

PHYS3520 Modern and Quantum Physics

Instructor

Dr. Wing H To

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Office Location

Naraghi 173

Office Hours

M: 10-12

T: 9:30-10:30

F: 10-12

Web Integration

csustanphysics.slack.com

#phys3520

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Course Overview

Introduction to Modern Physics covering the developments in Physics from 1905-today. This course is designed to introduce science, engineering and Physics majors to relativity, quantum mechanics, atomics, nuclear and particle physics.

Learning Goals

- Contrast classical and relativistic mechanics
- Apply physics laws in moving frames and transform results into other frames
- Discover particle and wave duality of all physical phenomena
- Develop intuitions about quantum mechanical systems
- Follow the developments in modern physics in atomic, nuclear and particle physics.

Required Material

Modern Physics by Serway, Moses and Moyer, 3rd Edition (min 180 days rental)

Scientific Calculator

iClicker Remote (any version, new or used)

Optional Material: Maple Student Version (\$99)

Modern Physics by Bernstein (a slightly more adv'd text)

Prerequisite

- PHYS2260 Required. PHYS3010 Recommended (Concurrently)

Resources

- Me: email or office hour visits!
- Slack integration: csustanphysics.slack.com

Grading

Component	% of Grade	Late Policy
iClicker	9%	Miss 3 days free
Homework	35	10%/day max 50%
Midterms x 3	36	Sub Final for 1MT
Final	20	-
Total	100	

Maximum 1MT grade can be shifted to final. Note that the final is comprehensive and more difficult than midterms

Tentative Schedule: Check for Revisions on csustanphysics.slack.com

Week	Readings	Topics
1: Aug 21	Bernstein.pdf pg9-14	Syllabus, Review of Waves
2: Aug 28	Chapter 1	The Ether, Michelson-Morley Experiment, Special Relativity
3: Sept 4	Chapter 2	No Class Monday , Relativistic Dynamics and Conservation
4: Sept 11	Chapter 3.1-3.5	Quantization of Light
5: Sept 18	Ch 3.6-3.7	Particle-Wave Duality, Midterm 1 (Rev-Ch3)
6: Sept 25	Ch 4	Atomic Energy Levels, Wave nature of matter
7: Oct 2	Ch5	Duplicitous electron, Heisenberg Uncertainty
8: Oct 9	Ch 6	Introduction to Quantum Mechanics, No Class Weds
9: Oct 16	Ch 7	Quantum Tunneling, Midterm 2 (Ch4-7)
10: Oct 23	Ch 8	Quantum Mechanics in 3D and Angular Momentum
11: Oct30	Ch 9	Atomic Structure and Electron Spins
12: Nov 6	Ch 13	Nuclear Physics, No Class Friday
13: Nov 13	Ch 14	Application of Nuclear Physics, Midterm 3 (Ch8,9,13,14)
14: Nov 20	Ch 15	Particle Physics
15: Nov 27	Ch 16	Cosmology
16: Dec 4	Experimental Papers	Frontiers in Physics
17: Dec 11	Monday: Final Review, Friday: Finals 8:30-10:30 (Comprehensive + Ch 15,16)	