

PHYSICS 3119/3129 Advanced Physics Laboratory I and II

Fall 2022

1 Course Information

1.1 Instructors

Primary instructor: Hyunsoo Kim (107 Physics, hyunsoo.kim@mst.edu)

Supporting instructors

- Joel Peacher: available during lab times.
- Jason Summers: electrical work support

Staff: Mr. Ron Woody (Machine shop G6 Physics)

1.2 Prerequisites

Physics 2129

1.3 Class hours/Classroom

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

Classroom: Lab 218, 219, Meeting 208 Physics Building

1.4 Course Objectives

The Advanced Lab courses 3119/3129 offer project-based 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 advanced 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

- Research Proposal: written, group
- Experimental Work: group/individual
- Midterm Presentation: oral, group
- Final Report: written, group

- Final Presentation: oral, group
- Peer Review Report: written, individual

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.

Assignment	Group/Individual	Points	Due date
Research proposal	Group	150	9/8/22
Midterm presentation	Group	150	10/13/22
Final presentation	Group	150	12/6/22
Final report	Group	300	12/8/22
Peer review report	Individual	100	12/13/22
Overall experimental work/participation	Individual	150	

Grades: A (≥ 900), B (≥ 800), C (≥ 700), D (≥ 600), F (< 600)

3 Miscellaneous Information

3.1 Campus Resources

3.1.1 Writing Center

The Writing Center's mission is to assist all students in their efforts to become better writers, communicators, and critical thinkers. They offer clients structured one-on-one and small-group conversations with peer consultants. Writing Center consultants are fellow students whose strong writing skills and special training allow them to offer meaningful feedback and guidance for any genre of writing. Students, faculty, and staff across all disciplines can make appointments in-person, online, and asynchronously. More information can be found at their website and through email: writing@mst.edu.

3.1.2 Student Success Center

The Student Success Center (SSC) supports student development through individualized tutoring, peer-to-peer life skill coaching, and campus programming – all while providing free coffee and hot beverages! The SSC was developed to provide additional assistance for students academically and help bolster non-academic life skills. All student Miners are encouraged to utilize the SSC's free services to get timely support and to enhance their S&T Miner Experience. Visit the SSC at 198 Toomey Hall, contact us at success@mst.edu, or join us on social media @sandtssc. To see the course offerings and times for SSC Tutoring, visit studentsuccess.mst.edu/tutoring/.

3.1.3 UCARE

UCARE 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.

3.2 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 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.

3.3 Disability Support Service

It is the university's goal that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, please contact your lab instructor and the Student Disability Services at (573) 341-6655, sdsmst@mst.edu, visit <http://dss.mst.edu/> for information, or go to mineraccess.mst.edu to initiate the accommodation process.

3.4 Academic Integrity

Academic dishonesty such as plagiarism, cheating, or sabotage is unacceptable and will not be tolerated. Students caught in this type of behavior will be punished to the fullest extent allowed by the university. For more detail see the Student Academic Regulations which are available at <http://registrar.mst.edu/academicregs/index.html> and the Honor Code developed and endorsed by the Missouri S&T Student Council at <http://stuco.mst.edu/honor-code>

3.5 Title IX: Addressing Sex Discrimination, including Sexual Harassment

The University of Missouri does not discriminate on the basis of sex in any education program or activity that it operates, including in any phase of the University's employment or admission process, and it is required by Title IX not to discriminate in that manner.

Addressing sex-based discrimination, which includes sexual harassment, is among the top priorities for the University of Missouri System. We will continue to enhance security and safety while providing effective tools and resources for our campus community. To inquire about the application of Title IX or to make a report of sex discrimination, please contact the Title IX Coordinator using their contact information found at the Title IX offices resource page at: https://www.unsystem.edu/ums/dei/titleix/title_ix_offices

3.6 Emergency Exits

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

3.7 COVID Update on Classroom Instruction

For the Fall 2022 semester, in-person courses and assessments are scheduled without distancing between students. To protect our campus community and each other from the risks of COVID-19 transmission,

we strongly encourage all students, faculty, and staff to become fully vaccinated and boosted. A combination of vaccination, masking, social distancing, staying home when you are sick, being cautious about spending time in large groups, and seeking testing when you have symptoms of COVID-19 will be our most effective measures to mitigate against the spread of the virus. There is no requirement to provide proof of immunization, but voluntary reporting of status for faculty and staff is available at MyHR. Students may report vaccination information at <https://studenthealth.mst.edu/>.

Students are advised to contact Student Health Services (mstshs@mst.edu), 573-341-4284, if they are quarantined, become ill, or are unable to attend class or take tests on campus. If a student is isolating or quarantining, the student will receive an absence note from Student Health and not Student Support and Community Standards (Care Management). The student will be responsible of forwarding the absence note to their instructors.

3.8 Complaints

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

4 Tentative Timeline, Fall 2022

Week	Class Dates	Class Activity	Campus Event
1	8/23, 25	Class introduction, research proposal	8/22 Classes begin
2	8/30, 9/1	Research proposal	
3	9/6, 8	Research proposal due 9/8	9/5 Labor day
4	9/13, 15	Experimental work	
5	9/20, 22	Experimental work	
6	9/27, 29	Experimental work	9/27 Career fair
7	10/4	Experimental work, no class on 10/6	10/6-10/10 Fall break
8	10/11, 13	Experimental work, Midterm presentation 10/13	10/15 Mid-Semester
9	10/18, 20	Experimental work	
10	10/25, 27	Experimental work	
11	11/1, 3	Experimental work	
12	11/8, 10	Experimental work	
13	11/15, 17	Experimental work	
14	11/22, 24	no classes	Thanksgiving break
15	11/29, 12/1	Experimental work	
16	12/6, 8	12/6 Final presentation, Final report due 12/8	12/9 Last Class Day

Peer review report due 12/13