Syllabus: Advance Laboratory I.

UNIVERSITY OF PUERTO RICO

RÍO PIEDRAS CAMPUS

COLLEGE OF NATURAL SCIENCES

DEPARTMENT OF PHYSICS

Title: Advance Laboratory I.

Code: PHYS 6407

Number of Credits: 3

Prerequisites: Permission of the Graduate Committee

Description

Advance Laboratory I. Development of the basic statements including the various representations and 'pictures' of experimental approaches to solution of different experimental problems. Detailed consideration of the different experimental methods used in nanomaterial science and spectroscopy. Set up of different experimental systems used for synthesis and characterization of nanostructured materials. Correct solution of experimental Problems.

Objectives

Through this course, the students will:

- Acquire a basic understanding of the Experimental Approaches to solution of different experimental problems of Physics meaning optimal using of equipment available for experiment.
- Become proficient with the experimental and theoretical tools to correct carry out experiment.
- Develop problem-solving skills and strategies in basic Physical experiments.
- Communicate effectively a topic pertinent to basic of Experimental approaches in Physics.

Course Contents and Time Distribution

I. Introduction (1 wks)
a) Syllabus discussion.
b) Discussion of experimental works included in Adv. Lab. I program.
c) Discussion of the first work basis statements.
II. First work (1 wks)
a) Calibration of absolute volume of the chamber.
b) Calibration of the absolute has flows.
III. Furnace tube reactor (1 wks)
a) Basic knowledge
IV. Hot Filament Chemical Vapor Deposition reactor (1 wks)
a) Basic knowledge.
V. Time resolved data acquisition system (1 wks)
a) Basic knowledge
VI. Time resolved Laser Induced Fluorescence (1 wks)
VII. Biophysical measurements (1 wks)
VIII. Getting basic knowledge about Raman Spectroscopy (Dr. R. Katiyar lab.: 1 wks)
IX. Getting basic knowledge about Atomic Force Microscopy (Dr. R. Katiyar lab.: 1 wks)
X. Getting basic knowledge about Scanning anf Transmission Electronic Microscopy (Mr. O. Resto: 2 wks)
XI. Getting basic knowledge about XRD, XPS and EPS Spectroscopy (2 wks)
XII. Getting basic knowledge about Correlation Scattering Spectroscopy (Dr. F. Aliev lab.: 1 wks)
XIII. Getting basic knowledge about Sputtering Deposition Technique (Dr. L. Fonseca lab.: 1 wks)

Instructional Strategies

Lectures, problem sets, experimental work, group discussions, and oral presentations by the students.

Minimum Required Facilities

Lab. Equipment of FB, NS and MS research Blds. will be used.

Student Evaluation

Two partial exams, 3 homework assignments, and oral presentation

Grading System

Standard A to F grading system:

100-90% = A, 89-80% = B, 79-70% = C, 69-60% = D, 59-0% = F.

Bibliography
Manuals prepared by Dr. Vladimir Makarov will be used.

Rights of Students with Disabilities
UPR complies with all federal and state laws and regulations regarding discrimination, including the Americans with Disabilities Act 1990 (ADA) and the Commonwealth of Puerto Rico Law 51. Students receiving services through R http://www.sciencedirect.com/science/book/9780124177550 Rehabilitación Vocacional must contact the professor at the beginning of the semester in order to plan for a reasonable accommodation and any required support equipment according to the recommendations given by the Oficina de Asuntos para las Personas con Impedimentos (OAPI) of the Dean of Students. Likewise, students with special needs that require some type of accommodation must contact the professor.