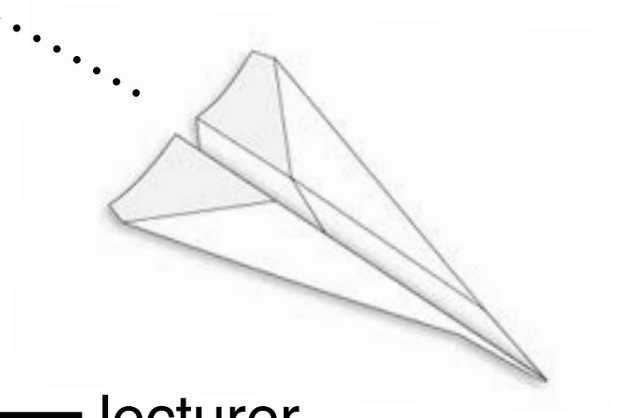
PHY180

Classical Mechanics

(aka Elements of Physics I)



Joseph Thywissen ← lecturer

["tie-wiss-en"]

Brian Wilson ← labs, tutorials

What is Classical Mechanics?

Study of motion and its causes

$$\vec{F} = \frac{d}{dt} m\vec{v}$$

You may have studied mechanics in high school, but now:

- Calculus based
- Advanced topics
  - Harmonic motion, rotating objects
- Not an historical perspective
  - Start from conservation laws, not F=ma

“Why study Classical Mechanics?”

- Conceptual building block
  - ✦ mechanics underpins many topics in engineering
  - ✦ starting point for quantum physics and more
- 1st physical theory that you may encounter
  - ✦ sophisticated mathematical structure
  - ✦ testing theory experimentally
  - ✦ distinction between postulates and derived relations
  - ✦ abstraction and beauty: conservation laws, symmetry
- Learning how to think:
  - ✦ how to solve problems
  - ✦ learn hypothesis-testing
  - ✦ new perspective on the world around you

Mathematics and the world around us

"Can I write an equation for that?"
-why should math work?
-can math describe everything?

….hired for this skill!

Falsifiable

-Physicist: someone who loves being proven wrong
-Experiments cannot indicate truth, only false
-How sure are you of what you think you know? (uncertainty is quantifiable)
-Do an experiment

Engineering Science is for the “Yes, but why?” students.

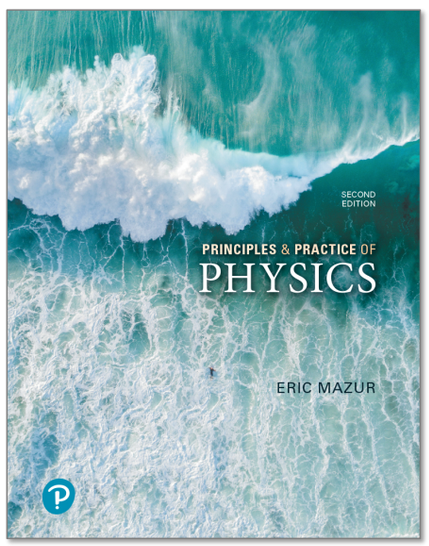
—K.B. Jackson, Chair of Engineering Physics from 1942-63

Course structure

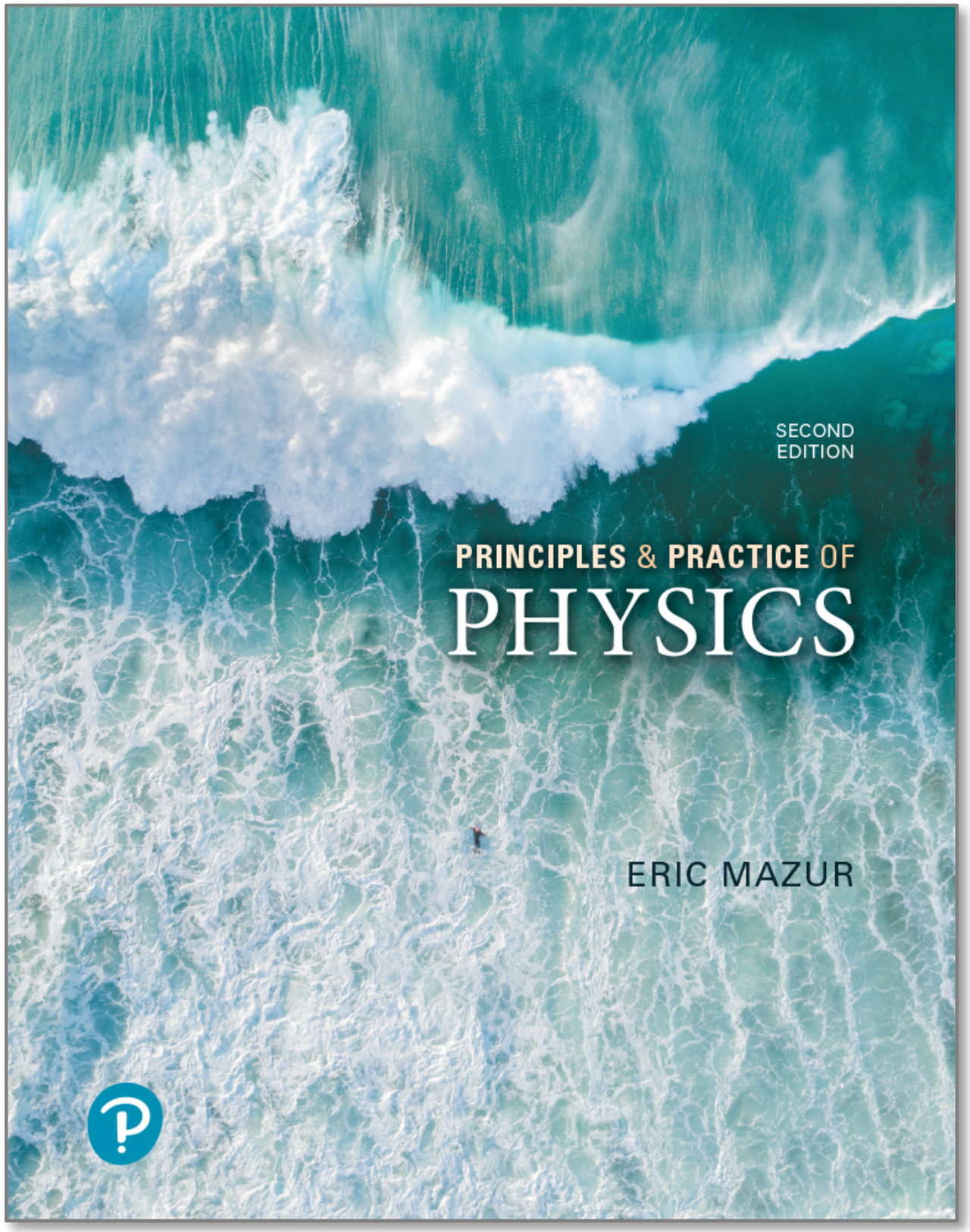
PHY180 online

- Homepage: Quercus q.utoronto.ca/
  - ✦Pre-recorded lecture videos
  - ✦Documents such as slides, solutions, etc.
  - ✦Lab report submission
  - ✦where you can see your grades
  - ✦links to other 2 sites:

- Communication: Piazza
  piazza.com/utoronto.ca/fall2020/phy180
  - ✦Online discussion forum
  - ✦All physics questions (to profs and TAs)
  - ✦Direct messaging for Prof. Thywissen (*instead of email, use this please*)



- Text: "MyLab and Mastering" site
  - ✦ebook: *Principles & Practice of Physics*
  - ✦assigned problem sets
  - ✦practice problems & study aids
  - ✦how to: https://tinyurl.com/y569myu7



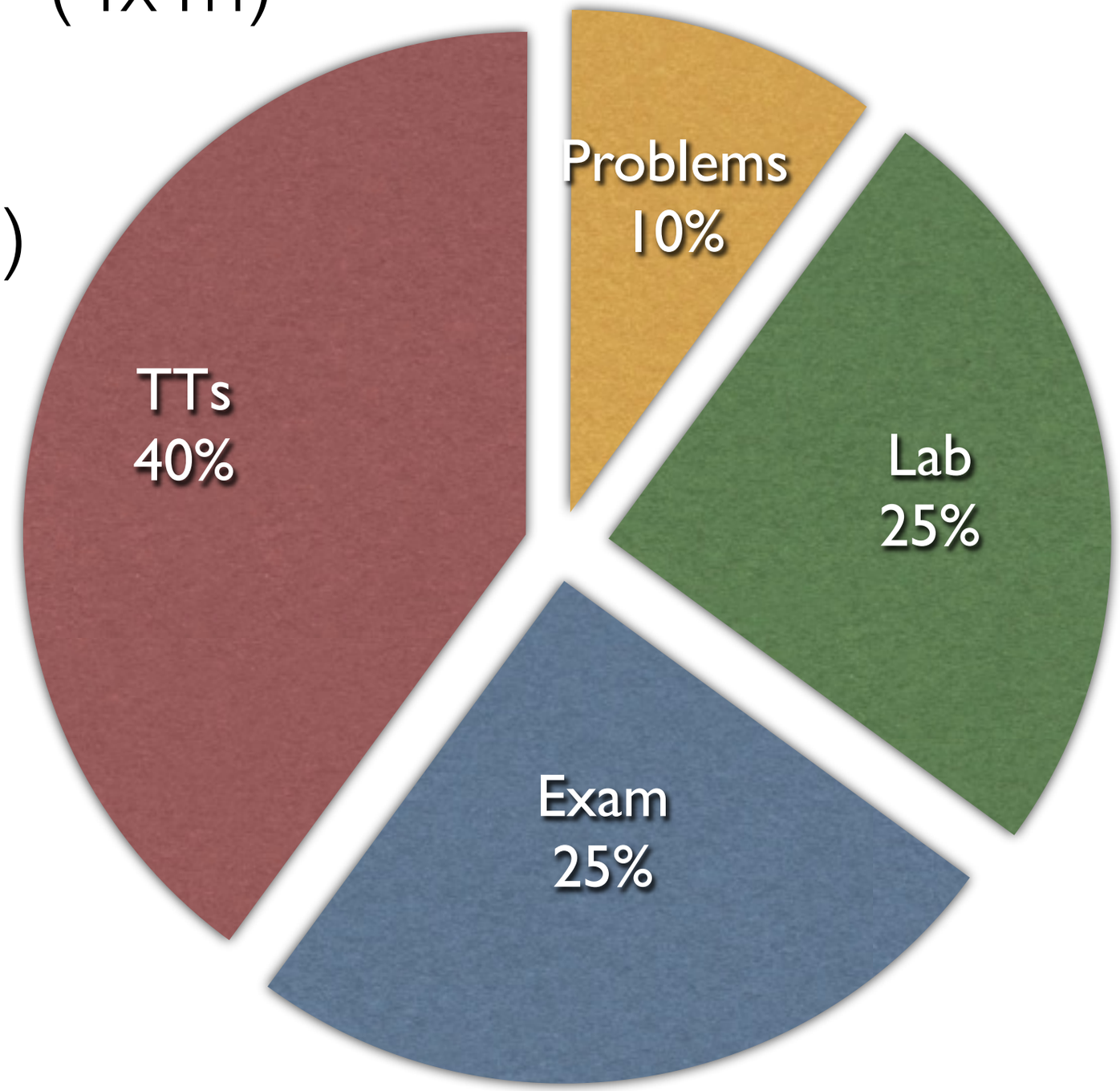
Read your amazing textbook!

Module 1

wk	Topic	Mazur Reading	Sun	Mon	Tue	Wed	Thu	Fri	Sat
0	Introduction	Ch. 1	06-Sep	07-Sep	08-Sep	09-Sep	10-Sep Course Intro	11-Sep	12-Sep practice PS due (no marks)
1	Motion, Acceleration	Chs. 2,3	13-Sep	14-Sep Ch2 Q&A; Tutorials	15-Sep Ch2,3 Q&A	16-Sep	17-Sep Ch3 Q&A	18-Sep PS due on Ch2,3	19-Sep
2	Momentum	Ch. 4	20-Sep	21-Sep Ch3 Q&A; Tutorials	22-Sep Practice Test Ch3,4 Q&A	23-Sep Lab Report due 8am	24-Sep Ch4 Q&A	25-Sep PS due on Ch4	26-Sep
3	Energy	Ch. 5	27-Sep	28-Sep review Q&A; Tutorials	29-Sep 9am Test on Module 1	30-Sep	01-Oct Ch5 Q&A	02-Oct PS due on Ch5	03-Oct
4	Reference frames	Ch. 6	04-Oct	05-Oct Ch5,6 Q&A; Tutorials	06-Oct Ch5,6 Q&A	07-Oct	08-Oct Ch6 Q&A	09-Oct PS due on Ch6	10-Oct
5	Interactions	Ch. 7	11-Oct	12-Oct Thanksgiving holiday!	13-Oct Ch6,7 Q&A	14-Oct Lab Report due 8am	15-Oct Ch7 Q&A	16-Oct PS due on Ch7	17-Oct
6	Force	Ch. 8	18-Oct	19-Oct review Q&A; Tutorials	20-Oct 9am Test on Module 2	21-Oct	22-Oct Ch8 Q&A	23-Oct PS due on Ch8	24-Oct
7	Work	Ch. 9	25-Oct	26-Oct Ch8 Q&A; Tutorials	27-Oct Ch8,9 Q&A	28-Oct Lab Report due 8am	29-Oct Ch9 Q&A	30-Oct PS due on Ch9	31-Oct
8			01-Nov	02-Nov review Q&A; Tutorials	03-Nov 9am Test on Module 3	04-Nov	05-Nov (no class)	06-Nov	07-Nov
			08-Nov	09-Nov	10-Nov	11-Nov	12-Nov	13-Nov	14-Nov
			Fall Break!						

PHY180 marking:

- 40% Term “Testlets” (4x1h)
- 10% Problem sets
- 25%: Lab (at home)
- 25%: Exam (2h)



“What do I do now?”

First week in PHY180

- Setup your tools (textbook; Piazza login)
- Read Chapters 1-3 in textbook
- Watch recorded lectures
- Work problem sets online to practice
- Ask q's in "PRA" (tutorial) and "LEC" (Q&A)
- Start your lab

First deliverables:

- Problem set on Ch 1, Sat 12 Sept (no mark)
- Problem set on Ch 2&3, Friday 18 Sept
- Lab report 1 on Wednesday 23 Sept

Questions?

ask on forum

Mon	Tue	Wed	Thu
07-Sep	08-Sep	09-Sep	10-Sep Course Intro
14-Sep Ch2 Q&A; Tutorials	15-Sep Ch2,3 Q&A	16-Sep	17-Sep Ch3 Q&A

ask during class