PHYSICS 2135 Syllabus
Spring 2023

This syllabus is your guideline for Physics 2135: *Engineering Physics II*. If corrections are required, the "official" version of this handout is maintained on the Physics 2135 web site (http://campus.mst.edu/physics/courses/24/index.html) and in the Canvas 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, collection of in-class exercises and student presentation of homework at the chalkboard.

Laboratory [Required] (alternating weeks). See the "Physics 2135 Laboratory" handout for details. This handout is available from your laboratory instructor, or online at http://campus.mst.edu/physics/courses/2135lab/. 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 (**Feb. 14, Mar. 21** and **Apr. 18**). See the course website for the location where the exams will be given for your recitation section. The final exam is **3:00 – 5:00 pm, Wednesday, May 10**. 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 **May 10**. 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 work done during recitation. 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 Chairman.

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, and sabotage, 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
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 individual and group counseling, wellness consultations and trainings, resources for many health and wellness topics, and help for mental health crisis situations.

Health and Well-Being Canvas Course
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.

Miner Well-Being Certification Program
The Miner Well-Being Certification Program is a semester-long certification where students can engage with campus-wide services and initiatives that help develop skills that contribute to personal well-being and success. Housed in MinerLink, students can start the certification at any time in the spring or fall semesters, but it must be completed before the end of the semester in which they started it. Participants who finish the program will receive a certification of completion signed by the director of the Student Well-Being department, a letter of recommendation, and a badge in MinerLink.

Student Support and Community Standards knows student life can be difficult. During your time at Missouri S&T, you may have a friend or peer who needs help navigating their student experience, facing a challenge, or experiencing distress and could benefit from support and connection to resources. You are not alone. We have a dedicated team of Care Managers, numerous resources, and services to support you or your student, friend, or peer. This includes emergency funding support for unexpected emergency expenses. To learn more visit or apply online.

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 does not discriminate 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.

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
Classroom egress maps are posted at http://designconstruction.mst.edu/floorplan/.

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 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 their website and through email: writing@mst.edu.

Student Success Center

The Student Success Center (SSC) provides additional assistance for students academically and helps bolster non-academic life skills, such as goal setting and time-management. The SCC offers individualized tutoring, peer-to-peer life skill coaching, and campus programming while providing free coffee and hot beverages! 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/.

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.

January				**2023**
Monday Lecture	Tuesday Recitation/Exam	Wednesday Lecture	Thursday Recitation	Throughout Week Lab
16 **Martin Luther King, Jr. Day** **No Class**	**17** **Recitation Introduction**	**18** **L1** **5:1-4** Electric Charge, Coulomb's Law, Electric Field, Motion of a Charge in an Electric Field	**19** **HW1**	**16-20** **No Labs**
23 **L2** **5:5** Electric Field of a Continuous Charge Distribution	**24** **HW2**	**25** **L3** **5:6-7 & 6:1-3** Electric Field Lines, Electric Dipoles, Electric Flux, Gauss' Law	**26** **HW3**	**23-27** **Coulomb** (Odd)
30 **L4** **6:3-4** Gauss' Law, Conductors in Electric Fields	**31** **HW4**			**(See February)**

February				**2023**
Monday Lecture	Tuesday Recitation/Exam	Wednesday Lecture	Thursday Recitation	Throughout Week Lab
		1 **L5** **7:1-3** Electric Potential, Electric Potential Energy	**2** **HW5**	**30-3** **Coulomb** (Even)
6 **L6** **7:3-5** Electric Potentials of Charge Distributions, Equipotentials, Potential Gradient	**7** **HW6**	**8** **L7** **8:1-2** Capacitance, Capacitors in Series and Parallel	**9** **HW7**	**6-10** **Capacitors** (Odd)
13 **Exam I Review**	**14** **E1 Review HW** **Exam I** **5:00-6:00 pm** (L1-L7)	**15** **L8** **8:3-5** Energy Stored in Capacitors and Electric Fields, Dielectrics	**16** **HW8**	**13-17** **Capacitors** (Even)
20 **L9** **9:1-4** Electric Current, Current Density, Resistance	**21** **HW9** **(Career Fair)**	**22** **L10** **9:5** Emf, Electric Power	**23** **HW10**	**20-24** **RC Circuits** (Odd)
27 **L11** **10:1-3** Resistors in Series and Parallel, Kirchhoff's Rules	**28** **HW11**			**(See March)**

March				**2023**
Monday Lecture	Tuesday Recitation/Exam	Wednesday Lecture	Thursday Recitation	Throughout Week Lab
		1 **L12** **10:4-6** Electrical Instruments, RC Circuits	**2** **HW12**	**27-3** **RC Circuits** (Even)
6 **L13** **11:1-3** Magnetic Fields and Flux, Motion of Charged Particle, Gauss' Law for Magnetism	**7** **HW13**	**8** **L14** **11:4-7** Magnetic Forces on Currents, Magnetic Torque	**9** **HW14**	**6-10** **Current Balance** (Odd)
13 **L15** **12:1-3** Magnetic Field of a Current, Biot-Savart Law	**14** **HW15**	**15** **LSpecial**	**16** **Spring Recess** **No Labs**	**13-17** **Spring Recess** **No Labs**
20 **Exam II Review**	**21** **E2 Review HW** **Exam II** **5:00-6:00 pm** (L8-14)	**22** **L16** **12:3-6** Magnetic Field of a Current Loop, Ampere's law	**23** **HW16**	**20-24** **Current Balance** (Even)
27 **Spring Break** **No Class**	**28** **Spring Break** **No Class**	**29** **Spring Break** **No Class**	**30** **Spring Break** **No Class**	**27-31** **Spring Break** **No Labs**

April				**2023**
Monday Lecture	Tuesday Recitation/Exam	Wednesday Lecture	Thursday Recitation	Throughout Week Lab
3 **L17** **13:1-5** Faraday's Law, Induction, Lenz's Law, Generators, Motional emf	**4** **HW17**	**5** **L18** **13:6-7** Induced Electric Fields, Maxwell's Law, Motors, Transformers	**6** **HW18**	**3-7** **Generator** (Odd)
10 **L19** **16:1-5** Electromagnetic Waves	**11** **HW19**	**12** **L20** **1:1-5** Light, Reflection, Refraction and Dispersion	**13** **HW20**	**10-14** **Generator** (Even)
17 **Exam III Review**	**18** **E3 Review HW** **Exam III** **5:00-6:00 pm** (L15-20)	**19** **L21** **2:1-2** Concave and Convex Mirrors	**20** **HW21**	**17-21** **Dispersion** (Odd)
24 **L22** **2:3-8** Thin Lenses, Optical Instruments	**25** **HW22**	**26** **L23a,b** **3:1-2** **4:1-3** Double Slit Interference, Single Slit Interference	**27** **HW23a,b**	**24-28** **Dispersion** (Even)

May				**2023**
Monday Lecture	Tuesday Recitation/Exam	Wednesday Lecture	Thursday Recitation	Throughout Week Lab
1 **L23c,d** **3:4** **4:4** Diffraction Gratings, Thin Film Interference	**2** **HW23c,d**	**3** **End Material Review**	**4** **EM Review HW** **Final Review HW**	**1-5** **No Labs**
8	**9**	**10** **End Material Test** **&** **Final Exam** **3:00 – 5:00 pm**	**11**	**8-12** **No Labs**