

# PHYSICS 6450 - Winter 2018

## Introduction to Materials and Device Characterization

**INSTRUCTOR:** Jian Huang (313-577-0564); OFFICE: 385 Physics, [jianhuang@wayne.edu](mailto:jianhuang@wayne.edu)  
**TIME for lectures:** T, F 2:30 – 3:45 PM. Room: 185 Physics  
**Lab:** T 3:45 - 5:25 PM  
**Office Hours:** T, F 12:30 - 1:30 or by appointment  
**Suggested TEXT:** Materials Characterization, 2<sup>nd</sup> Edition by Yang Leng ISBN: 978-3 – 527-33463-6  
**Lectures Notes will be provided via blackboard.**  
**REFERENCE:** Characterization of Materials (Journal by Wiley), workshops, etc.  
**COURSE WEB PAGE:** WSU Blackboard  
**PRE-REQUISITE:** PHY217/218 (Halliday Resnick). Suggested co-requisites: PHY7050/ECE5500

**Introduction:** This course deals with modern techniques used in the characterization of materials and devices. Several techniques based on microscopy, spectroscopy, optical, magnetic, and electrical properties will be discussed. Lectures are given by the instructor and several guest lecturers who are experts in their fields. Lecture notes will be provided through blackboard. One of the goals of the course is to introduce tools that may enhance students' own research activities.

Students are required to participate the lectures and the laboratory sessions. Information on the lab sessions will be provided in a class schedule document (provided separately).

**Grades:** There are no exams for this course. Evaluation is based on the following:

Laboratory notes and reports:	30%	Technical Report:	20%
Oral Presentation:	30%	Quizzes:	20%

**Laboratory notebook** is required for each student to make detailed notes for each of the lab sessions. The notebook will be collected at the end of the semester for evaluation. Evaluation is based on the quality of the notes in terms of correctness, thoroughness, details, organization, clarity and neatness. In addition, some of the labs will involve onsite experiment/measurement or demonstrations for which some questions may be provided to assist the understanding of the techniques and results. Students are required to answer these questions and submit the answers in the form of a lab reports. **NO MAKE-UP.**

**Project and Technical Report are a major component of the course.** A group of 2-3 will design a research project that complements their current research. Students are encouraged to learn about each other's research as early as possible to form suitable partnership. A project title along with a strategic plan must be submitted by March 6, 2018. The plan should include complete information on sample choices and a justification of a minimum of three characterization techniques. Experiments and data collection should be completed by April 6, 2018. The technical report must be prepared in a form of a scientific article, with introduction/motivation, a review of the relevant background literature, experimental methods, results (including relevant plots, tables etc.), and a discussion/summary. The technical report is due April 20, 2018

**Oral Presentation will be 20-minute talks given by each team.** Each member of the team will be allotted equal amount of time to present. There will be a 3-minute Q&A following each presentation. Evaluation is based on the quality of the talk and the abilities of addressing the questions raised during the Q&A.

**Quizzes:** There will be unannounced short quizzes during class.

**Office Hours:**

I encourage you to take advantage of the office hours from early on. If it is impossible for you to make it to the listed hours, you can contact me through email so that a time can be set to meet.

**In-class policies**

Out of consideration for the other students in the lecture please abide by the following rules of conduct: (1) Turn off all cell phones while in lecture, (2) Please arrive on time for lecture and do not leave early, (3) Please be mindful of your classmates.

**Academic dishonesty**

All of the graded assignments are designed to measure your individual understanding of the material. No forms of cheating on these graded assignments will be tolerated (working together on the homework assignments are not considered cheating but copying of someone else's homework is). Anyone found cheating on any graded activity will receive a grade of zero for that part of their grade, and may receive a failing grade for the course. Use of a cell phone or texting device during an exam will be considered to be prima-facie evidence of cheating.

**Students with disabilities**

If you have a documented disability that requires accommodations, you will need to register with Student Disability Services (SDS) for coordination of your academic accommodations. The Student Disability Services (SDS) office is located at 1600 David Adamany Undergraduate Library in the Student Academic Success Services department. SDS telephone number is 313-577-1851 or 313-577- 3365 (TDD only). Once you have your accommodations in place, I will be glad to meet with you privately during my office hours to discuss your special needs. Student Disability Services' mission is to assist the university in creating an accessible community where students with disabilities have an equal opportunity to fully participate in their educational experience at Wayne State University.

Please be aware that a delay in getting SDS accommodation letters for the current semester may hinder the availability or facilitation of those accommodations in a timely manner. Therefore, it is in your best interest to get your accommodation letters as early in the semester as possible.