

# Engineering 10: Introduction to Engineering

## Section 10.62, Fall 2016

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Instructor:	Raji Lukkoor
Class Days/Time:	Tuesdays and Thursdays: 6:30 PM – 7:45 PM Lecture; 7:50 PM - 10:05 PM Lab
Location:	S42
Office Hours:	TTh 6:00 PM – 6:30 PM, 10:00 PM – 10:30 PM
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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.

### 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, during the third week of the quarter, which 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 submit a project report. Students will conduct peer evaluations by providing constructive feedback on the project presentations. The design project, presentation and report writing constitute 50% of your course grade; participation is mandatory and a requirement to pass this course.

Also during this course, you will attend a Speaker Series event. Silicon Valley professionals from various engineering disciplines will present an overview of their discipline, discuss their experiences, and provide tips on a number of topics, including business and technology trends, how to seek and interview for an

internship, academic pathways to pursue, and salary expectations. Participation in 4 out of the 5 Speaker events and submission of papers for each event attended is mandatory, and a requirement to pass this course.

## **Student Learning Outcome**

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

1. Summarize the steps of the engineering design process;
2. Apply basic physics concepts to the design and analysis of built systems;
3. Apply teamwork skills and resolve team conflict;
4. Write a simple engineering report and present the report orally;
5. Use tools such as spreadsheets to support engineering design and analysis;
6. Use ethical reasoning to address to evaluate ethical dilemmas;
7. Explain principles of sustainability and how they affect engineering design;
8. Appreciate the challenges surrounding the world's energy needs;
9. Appreciate and align with the various engineering disciplines.

## **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

At the beginning of the quarter, your instructor will create a *Dropbox* account and each student will receive your own *Dropbox* invitation link to view the lecture presentations and upload your work. Please refer to the Calendar folder for the Course Schedule. Each student is responsible to check the calendar folder on a regular basis to see if there is a change in the schedule. A tentative schedule is attached.

Note: For full credit consideration, all materials must be submitted on time. Work submitted even a minute late, but within 24 hours of the due date, will be docked 50% points. Work submitted past 24 hours will earn a zero.

### Homework/Papers:

Relevant papers will be assigned throughout the quarter. Note that papers might be added or deleted from the list as the quarter progresses. If applicable, paper guidelines will be posted on *Dropbox*.

Note: This is an individual effort.

### Speaker Series Participation:

Speaker Series participation consists of attending each event, participating in class discussions, asking content-related questions, and submitting a paper. The aim of these exercises is to help you develop your critical thinking skills. Note that exercises might be added or deleted from this list as the quarter progresses.

Note: This is an individual effort. You must attend 4 out of 5 events and submit a paper for each event attended. If you did not attend an event, and submitted a paper for it, your submission will receive a zero!

### 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 course.

### Final Written Report:

A final written report per team is due for your project.

Note: You must submit the Final Report in order to complete the course.

### Final Demo, PowerPoint Presentation & Peer Evaluation:

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

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

## Evaluation & Grading:

Coursework will be weighted as follows:

Project Proposal	Team	10%
PERT & Gantt Charts	Team	10%
Final Demo & PowerPoint Presentation	Team	20%
Final Written Report	Team	10%
3 Papers (Teamwork, Ethics, Sustainability/Energy)	Individual	30%
4 Speaker Events Participation and 4 Papers	Individual	20%

*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.