PHYSICS 2135 Syllabus
Fall 2023

This syllabus is your guideline for Physics 2135: *Engineering Physics II*. If corrections are required, the "official" version of this syllabus is maintained in the Canvas lecture course.

Textbook: *University Physics Vol. 2* and *Vol. 3*, Ling, Sanny and Moebs. May be viewed or downloaded from the OpenStax web site.
https://openstax.org/details/books/university-physics-volume-2
https://openstax.org/details/books/university-physics-volume-3

Course Description: An introduction to electricity, magnetism, and light, with emphasis on topics needed by engineering students. Prerequisites: Physics 1135 or Physics 1111, Math 1221 or Math 1215

Purpose

The purpose of this course is to provide students with knowledge, conceptual understanding and problem-solving skills in the discipline, so that students have the opportunity to be successful in further studies in science and/or engineering.

Major Course Elements

Lecture [Required] (Mondays and Wednesdays). Lectures will elaborate on concepts that are difficult to master or understand on a first reading of the material. In addition, examples will be worked to demonstrate the concepts and assist in the development of your problem-solving skills. You are expected to have completed your reading assignment prior to lecture.

Recitation [Required] (Tuesdays and Thursdays). Recitation will be an additional source of instruction on important course concepts, with emphasis on developing the problem-solving skills necessary for completion of the assigned homework. Your mastery of the material and your problem-solving skills will be tested through collection of the assigned homework and other recitation exercises.

Laboratory [Required] (alternating weeks). Laboratory details will be provided by your lab instructor. The laboratory is designed to reinforce concepts learned in lecture and recitation, to connect those concepts to physical experience, to illustrate scientific methods, and teach measurement theory.

Physics Learning Center (PLC) [Recommended] (Mondays and Wednesdays). This is an open learning environment where you can solve problems in informal student groups, get help and insight in a relaxed setting, and prepare for your recitation class. You can come at *any* time during operating hours (2-4:30pm and 6-8:30pm) in rooms 129-130 of the Physics Building. The PLC is staffed by peer tutors and course instructors. For more information about the Physics Learning Center, contact your recitation instructor or the LEAD office (573-341-7276, lead@mst.edu).

Sources of Points and Grading

Exams. There will be three hour long exams, given only **5:00 pm – 6:00 pm** on the Tuesdays listed in the *Schedule of* Classes (**Sept. 19, Oct. 24** and **Nov. 14**). See the course website for the location where the exams will be given for your recitation section. The final exam is **12:30 – 2:30 pm, Thursday, Dec. 14**. These four exams are worth 200 points each. Your lowest exam score (out of the three exams and the final) will be dropped.

End-Material Test. A 50-point end-material test will be given concurrent with the final exam on **Dec. 14**. This test will cover material presented in class after the material for Exam 3.

Homework. On unannounced recitation days, assigned homework will be collected during recitation. A total of six homework sets will be collected and your lowest score will be dropped.

Recitation. Your recitation instructor will collect and grade work that may include presentation of homework problems on the board and test-level problems. If you are absent when called to present a problem, a grade of zero will be recorded. A maximum of 150 points will be given for recitation work. Your recitation instructor will provide additional grading details. [Note that there is not a universal number of recitation assignments. The final recitation average will be converted and reported relative to a 150 point maximum.]

Laboratory. There will be six laboratories during the semester. Your reports are to be turned in to your lab instructor at the end of the lab period. Lab reports will be graded on the basis of 100 points, and reports will be returned by your lab instructor. The lowest lab report score will be dropped. ***Each Physics 2135 student must purchase a lab manual***. ***Students not purchasing a lab manual will receive a laboratory grade of 0.***

Course Points:

Exams:	600
End Material Test:	50
Homework:	50
Recitation:	150
Laboratory:	150
Total	1000

One exam, and one homework score will be dropped. Your recitation instructor will describe how your recitation grade is determined. Your lab points will be 1.5 times your average lab percentage after the lowest lab grade is dropped. Grading is on an absolute scale.

The cut-offs for grades are:

A ($\geq$ 89.50%)	$\geq$ 895.0
B ($\geq$ 79.50%)	$\geq$ 795.0
C ($\geq$ 69.50%)	$\geq$ 695.0
D ($\geq$ 59.50%)	$\geq$ 595.0
F ($<$ 59.50%)	$<$ 595.0

Grade Issues

Regrade policy. Requests for regrades must be submitted no later than the end of the second recitation meeting after the general return of the graded material, except that lab regrade requests must be submitted in accordance with the current lab policy. Regrade requests for the Final Exam must be submitted as soon as possible in order to complete the regrade before grades are due. Except for labs, all regrade requests must be submitted to your recitation instructor. Compose a detailed but ***brief*** written statement on a separate sheet of paper explaining why you are requesting a regrade. Attach the sheet to the front of the full assignment and submit it to your recitation instructor by the appropriate deadline.

There are occasional instances in which a score is not entered correctly in the spreadsheet record. In such an event, you must bring your recitation instructor the assignment that was incorrectly recorded, and the correction will be made. It may be necessary to bring ***all*** assignments of that type (e.g. homework, etc.) in order to have your scores correctly entered. Spreadsheet corrections involving exams must be requested within two weeks of posting of the exam grades. Other spreadsheet corrections must be requested before the start of the Final Exam.

Attendance and Participation

Students with inadequate attendance may be dropped. Any student who has inadequate attendance, as evidenced by 5 confirmed absences or by missing a total of 5 graded assignments of any kind (exams, homework, recitation, and labs) are subject to being dropped if a subsequent class or assignment is missed.

Those participating in a major university or intercollegiate event on the day of an exam may make arrangements with Dr. Musser to take the exam if they submit a written request for an excused absence. The student must submit a written request (email is acceptable) to Dr. Musser, acknowledged in writing (email is acceptable) by the event's Missouri S&T Faculty Sponsor, *no later than the end of the last Wednesday lecture the week before the exam.*

Students who are ill, quarantined or otherwise unable to attend are encouraged to contact Care Management (cm@mst.edu). In addition, students who are unable to attend will need to contact their recitation instructor to make arrangements to complete and submit course work.

Complaints About the Course

Unresolved complaints about a laboratory or recitation instructor: Occasionally, a student has a conflict with a laboratory or recitation instructor. It is hoped that any complaints can be resolved in a collegial manner through discussions between student and instructor. However, if such a situation continues or remains unresolved, please feel free to discuss it with Dr. Musser.

Unresolved complaints about the course: It is hoped that any complaints about the course can be resolved in a collegial manner through discussions with Dr. Musser. However, if there are any complaints that cannot be resolved, you may take them up with Dr. Thomas Vojta, Physics Department Chairperson.

S&T Campus-Wide Policies

Statement about Copyright, FERPA, and Use of Video
It is vitally important that our classroom environment promote the respectful exchange of ideas. This entails being sensitive to the views and beliefs expressed during discussions, whether in class or online. Please obtain instructor permission before recording any class activity. It is a violation of University of Missouri policy to distribute such recordings without authorization and the permission of all who are recorded. More information is provided online.

Accessibility and Accommodations
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 a disability, please contact Student Accessibility and Testing at (573) 341-6655, email dss@mst.edu, or visit https://saat.mst.edu/ for information.

Student Honor Code and Academic Integrity

- All students are expected to follow the Honor Code.
- Student Academic Regulations 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 Vice Provost for Undergraduate Education.
- Other resources for students regarding academic integrity can be found online.

Student Well-Being (https://wellbeing.mst.edu/)

Your well-being is important, and it contributes to your success in this course. At S&T, we provide resources to support your mental, physical, and social well-being. Any of us can experience challenges that make learning difficult. If you are struggling, take advantage of the following resources offered by the university:

Student Well-Being
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, resources for many health and wellness topics, and help for mental health crisis situations.

For the National Suicide Prevention Lifeline, call or text 988, or visit missouri988.org.

Health and Well-Being Canvas Course (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.

Student Support and Community Standards is your "Google Maps" for support. During your time at S&T, you or a friend may need help navigating the student experience, facing a barrier, or experiencing a challenge. You are not alone!

Student Support has a dedicated team and numerous resources such as UCARE and the student emergency fund to help you navigate the S&T experience and support your success. This includes support to address barriers related to academic, personal, emotional, medical, financial, or any other needs.

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 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.

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

Classroom Egress Maps
For all in-person instruction, faculty should explain where the classroom emergency exits are located. Classroom egress maps are posted at http://designconstruction.mst.edu/floorplan/.

Learning Assistance through LEAD
The Learning Enhancement Across Disciplines (LEAD) program runs Learning Centers and Tutoring which provide an efficient means to improve your understanding and increase your mastery of the material you are studying. Discipline-based faculty and undergrad peer instructors operate open-environment learning centers in nearly every foundational course as well as many upper-level courses. See the schedule for LEAD learning assistance at https://lead.mst.edu/schedule/.

Writing Center
The Writing Center's mission is to assist all students in their efforts to become better writers, communicators, and critical thinkers. The Writing Center's peer consultants and writing 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 or stop by Curtis Laws Wilson Library 314–315.

Student Success Center
The Student Success Center (SSC) supports student development through peer Academic Mentoring focusing primarily on STEM courses, Peer-to-peer soft skill coaching which can also act as an accountability buddy, and campus programming – all while providing free coffee and hot beverages! All undergraduate students 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 573-341-7590. To see the course offerings and times for SSC Tutoring, visit https://studentsuccess.mst.edu/academicmentoring/.

Knack Tutoring (https://mst.joinknack.com/)

With Knack Tutoring, any enrolled undergraduate student at S&T can get **FREE** help from a fellow miner who already took the class 24/7. You can choose to meet online on the Knack platform or on campus in person. If you've aced a course, sign up as a Knack Tutor to help your peers!

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.

August				**2021**
Monday Lecture	Tuesday Recitation/Exam	Wednesday Lecture	Thursday Recitation	Throughout Week Lab (Sections, Location)
21 **L1** **5:1-4** Electric Charge, Coulomb's Law, Electric Field, Motion of a Charge in an Electric Field	**22** **HW1**	**23** **L2** **5:5** Electric Field of a Continuous Charge Distribution	**24** **HW2**	**21-25** **No Lab**
28 **L3** **5:6-7 & 6:1-3** Electric Field Lines, Electric Dipoles, Electric Flux, Gauss' Law	**29** **HW3**	**30** **L4** **6:3-4** Gauss' Law, Conductors in Electric Fields	**31** **HW4**	**28-1** Odd Sections Coulomb's Law

September				**2023**
Monday Lecture	Tuesday Recitation/Exam	Wednesday Lecture	Thursday Recitation	Throughout Week Lab
4 **Labor Day**	**5** **HW4b**	**6** **L5** **7:1-3** Electric Potential, Electric Potential Energy	**7** **HW5**	**4-8** **No Lab**
11 **L6** **7:3-5** Electric Potentials of Charge Distributions, Equipotentials, Potential Gradient	**12** **HW6**	**13** **L7** **8:1-2** Capacitance, Capacitors in Series and Parallel	**14** **HW7**	**11-15** Even Sections Coulomb's Law
18 **Exam I Review**	**19** **HW E1 Review** **Exam I** **5:00 – 6:00 pm** (L1-L7)	**20** **L8** **8:3-5** Energy Stored in Capacitors and Electric Fields, Dielectrics	**21** **HW8**	**18-22** Odd Sections Capacitors
25 **L9** **9:1-4** Electric Current, Current Density, Resistance	**26** **HW9** (Career Fair)	**27** **L10** **9:5** Emf, Electric Power	**28** **HW10**	**25-29** Even Sections Capacitors

October				**2023**
Monday Lecture	Tuesday Recitation/Exam	Wednesday Lecture	Thursday Recitation	Throughout Week Lab
2 **L11** **10:1-3** Resistors in Series and Parallel, Kirchhoff's Rules	**3** **HW11**	**4** **LSP1**	**5** **Fall Break**	**2-6** **No Lab**
9 **L12** **10:4-6** Electrical Instruments, RC Circuits	**10** **HW12**	**11** **L13** **11:1-3** Magnetic Fields and Flux, Motion of Charged Particle, Gauss' Law for Magnetism	**12** **HW13**	**9-13** Odd Sections RC Circuits
16 **L14** **11:4-7** Magnetic Forces on Currents, Magnetic Torque	**17** **HW14**	**18** **L15** **12:1-3** Magnetic Field of a Current, Biot-Savart Law	**19** **HW15**	**16-20** Even Sections RC Circuits
23 **Exam II Review**	**24** **HW E2 Review** **Exam II** **5:00 – 6:00 pm** (L8-L14)	**25** **L16** **12:3-6** Magnetic Field of a Current Loop, Ampere's law	**26** **HW16**	**23-27** Odd Sections Current Balance
30 **L17** **13:1-5** Faraday's Law, Induction, Lenz's Law, Generators, Motional emf	**31** **HW17**			(See following page.)

November				**2023**
Monday Lecture	Tuesday Recitation/Exam	Wednesday Lecture	Thursday Recitation	Throughout Week Lab
		1 **L18** **13:6-7** Induced Electric Fields, Maxwell's Law, Motors, Transformers	**2** **HW18**	**30-3** Even Sections Current Balance
6 **L19** **16:1-5** Electromagnetic Waves	**7** **HW19**	**8** **L20** **1:1-5** Light, Reflection, Refraction and Dispersion	**9** **HW20**	**6-10** Odd Sections Generator
13 **Exam III Review**	**14** **HW E3 Review** **Exam III** **5:00 – 6:00 pm** (L15-L20)	**15** **L21** **2:1-2** Concave and Convex Mirrors	**16** **HW21**	**13-17** Even Sections Generator
20 **Thanksgiving Break**	**21** **Thanksgiving Break**	**22** **Thanksgiving Break**	**23** **Thanksgiving Break**	**20-24** **Thanksgiving Break**
27 **L22** **2:3-8** Thin Lenses, Optical Instruments	**28** **HW22**	**29** **L23a,b** **3:1-2** **4:1-3** Double Slit Interference, Single Slit Interference	**30** **HW23ab**	**28-1** Odd Sections Dispersion

December				**2023**
Monday Lecture	Tuesday Recitation/Exam	Wednesday Lecture	Thursday Recitation	Throughout Week Lab
4 **L23c,d** **3:4** **4:4** Diffraction Gratings, Thin Film Interference	**5** **HW23cd**	**6** **End Material Review**	**7** **HW EM Review** **HW Final Review**	**4-8** Even Sections Dispersion
11	**12**	**13**	**14** **End Material Test** **Final Exam** **12:30 – 2:30 pm**	**11-15** **No Lab**