Proposed New Undergraduate Course

Department: Physics Date: 3/2/11

Course Number: PH 3002 Title: Junior Physics Laboratory

Hours: Lecture Recitation Tutorial Laboratory Test Credits

 0.0 0.0 0.0 4.0 0.0 2.0

Prerequisites: PH 2344

Co-Requisites: MA 2222

Co-Registration Requirements: None

Other Restrictions on Registration: None

Restrictions on who may receive

 credit for this course: None

Date of First Offering: Fall 2011

Lab or Other Fees: None

The course will be offered: Once per year

# Textbooks: An Introduction to Error Analysis, J.R. Taylor, 2nd Edition, University Science Books, 1996.

Probable Instructor: Sheverev/Mugglin/Folan

# Library Needs: Course reserve copies of: An Introduction to Error Analysis, J.R. Taylor, 2nd Edition, University Science Books, 1996; Data Reduction and Error Analysis for the Physical Sciences, P. Bevington, 3rd Edition, McGraw Hill, 2002; Measurements and their Uncertainties, I.G. Hughes and T.P.A. Hase, Oxford University Press, 2010

Computer Needs: Students will need access to a spreadsheet application such as Excel and presentation application such as Powerpoint.

Laboratory Needs: A room is being prepared with capacity of 10 – 12 students.

This course replaces: None

**PH 3002 - Junior Physics Laboratory**

(Fall Semester 2011)

Catalog Data: PH 3002 Junior Physics Laboratory. (0:0:4:2). An intermediate level laboratory course providing in depth exposure to a selection of classic physics experiments. Students’ experimental skill set is expanded and data analysis and communication skills developed. *This course meets four hours per weeks.*

Prerequisites: *PH 2344.*

Corequisites: *MA 2222.*

Textbook: An Introduction to Error Analysis, J.R. Taylor, 2nd Edition, University Science Books, 1996.

Reference Measurements and their Uncertainties, I.G. Hughes and T.P.A. Hase, Oxford University

Texts: Press, 2010.

Data Reduction and Error Analysis for the Physical Sciences, P. Bevington, 3rd Edition, McGraw Hill, 2002.

Coordinator: Sheverev

Goals: Expand students’ experimental skills, expose students to a selection of classic physics experiments, and provide a sense of the nature of independent experimental work.

Description: The first hour of each laboratory sessions will be devoted to instruction on report content and format, data and error analysis, experimental technique and methodology and specific background material for the various experiments. Students will spend the remainder of two sessions working on each of six experiments. Students will maintain a laboratory notebook and use it to record progress on each experiment. Reports will be prepared and submitted one week after completion of an experiment. In the final session the students will give an oral presentation on an experiment to the group.

Grading: Involvement & Data Quality 10%

 Reports (6) 75%

 Presentation (1) 15%

Experiments: Cavendish Experiment. Measurement of Newton’s universal gravitation constant.

 e/m Experiment. Measurement of the charge to mass ratio for the electron.

 Michelson Interferometer. Measurement of wavelength and refractive index.

 Franck Hertz Experiment. Measurement of the energies of elementary excitations in atoms.

 Radioactive Decay. Measurement of the decay constants and halflives of radioactive isotopes.

 Scintillation Spectroscopy. Measurement of x- and - ray energies using scintillators.