Phys 417: Modern Physics Laboratory Dr. Ostrovskii Spring-2026

1. Course Information

Instructor: Dr. Igor Ostrovskii
Lab Physicist: Thomas Jamerson

- **Laboratory Location:** Room 29 Lewis Hall
- **Classes: T, TH 1:00 pm – 2:45 pm,** Room 29 Lewis Hall
- **Office**: Room 207 Lewis Hall; Email: iostrov@phy.olemiss.edu
- **Office Hours:**
- **Igor Ostrovskii: TH: 3:00 pm - 4:00 pm** & **by appointment (29 Lewis Hall).**
  Thomas Jamerson: T, TH : 11:00 am-12:00 Noon, Room: Lewis 29.
- **Corequisite Course: PHYS 317 is required**.

2. Course Description

In this laboratory-based course, students will be introduced to the experimental methods and corresponding measurements in the field of Modern Physics. The individual experiments are mainly devoted to the Nobel Prize-winning works contributing to the development of main physical concepts, theories, and applications of the 20th and 21st centuries.

3. Course Learning Outcomes

Students will assemble experimental setups and perform individual experimental measurements. It allows the student to develop a deep understanding of the Modern Physics concepts that appeared during the 20th century and the beginning of the 21st century.
Students will learn laboratory skills necessary for a contemporary research laboratory, and technological applications.

***After completing this course, the students should be able to*:**

- Understand the background of intuitive ideas of Atomic and Quantum physics, and applications in solid state and semiconductors physics.
- Develop a comprehension of the current basis of Modern physics applications.
- Significantly improve critical thinking, analytical reasoning, and problem-solving skills.
- Cultivate a usage of interactive methods & Internet for independent course learning.

4. Course Texts and Materials

- **Text**: **Modern Physics, by Paul A. Tipler, Ralph A. Llewellyn, 6th edition.**
  ISBN-13: 978-1-4292-5078-8; ISBN-10: 1-4292-5078-X
- **A detailed description of the Experiments is located on the Corresponding pages of experiment-maker PASCO: https://www.pasco.com/.**

5. **Major Assignments** The major assignments are **pre-lab preparations** for the experiments in Modern Physics and **Final report on the Experiments completed**. The students are required to read and understand the manuals for each experiment for further setting up the experimental setup and taking experimental measurements. Then, to work with the data obtained/measured for calculating obtained experimental results in numbers, with uncertainties/errors, correct units, and explanations and conclusions . All work done will be presented in the final report for each of the experiments.

6. Course Grading

GRADING SCALE:

A's ---------- 100 - 87 B's ---------- 86 - 75
C's ---------- 74 - 63 D's ---------- 62 - 50
F < 50.

Grades will be based on pre-lab preparation work, experiment setup, experimental measurements, and final lab reports:

1. Pre-labs preparation work	10%
2. Experiment setup	15%
3. Experimental measurements	40%
4. Final Lab reports	25%
5. Final Test	10%
TOTAL:	100 points

The midterm grade covers a part of the required experiments and Final Lab reports.

7. Course Schedule and Outline of covered topics.

Each experiment includes Pre-labs preparation work (read and follow refernce in Sn. 8 for each needed Experiment), Experiment setup, Experimental measurements, and a Final report presented in the last class of each experiment.

1) Classes INTRO: Errors, Devices, Measurements [2 classes]

2) Black body radiation: Spectra measurements. [4 classes]

3) Experimental investigation of the Atomic spectra. [4 classes]

4) Class to finish 2 Labs and present 2 Reports for midterm [1 class]

5) Photoelectric effect experiment. [4 classes]

{1 class theory + 1 class introduction to the experiment + 2 classes measurements}

6) The Frank-Hertz experiment. [4 classes]

{1 class theory + 1 class introduction to the experiment + 2 classes measurements}

7) Observation and Experiment of the Hall Effect. [4 classes]

{1 class theory + 1 class introduction to the experiment + 2 classes measurements}

8) Classes to finish all Labs and 3 Reports for FNL [2 class]

9) Final Quiz [1 class]

10) Demonstrations: ESR Experiment [2 classes]

***If you need extra LABORATORY TIME, please set up time with Mr. Jamerson**

8. Student Resources

The detailed information about requirements and descriptions about the Experiments

of Phys-417.

- https://relativity.phy.olemiss.edu/~thomas/weblab/Modern_Lab_PHYS417/Modern_417_lab_index.html

The detailed descriptions of the Experimental Equipmemnt are located on the Corresponding pages of experiment-maker PASCO: https://www.pasco.com/.

1) Black body radiation Experiment
https://www.pasco.com/products/complete-experiments/thermodynamics/ex-5529#experiment-panel

Educational Spectrophotometer
https://hepweb.ucsd.edu/2dl/pasco/Educational%20Spectrophotometer%20kit%20Manual(OS-8539).pdf

Aperture-Bracket-Manual-OS-8534A.pdf
https://cdn.pasco.com/product_document/Aperture-Bracket-Manual-OS-8534A.pdf

2) Experimental investigation of the Atomic spectra
https://www.pasco.com/products/complete-experiments/quantum/ex-5546

3) Photoelectric-Effect-Apparatus-Manual.pdf
https://cdn.pasco.com/product_document/Photoelectric-Effect-Apparatus-Manual.pdf

4) Franck-Hertz-Experiment-Manual-SE-9639-1.pdf
https://www.scribd.com/document/420599134/Franck-Hertz-Experiment-Manual-SE-9639-1-pdf

5) Hall Effect Experiment
https://www.pasco.com/products/complete-experiments/quantum/ex-5560#experiment-panel

9. Course and UM Policies

- **Attendance and participation**: Attendance is necessary and will be verified by OleMiss attendance requirements. To comply with attendance verification, a report of your attendance will be made.

- **IMPORTANT**: **All students must follow the UM requirements in connection with the COVID-19 or similar, in case of possible pandemic.** "Failure to adhere to health requirements during the COVID-19 or similar emergency will be deemed disruptive to the classroom and will be enforced following the Academic Conduct & discipline procedures."
The University of Mississippi has adopted a 'tiered disciplinary protocol' for nonadherence to COVID-19 health requirements. This disciplinary protocol is maintained by the Office of Conflict Resolution and Student Conduct(https://conflictresolution.olemiss.edu/

- **Disability Accommodations / Access and Inclusion**

All students who wish to request **disability-related accommodation** must be approved by UM SDS. Students with disabilities, which have been verified through the Office of Student Disability Services, are encouraged to contact their instructors to discuss their individual needs for accommodations. The SDS will communicate with individual academic units regarding the student's needs. **The student is responsible for all documentation necessary for SDS accommodation in class.** https://sds.olemiss.edu/

- **Academic Integrity** The University is conducted on a basis of **common honesty**. **Dishonesty, cheating, plagiarism, or knowingly furnishing false information to the University are regarded as particularly serious offenses.**' We share a responsibility to maintain academic integrity in our work and will follow the procedures outlined in the Academic Conduct and Discipline Policy and the M Book for any instance of academic misconduct.

- **Classroom Environment** In line with the Pathways to Equity Strategic Plan and The Creed, it is our responsibility to cultivate an environment that respects the dignity of each person, promotes fairness and civility and welcomes diverse identities and perspectives. The classroom should be an inclusive space in which every student feels supported, challenged, and welcome to contribute to our collective learning.
  - **Technology in the Classroom**

Laptops and cell phones can be effective learning aids but can also distract you and your classmates from the task at hand. At some points in class, we may make use of these technologies as learning resources, and at some points, I may request that you put them away to give the class activity your undivided attention. I encourage you to take responsibility for your use of personal devices and to employ them in ways most likely to enhance your learning. If inappropriate use of technology becomes a persistent problem, I may ask you to refrain from using these devices in class for the semester or speak with me individually to resolve the issue.

- **The University of Mississippi Regulations Governing All Examinations**

A student's failure to appear for an examination without an acceptable excuse, inability to present valid identification, absence from the room during an examination without the consent of the examiner, or attempting any portion of an examination without submitting his or her answers shall fail the examination. **Tardiness beyond 15 minutes forfeits a student's right to an examination.**

- **Last Week Policy**: During the period of Wednesday through Friday of the last week of class, instructors are not to give exams, tests, or quizzes that contribute more than 10% of the final grade for a class.

The END.