

**PHYS 3201 (71209)
Physical Mechanics
Fall 2023 Syllabus**

Catalog Course Description:

This course covers topics of rigid body motion in three dimensions, moving coordinate frames, two body collisions, conservation laws, small oscillations, generalized coordinates, and LaGrange's and Hamilton's equations. Prerequisite: Physics 2401.

Instructor:

Dr. Jim Musser
Physics 122
musserj@umsystem.edu

Office hours:

Mondays and Wednesdays, 11:00 am – 12:00 pm
Tuesdays and Thursdays, 9:00 – 10:00 am

Class meetings:

Tuesdays and Thursdays, 11:00 am – 12:15 pm in Physics 127

Textbook:

Classical Mechanics
Taylor, John R.
ISBN: 1-891389-22-X

Grading:

Regular Exams (3)	60%
Final Exam	15%
Homework	25%

Course Objectives (Student Learning Outcomes):

Students will be able to solve standard problems in Classical Mechanics from the topics listed in the course schedule.

Students will be able to apply standard classical mechanics techniques to solve problems not previously encountered.

Homework:

Homework assignments will be posted in the Canvas course.

Participation:

Attendance and participation are required at every class meeting. Occasionally, a student will be absent due to university activity, illness or emergency. It is the student's responsibility to inform the instructor of any absences, provide appropriate relevant documentation and make arrangements with the instructor regarding missed assignments. If possible, inform the instructor in advance.

Tentative Schedule

Section I

- Fundamentals (Chapter 1)
- Motion in gravitational, electric and magnetic fields (Chapter 2)
- Momentum and Angular Momentum (Chapter 3)
- Energy (Chapter 4)
- Oscillations (Chapter 5)

Exam I, September 14

Section II

- Calculus of variations and Lagrange's equations (Chapters 6-7)
- Two-body central forces (Chapters 8 and 14)
- Non-inertial reference frames (Chapter 9)

Exam II, October 26

Section III,

- Rigid bodies (Chapter 10)
- Coupled oscillators and continuum mechanics (Chapters 11 and 16)
- Hamiltonian mechanics (Chapter 13)
- Special relativity (Chapter 15)

Exam III, December 7

Final Exam:

- Tuesday, December 12
- 12:30 – 2:30 pm

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/) (<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.