

# PHYSICS 3119/3129 - Advanced Physics Laboratory I/II

Fall 2024

## 1 Course Information

### 1.1 Instructors

- Hyunsoo Kim (107 Physics Bldg, hyunsoo.kim@mst.edu)
- Joel Peacher (120 Physics Bldg, peach@mst.edu)

### 1.2 Prerequisites

Physics 2129 - Intermediate Physics Laboratory

### 1.3 Class hours/Classroom

Class hours: Tue/Thu 12:30 pm - 15:15 pm

Classroom: 208, 217, 218 Physics Bldg.

Note: Students are expected to come to room 208 before any experimental work at lab 217 or 218.

### 1.4 Course Objectives

The Advanced Physics Lab courses (Physics 3119/3129) offer project-based group learning opportunities. The ultimate goal of this course is to provide a culminating experience for applying comprehensive physics knowledge to complete a semester-long research group project. The major activities include finding a research topic of students' interest, designing proper investigative methods, conducting experiments, analyzing the outcomes, and presenting their final report in both oral and written forms. Upon successful completion of the course, students will understand scientific reasoning and be able to apply scientific methods to solve problems through critical thinking.

All experimental research projects rely on the cooperation of several individuals. The lab class provides an ideal environment to train your skills for a team project. Therefore, students should conduct the research projects in a group formed at the beginning of the semester. All students of each group should contribute equally to all outcomes.

## 2 Course Assignments and Grade Policies

### 2.1 Assignments

Assignment	Note	Points	Due date
Research proposal	Group	150	9/6/24
Midterm presentation	Group	150	10/17/24
Final presentation	Group	150	12/5/24
Final report	Group	300	12/9/24
Peer review report	Individual	100	12/13/24
Overall experimental work/participation	Individual	150	

### 2.2 Grade Policy

The following scores will be accumulated during the course of the semester. The final grade will be determined based on the sum of the components listed below. It will NOT directly be based on the

success of your research project. However, it will depend on the active participant in the research project and an understanding of the scientific methodology.

Grades: A ( $\geq 900$ ), B ( $\geq 800$ ), C ( $\geq 700$ ), D ( $\geq 600$ ), F ( $< 600$ )

The detailed instructions for each assignment will be separately provided.

### 3 Safety

Students should always consider any potential risks involved in an experiment, e.g., those associated with the use of high voltages, chemicals, radioactive sources, lasers, ultraviolet light, cryogenic fluids, heating elements, heavy equipment, heavy metals, cutting edges, particulate dust, intense sound, high-pressure gas, or vacuum. Any technical instrumentation may only be operated after the approval of the instructors or staff. Lasers, chemicals, radioactive sources, liquid nitrogen, etc., may only be handled after the corresponding safety training. Food and drinks are not allowed in the laboratory. All safety-related incidents, including close calls, must be reported to the instructors.

#### 3.1 Emergency Exits

Students are advised to be familiarized with the classroom emergency exits shown on the egress maps posted online at: <http://designconstruction.mst.edu/floorplan/>.

## 4 Campus Resources and Miscellaneous Information

### 4.1 UCARE

UCARE, housed within the Division of Student Success, is the central point of contact to connect a student who may be experiencing a personal, academic, financial, wellbeing, and/or other concern to support and resources. Sharing your concern with UCARE helps connect a student with solution-focused assistance to support their holistic well-being, success, and academic progress. A referral can be submitted at <https://go.mst.edu/ucare-refer/> or by emailing [ucare@mst.edu](mailto:ucare@mst.edu). For urgent matters, check out the after-hour and urgent resources at <https://wellbeing.mst.edu/redfolder/>.

### 4.2 Accessibility and Accommodations

It is the university's goal that learning experiences be as accessible as possible. Student Accessibility and Testing provides services and accommodations that facilitate full participation in Missouri S&T's learning experience for students with disabilities. If you anticipate or experience physical, academic, and/or digital barriers due to a disability, please contact Student Accessibility and Testing at (573) 341-6655, email [dss@mst.edu](mailto:dss@mst.edu), or visit <https://saat.mst.edu/> for information.

### 4.3 Student Honor Code and Academic Integrity

- All students are expected to follow the Honor Code.
- Student Academic Regulations (<https://registrar.mst.edu/academicregs/conductofstudents/>) describes the student standard of conduct relative to the University of Missouri System's Collected Rules and Regulations section 200.010, and offers descriptions of academic dishonesty including cheating, plagiarism, sabotage, and unauthorized use of artificially generated content, any of which will be reported to the Dean of Students.

Other resources for students regarding academic integrity can be found online. <https://undergrad.mst.edu/academicintegrity/studentresources-ai/>

#### **4.4 Use of Artificial Intelligence**

Unauthorized use of artificially generated content violates University Student Academic Standards without the consent of the instructor.

#### **4.5 Student Well-Being (<https://wellbeing.mst.edu/>)**

Student Well-Being provides counseling services, health promotion initiatives, and prevention programs to empower the S&T community to thrive and enhance personal, academic, and professional success. Department office hours are Monday – Friday, 8 a.m. – 5:00 p.m. On the website, you can find information related to confidential individual and group counseling, wellness consultations and trainings, case management services, resources for many health and wellness topics, and help for mental health crisis situations. For the 988 Suicide and Crisis Lifeline, call or text 988, or visit [missouri988.org](https://missouri988.org) For the National Suicide Prevention Lifeline, call or text 988, or visit [missouri988.org](https://missouri988.org).

#### **4.6 Health and Well-Being (<https://umsystem.instructure.com/enroll/G3LY3G>)**

The Health and Well-Being Canvas Course features trainings, presentations, and other health and well-being resources for students. The course is free for all students, is non-credit, and students can enroll at any point in the semester.

#### **4.7 Student Emergency Fund (SEF)**

The SEF is administered by the Division of Student Success to help ensure Missouri S&T students have access to the support and resources they need to successfully recover from an unforeseeable financial emergency. The goal of this fund is to prevent one small emergency or unexpected expense from derailing a student’s progress toward degree completion.

#### **4.8 Nondiscrimination, Equity, and Title IX**

Missouri S&T is committed to the safety and well-being of our campus community, and to creating an environment free from discrimination and harassment.

The University prohibits discrimination and harassment on the basis of race, color, national origin, ancestry, religion, sex, pregnancy, sexual orientation, gender identity, gender expression, age, disability, protected veteran status, and any other status protected by applicable state or federal law. As used in this policy, the word “sex” is also inclusive of the term “gender.”

Additionally, US Federal Law Title IX states that no member of the university community shall, on the basis of sex, be excluded from participation in, or be denied benefits of, or be subjected to discrimination under any education program or activity. Sexual harassment violations of this law include quid pro quo, hostile environment, sexual assault, dating/domestic violence, and stalking. The U.S. Department of Education has stated the prohibition on discrimination on the basis of sex includes sexual orientation and gender identity.

Students who are experiencing pregnancy or pregnancy-related conditions, including the birthing parent and non-birthing parent, have rights protected under Title IX. Students should contact Student Accessibility and Testing or the Office of Equity and Title IX to learn more about their rights and pregnancy-related assistance/accommodations provided by the University to ensure equitable access to University educational programs and activities.

In accordance with the University of Missouri’s Collected Rules and Regulations, all faculty and staff are required to report any information concerning discrimination disclosed through communication including, but not limited to, direct conversation, email, social media, classroom papers and homework exercises to the Equity Officer/Title IX Coordinator.

For more information regarding support for those that have been impacted or to report an incident of discrimination or harassment as defined by Chapter 600. of the University's Collected Rules and Regulations, visit the Office of Equity and Title IX or visit their website at [equity.mst.edu](http://equity.mst.edu).

#### **4.8.1 Office of Equity and Title IX**

- Equity Officer and Title IX Coordinator: Dr. Paul Hirtz
- Phone: (573) 341-7734
- Location: 900 Innovation Drive, Suite 500
- E-mail: [equity@mst.edu](mailto:equity@mst.edu)

#### **4.9 University Libraries**

The Curtis Laws Wilson Library is the place to gather on campus, offering group meeting spaces, quiet study carrels and reservable conference rooms. The library provides students and faculty with physical and electronic books, journals, articles and databases as well as recreational reading, games and DVDs. We also have technology to check out, from laptops to chargers to calculators and everything in-between. Librarians create library and course guides to help navigate searching for resources. Talk to us one-on-one via chat, email, phone or in person for any assistance regarding library services or finding peer-reviewed, credible research materials for study and research needs. Find out more information and connect with the library here: [library.mst.edu](http://library.mst.edu).

#### **4.10 Writing and Communication Center**

The Writing and Communication Center's mission is to assist all students in their efforts to become better writers, communicators, and critical thinkers. The Center's peer consultants and coaches provide free individualized one-on-one and small-group conversations to offer meaningful feedback and guidance to students across all disciplines. More information can be found on our website, through email: [writing@mst.edu](mailto:writing@mst.edu) or stop by Curtis Laws Wilson Library 314-315.

#### **4.11 Student Success Center**

The Student Success Center (SSC) offers peer tutoring and success coaching to help students succeed in their academic goals. Additionally, we work as a resource hub and can connect you to the campus resources necessary to help you dig deeper and finish the semester strong. Visit the SSC in Room 117 Innovation Lab and contact us at [ssc@mst.edu](mailto:ssc@mst.edu) or 573-341-7590. To learn more about the SSC, visit <https://ssc.mst.edu/>.

#### **4.12 S&T Tutoring Opportunities**

The Student Success Center (SSC) helps you with your studies in three ways:

- LEAD Drop-in (<https://ssc.mst.edu/leaddrop-in/>): Our LEAD Drop-in service provides convenient access to experienced peer learning assistants for a multitude of courses across campus. No appointments necessary. Simply check our tutoring schedule to discover when support for your specific course is available.
- LEAD Group Sessions (<https://ssc.mst.edu/leadgroup/>): Our LEAD Group sessions offer after-hours group tutoring, facilitated by our dedicated peer learning assistants in partnership with faculty members. Explore the LEAD Group schedule to see if your course is featured and join us at the next session.

- Knack Tutoring (<https://ssc.mst.edu/knacktutoring/>): If your schedule clashes with our LEAD offerings, or if your course isn't covered, Knack is your solution. Request a tutor for either a virtual meeting or an in-person session on campus, ensuring you get the help you need, when you need it.

#### 4.13 Student Veterans Resource Center

The Student Veterans Resource Center (SVRC) is the nexus of resources and support for student veterans at S&T. The SVRC provides student veterans with a “safe space” and a familiar atmosphere. The center’s Veteran Consuls provide one-on-one consultations to guide students to various resources on campus, while its advisor provides students with VA health and benefits resources. Visit the SVRC at Harris Hall, Suite G10, and contact us at [svrc@mst.edu](mailto:svrc@mst.edu).

#### 4.14 Classroom Instruction for Respiratory Illnesses

In March 2024, the Centers for Disease Control and Prevention (CDC) updated recommendations on how people can protect themselves and their communities from respiratory viruses, including COVID-19. The new simplified recommendations follow similar guidelines for other respiratory infections. For any respiratory illness, COVID-19 and influenza in particular, the new recommendations suggest returning to normal activities when:

- Symptoms have been improving overall for at least 24 hour, and
- If fever is present, no fever for 24 hours without the use of fever-reducing medication.

Students who are ill are advised to be seen at Student Health Services. Students can schedule appointments by calling (573) 341-4284 or online through their patient portal.

If you are ill, protect others around you by:

- Practicing good hygiene: cover your coughs and sneezes, wash or sanitize hands often, and clean frequently touched surfaces.
- Stay away from others until you are feeling better, particularly if they are immunocompromised.

#### 4.15 Complaints

It is hoped that any problems can be resolved through discussions between students and instructors. If there are any complaints that cannot be resolved they can be taken to Dr. Vojta (102 Physics, [vojtat@mst.edu](mailto:vojtat@mst.edu)).