 04	Lec: Engineering Ethics Lab: Update on Class Project Work on Class Project Interview Questions Review	Ethics Paper	
	Nov 06	Lec: Technical Communication II Lab: Work on Class Project		
8	Nov 11	<i>Holiday</i>		
	Nov 13	Lec: Technical Communication III Lab: Work on Class Project Work on Sustainability Paper	Class Project Presentation	Sustainability Paper
9	Nov 18	Lec: Interview Report Review Lab: Work on Class Project		

		Work on Ethics Paper		
	Nov 20	Lec: Class Project Presentation Review Lab: Work on Class Project Update on Class Project Work on Ethics Paper		Ethics Paper
10	Nov 25	Lec: Interview Report Review Lab: Work on Class Project/Presentation		
	Nov 27	TBA		
11	Dec 02	Lec: Class Project Presentation Review Lab: Work on Class Project/Presentation		
	Dec 04			Class Project Presentation/Demo Teammate Evaluation
12	Dec 11			Interview Report

Student Learning Outcome(s):

- *The student will be able to analyze, graph and develop a formula for a given data set.
- *The student will be able to prepare and write technical specifications and documentation, and be able to orally present them.
- *The student will work collaboratively on an engineering team.