CENG 210S Engineering Improv: *How engineers think.*

Classroom: ML 107
Class schedule: MWF 9:00-11:15

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Objectives:

This is a general introduction to engineering analysis and to chemical engineering principles. Material will include the derivation of governing equations from first principles and the analysis of these equations, including underlying assumptions, degrees of freedom, dimensional analysis, scaling arguments, and approximation techniques. The goal of this course is to obtain the necessary skills for improvising mathematical models for a broad range of problems that arise in engineering, science and everyday life.

Prerequisite: Calculus.

Improv: https://www.youtube.com/watch?v=LyxHujdRIpk

Text (optional):

Chemical Engineering, An Introduction,
Morton M. Denn, Cambridge.
ISBN 9781107669376.
https://dl.icdst.org/pdfs/files1/ae44fd68aa54af0e29f1112974fd0522.pdf

Exams, homework, and in-class work

4 non-cumulative tests, 20% each
weekly homework assignments, 20%

Note about problem sets and tests:

Test problems will be drawn from problem sets.

Topics

1. Conservation laws;
   Constitutive equations;
   Governing equations;
   Boundary conditions.

2. Degrees of freedom;
   Dimensional analysis;
   Characteristic scales;
   Dimensionless parameters;
   Problem solving.

3. Assumptions;
   Scaling arguments;
   Estimates;
   Approximation solutions.