Syllabus for PHYS 175T

Techniques for Strongly Correlated Electron Physics

(PHYS175T-13-36916-2133)

(updated on March 3, 2013)

Introduction and Course Description

This course will engage students who are interested in Experimental Research in the Strongly Correlated Electron Systems in connecting the real-life cases with the physics concepts in Condensed Matther Physics, particularly focused on magnetism, superconductivity and intermetallic behavior. Students are required to presenting and discussing these topics in an assigned weekly meeting time. This course will train the next generation of scientists and researchers.

Advanced concepts in Strongly Correlated Electron Physics. Vacuum technologies. Computer interfacing and data collecting. PID Control in the control loop feedback mechanism. Technics of measurements in properties of metallic or semiconducting compounds. Providing students environments in professional research, each student will be required to develop power point presentations, scientific reports, online resources to demonstrate the results of the assigned research projects. 1-hour group meeting and 3 lab hours per week.

PHYS 175T TECHNIQUES FOR STRONGLY CORRELATED ELECTRON PHYSICS (PHYS175T-13-36916-2133)	
Spring 2013	California State University, Fresno
Course Information	Instructor Name Pei-Chun Ho
Units: 2	Office Number – McLane Hall Room 254
Time Group Meeting: M. 11:00 AM – 12:00 PM Lab Hours: Tue. 3:00 PM-6:00 PM	E-Mail pcho@csufresno.edu
Location Group Meeting: McLane Hall Room 173 Lab: McLane Hall Room 254	Telephone 559-278-5990
Website – To access the course login to Blackboard (http://blackboard.csufresno.edu) using your Fresno State username and	Office Hours M, W: 12:15 PM — 1:30 PM Tu: 12:00 PM — 1:30 PM

password. For help with Blackboard contact Technology Innovations for Learning and Teaching at 278-7373 or send an email to tiltsupport@csufresno.edu.	Th: 12:00 PM — 1:00 PM

Prerequisites

***Phys 4B* Electricity, Magnetism, and Heat:** Topics in classical physics including heat and thermodynamics, electrostatics, electric fields and potential, currents and AC and DC electric circuits, magnetic fields, electromagnetic induction.

***Phys 4C Light and Modern Physics*:** Geometrical optics; electromagnetic radiation; physical optics; introduction to special relativity; quantum physics; and the physics of atoms, nuclei, and the solid state.

***Phys 102 Modern Physics*:** Fundamental concepts of atomic and nuclear structure, transitions and radiation. Includes discussions of relativistic mechanics, quantum mechanics, solid state physics. Special topics as they pertain to modern developments in physics, engineering, and chemistry.

Required Textbooks and Materials

(1) Reference Textbooks:
- Modern Physics for Scientists and Engineers, 3rd edition, by Stephen T. Thornton and Andrew Rex
- Thermal Physics, by Charles Kittel, Herbert Kroemer
- Introduction to Solid State Physics, by Charles Kittel
- Solid State Physics, by Neil W. Ashcroft and N. David Mermin

(2) An email and internet account at CSU-Fresno: available for fee at http://www.fresno.com/cvonline/cvip.html
- ❖ By the University policy, all students have to check email daily.

(3) ETS Criterion for checking grammars, style, mechanisms, and structure of writing.

Course Organization

This course will include assigned experimental projects and assigned readings in your textbook that should be completed outside of the class session. During the 1-hour lecture sessions there will be minilectures, class discussions, and student Power-Point presentations on the assigned projects. The 3-lab-hour session, students will work on the hardware software setup, equipment

maintenance, measurements, and data analysis. Main focus is to develop student's analytical thinking and trouble shooting ability.

Participation Standards

"Attendance is mandatory." If you have some compelling reasons to miss the group meeting and lab hours, you have to email the instructor and state the intended make-up hours, which will match the instructor's schedule.

Grading

A	100 – 87.00	**B**	86.99 – 74.00	**C**	73.99 – 60.00
D	59.99 – 50.00	**F**	49.99 - 0		

Weighted Grades:

Assigned Experimental Projects (Hardware and Software design, setup, and maintenance, measurements and data taking)	20 %
Data Analysis and progress reports	25 %
Group and Class Discussions	15 %
Power Point Presentations	15%
Final Report	15 %
+) Homework	10 %

Total possible points 100 % (**grade will not be curved.**)