

Course Syllabus

PHYSICS 202: EXPERIMENTAL PHYSICS Spring 2021

Instructor: Randall Headrick

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Instructor office hours: TBA. Office hours will be held remotely on Microsoft Teams

Meeting times: MF, 3:30 – 4:45 pm in Discovery W403.

Textbook: None. The following references may be helpful, but they not required:

“An Introduction to Error Analysis: The Study of Uncertainties in Physical Measurements” (2nd Edition), by John R. Talyor, University Science Books, 1997.

“Experiments in Modern Physics” (2nd Edition), by Adrian C. Melissinos and Jim Napolitano, Academic Press, 2003.

Prerequisites: Phys 128; Math 121; Junior Standing.

Course description:

Experimental topics

- Optical spectrometer
- Vacuum systems
- Oscilloscopes
- Pulse generator
- Circuit design
- Nuclear Magnetic Resonance (NMR)
- X-ray sources and detectors
- Measurement of Current, Voltage, and Resistance
- Diodes and solar cells
- Clean room protocols
- Dark room
- Diodes and solar cells

Laboratory Experiments

- Solar spectrum

- Optical absorbance and reflectance
- Thin film resistivity
- Solar Cell power conversion efficiency
- Organic Photovoltaic Cell fabrication
- Pulsed NMR and CW NMR
- Magnetic Resonance Imaging in 1-Dimension
- X-ray Powder diffraction
- Johnson noise

Note: We will not do all of the experiments listed above. Just a subset of them, and maybe some new ones as well!

Homework/Exams/Grades: Weekly exercises will include a lab component and data analysis (70%). Roughly three lab reports and/or presentations will count for the balance of the grade (30%). There are no exams, mid-term or final.