FLORIDA ATLANTIC UNIVERSITY
Department of Physics

Syllabus of PHY4803L (CRN) Modern Physics Lab Spring 2016

Course Descriptions: *A series of laboratory experiments in classical and modern physics, electrical measurement techniques, and optics, with applications to problems in atomic, nuclear and solid-state physics comprise this course.*

Objective: *PHY4803L is undergraduate lab II. It provides hands-on experience with experiments in modern physics that are challenging at varying levels of expertise. Students will learn in this course how a problem in experimental modern physics is tackled: how to organize the investigation, collect and record data, analyze the data, draw conclusions and present the results and conclusions in a written form.*

Prerequisite: *PHY3101*

Course credit: *1 credit for which all the 8 experiments listed in Table 1 must be done.*

Credit hours: *PHY4803L is an independent-study course, students are required to read the manufacture lab manuals and figure out how to perform each experiment. In average, it takes a student 3 hours for reading lab manual and performing the experiment, 2 to 3 hours for analyzing data and writing lab report. In total, it takes a student 40 to 48 hours for 1 credit in fall semester.*

Table 1 Experiments in PHY4803L

1	*Hall Effect*
*2**	*Photoelectric Effect*
*3**	*Series LCR Resonance*
*4**	*Electron Spin Resonance*
5	*Michelson and Fabry-Perot Interferometer*
*6**	*Nuclear Magnetic Resonance*
7	*Millikan's oil drop experiment*
*8**	*Hydrogen Line Spectrum*

** Bring your USB for saving your raw and analyzed data.*

Table 2 Lab Schedule

Date	*# of experiments (accumulated) should be done*
1/12 ---- 2/2	*2*
2/3 ----2/24	*4*
2/25 ---- 3/25	*6*
3/26 ---- 4/17	*8*

Lab rooms: *Rooms 125 and 126, Physical Science Bldg.*

Keycard: *Use your OWL CARD to access room PS-125.*

Lab instructor: *Dr. Shen Li Qiu* *Office: Room 102 SE Bldg.*
Email: qiu@fau.edu *Website: http://wise.fau.edu/~qiu/*
Phone: (561) 297-3386 *Office hours: T, R 2:00 – 3:00 PM*

Lab manuals: *(a) Manufacture lab manuals*

- *Manufacture lab manuals are posted on FAU blackboard along with an "Instruction Notes" on "Measurements to be done", "Lab report on the experiment" and "Questions" for each experiment.*
- *Hard copies of the manufacture lab manuals for each experiment are placed in the file holder at each experiment station in rooms PS 125 and 126. Don't take the lab manuals out of the lab.*
- *Several modern physics experiments have been computerized recently, for which both the original manufacture lab manual and the computer interface lab manual should be used for performing the experiments.*

(b) Lab manuals written by Dr. Qiu

- *Lab manuals written by Dr. Qiu are personal notes, which should be used as the supplementary to the manufacture lab manuals.*
- *A hard copy of Dr. Qiu's lab manual for each experiment is placed in the file holder at each experiment station in rooms PS 125 and 126. Don't take the manuals out of the lab.*

Lab performance*: (a) Students should do the experiments individually. Students can get help from Dr. Qiu for difficult physics problems.*

(d) Students have the freedom of doing whatever experiments listed in Table 1 on whatever days, however, students have to finish the required number of experiments by the deadline shown in Table 2.

Lab report: *(a) Students are expected to write lab reports individually. Lab reports copied from others including scanned pages from lab manuals are unacceptable.*

(b) General requirement for a lab report:

- *Title of experiment, lab date, report date, your name.*
- *The purpose of the experiment.*
- *A short summary of the theory underlying the experiment.*
- *Experimental method and apparatus.*
- *Presentation of your results including raw data and analyzed data in the forms of tables, graphs, photos, fitting plots, etc., comparison of experimental results with theoretical predictions, and error analysis.*
- *Discussions and conclusions.*
- *Answers to the questions listed at the end of the lab manual for each experiment.*
- *Lab report should be in Word format and submitted via email. For computerized experiments the capstone files (using 850 interface) or csv and jpg files (using digital oscilloscope) should also be submitted via email as a part of your lab report.*

(c) Specific requirement for each experiment can be found in "Instruction Notes" posted on FAU Blackboard.

Grading policy: *(a) Each lab report will be graded in a 20-point scale as shown in Table 3.*

- *12 points for complete and correct raw (measured) data.*
- *5 points for complete and correct data analyses (plotting, fitting, calculations).*
- *3 points for complete and correct answers to questions listed in the lab manual of each experiment.*

(b) Lab reports should be turned in by the deadlines listed in Table 2. Points will be deducted for the late lab reports: One week late - one point, Two weeks late - three points. Three or more weeks late -ten points.

(c) Final Grade is the average grade of all required lab reports.

Table 3 Grading scale of lab reports

		A	19.0---20	A-	18.0---19.0
B+	17.0---18.0	B	16.0---17.0	B-	15.0---16.0
C+	14.0---15.0	C	13.0---14.0	C-	12.0---13.0
D+	11.0---12.0	D	10.0---11.0	D-	9.0 ---10.0
F	< 9.0				

Disability policy statement: *In compliance with the Americans with Disabilities Act (ADA), students who require special accommodation due to a disability to properly execute coursework must register with the Office for Students with Disabilities (OSD) -- SU 133 (561-297-3880).*

Code of Academic Integrity policy statement: *Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards, because it interferes with the university mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see University Regulation 4.001.*