Sichuan University Pittsburgh Institut

proudly presents

Introduction to Engineering I

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Introduction to Engineering I
Lecture 1

Course Goals/Syllabus
The Engineering Method
Problem Documentation
Form Teams
Studio Problems
Homework and Reading
Course Goals

• To develop skills in engineering problem definition and solving
• To gain proficiency in communication through written and oral reports
• To practice solving problems through teamwork
• To understand the importance of economic considerations in engineering design
• To learn how to acquire, judge, and use information in solving problems
How To Succeed In This Class

• Ask questions – in person or by email, in class or in our offices

• Follow instructions:
  • Read the textbook, read the Matlab documentation
  • Lectures will NOT repeat material from the textbook

• Understand:
  • Process is much more important than the answer
  • Presenting your work logically and professionally is as important as the technical content

• Be engaged, contribute to discussions, offer your opinions
  • Don’t be afraid to be wrong
  • Don’t worry if you're confused at first

• Ask questions!
Syllabus

Class Website:

faculty.virginia.edu/reed/scupi/intro_engr_1/home.html

Website location will probably change during the semester
The Engineering Method

1. Recognize and understand the problem
2. Accumulate data and verify accuracy
3. Select the appropriate theory or principle
4. Make the necessary assumptions
5. Solve the problem
6. Verify, check, and **document your results**
Problem Documentation

The problem/project documentation will contain most of these elements:

1. Problem statement
2. Diagram
3. Theory
4. Assumptions
5. Solution steps
6. Mark the solution
7. Solution verification
8. Discussion / Conclusion
9. Information sources and acknowledgments
10. Identifying information (name, date, institution, etc.)
No Handwritten Reports

• Use Matlab (NOT EXCEL!) to perform calculations and draw graphs
• Use Word to format your work
• Print your reports
• Why?
  • Formal formatting emphasizes a logical, disciplined solution
  • Tools facilitate spell checking and neat graphs
  • Prevent ambiguity arising from handwriting variations
  • Properly used, the computational tool can vastly reduce errors
• Formatting will become easier with practice
Example – Tank Design

Figure 4.3, Text page 82

*Problem*

A tank is to be constructed that will hold $5.00 \times 10^5$ L when filled. The shape is to be cylindrical, with a hemispherical top. Costs to construct the cylindrical portion will be $300/m^2$, while costs for the hemispherical portion are slightly higher at $400/m^2$.

*Find*

Calculate the tank dimensions that will result in the lowest dollar cost.
Matlab Demo

- Just watch – don’t take notes!
- In a few minutes, you will be doing the same
Class Teams

• Take five minutes to form three person teams
• Choose your seating (please sit in the same place for the entire semester)
• While you're working on your studio problems:
  • Choose a team name from the list
  • Enter names, email addresses, and ID numbers into the spreadsheet
Next Steps

• **Studio Exercise** (remainder of class today); Download and follow instructions here: [faculty.virginia.edu/reed/scupi/intro_engr_1/materials/studio_01.pdf](faculty.virginia.edu/reed/scupi/intro_engr_1/materials/studio_01.pdf)

• Demonstrate your work to Prof. Reed or a TA by the end of class today

• **Homework assignment**
  [faculty.virginia.edu/reed/scupi/intro_engr_1/materials/hw_01.pdf](faculty.virginia.edu/reed/scupi/intro_engr_1/materials/hw_01.pdf)

• Each student turns in printed homework by the due date

• **Student information worksheet** (turn in with Homework 1):
  [faculty.virginia.edu/reed/scupi/intro_engr_1/materials/student_info.docx](faculty.virginia.edu/reed/scupi/intro_engr_1/materials/student_info.docx)
Questions?

• What is the mass, in kg, of the air in this room?

• Go to the class website now:
  faculty.virginia.edu/reed/scupi/intro_engr_1/home.html

• Download the studio assignment and work on it

• TEAMWORK! Do NOT work by yourself!