

Physics 6101 Classical Mechanics

Fall Semester 2022

Version 1.0

Updated on August 17th 2022

Goal

Comprehensive understanding of formal Classical Dynamics in Lagrange and Hamiltonian formalisms towards an introduction to modern physics such as General Relativity and Quantum Mechanics.

Instructor

Dr. Shun Saito

Office: Physics 106

Office hours: 10am-12pm on Tuesday or by email appointment

Email: saitos@mst.edu

Meeting time and location

Tuesday and Thursday, 12:30pm-1:45pm@Physics 127

All announcements and resources will be available **on One Canvas**.

Textbook

Required:

1) **Goldstein, Poole, and Safko, “Classical Mechanics (3rd edition)”**

Be aware that there are MANY typos: Check out [the author’s website](#).

Supplements:

2) Wells, “Lagrangian Dynamics”

3) Landau & Lifshitz, “Mechanics”

4) Marion & Thronton, “Classical Dynamics of Particles and Systems”

5) Soper, “Classical Field Theory”

Grading

A \geq 445, B \geq 395, C \geq 345 for 500 total points whose break down is following:

Homework	140
Exam I (75 mins)	100
Exam II (75 mins)	100
Final Exam (120 mins)	160
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Total	500

Homework

Problem sets will be due every week (except for the first week) in class (namely 12:30pm) on **Tuesday**. Homework will be collected electrically in a form of **PDF file on Canvas**. Each homework will be graded on Canvas with **maximum of 10 points**, and returned by the next class. **Any late submission is subject to a 2-point subtraction**. The minimum score out of 15 submissions will be dropped.

Exam

There will be two mid-term exams scheduled during a regular class in addition to a final exam. The first two in-class exams will cover the materials specified in "Schedule", and will be graded with maximum of 100 points. The final exam is scheduled during **7:30am-9:30am on Wednesday, 12/14**, and will cover the first two exams and two more chapters.

Course attendance policy

Students are required to attend all classes. Please do not arrive late to class or leave early unless you have been previously excused by the instructor. Of course, if you are taken ill during class, or in case of an emergency, feel free to leave. However, as soon as you feel better, or the emergency is over, let the instructor know the reason why you left. The instructor will not solicit details of the occurrence, or any personal or private information. Students with inadequate attendance may be dropped. Any student who has inadequate attendance, as evidenced by 5 (five) confirmed absences or by missing a total of 5 (five) graded assignments of any kind (exams and homework) are subject to being dropped if a subsequent class or assignment is missed. The University requires that all students have their course attendance verified at least once during the first two weeks of the semester. If your attendance is not verified, then you will be dropped from the course and any financial aid will be adjusted accordingly.

In case you are/may be exposed to COVID-19, please follow [the university guideline](#). Please notify the instructor as soon as you expect to be absent in a class due to sickness. If it involves multiple students particularly for COVID-19, the instructor will flexibly deal with an individual case.

Academic dishonesty and disruptive behavior

Academic dishonesty and disruptive behavior will not be tolerated and will be dealt in accordance to university policies. Students should familiarize themselves with the Student Conduct Rules of the University of Missouri in [Section 200 of the Collected Rules and Regulations](#) to review the expected standards for student academic integrity, disciplinary procedures, sanctions, and appeal procedures. In the occurrence of disruptive behavior, the course instructors may request the campus Judicial Officer to take effective disciplinary action after issuing a warning. See [Student Academic Regulations](#).

Disability policy

The Americans with Disabilities Act prohibits discrimination against and guarantees that people with disabilities have the same opportunities as people without a disability. Missouri University of Science and Technology is committed to providing educational opportunities for all academically qualified students. Reasonable accommodations to ensure equitable access to its programs and services for individuals with disabilities will be made in compliance with the Americans with Disabilities Act. Students with disabilities, which have been verified through the Office of Student Disability Services, should contact the instructor at the beginning of the semester to discuss their individual needs for accommodations. Please visit [Student Accessibility and Testing](#) for details.

Non-discrimination statement

The University of Missouri 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, or any other status protected by applicable state or federal law. The University affirms its commitment to providing equal opportunities by establishing the Equal Opportunity Policy statement in [Section 600.010 of the Collected Rules and Regulations](#). The University's nondiscrimination policies apply to any phase of its employment process, any phase of its admission or financial aid programs, and other aspects of its educational programs or activities.

Additionally, this policy and the existing Title IX policies apply to allegations of sexual misconduct or allegations of other forms of sex discrimination, as defined in [Section 600.020C](#), occurring within the University's educational programs and activities and instances occurring in other settings, including off-campus if there are effects of the conduct that interfere with or limit students' ability to participate in or benefit from the University's educational programs and activities.

Contact equity@mst.edu to report any issues related to equity and Title IX. To learn more about Title IX resources and reporting options (confidential and non-confidential) available to Missouri S&T students, staff, and faculty, please visit [Equity and Title IX office website](#).

Changes to syllabus

If a revision of the syllabus becomes necessary during the semester, it will be discussed in a class. Any changes to the syllabus will be posted on Canvas.

Statement of agreement

Please carefully review and print for your records this syllabus. By taking this class, you confirm you have read and understood this document and are agreeable to the policies and provisions set forth therein.

Schedule

Number	Date	Contents	Homework due
1	Tue, 8/23	Overview, 1.1	
2	Thu, 8/25	1.2, 1.3	
3	Tue, 8/30	1.4, 1.5, 1.6	HW#1
4	Thu, 9/1	Chap.1 Example Problems	
5	Tue, 9/6	2.1, 2.2, 2.3	HW#2
6	Thu, 9/8	2.4, 2.5, 2.6, 2.7	
7	Tue, 9/13	3.1, 3.2, 3.3	HW#3
8	Thu, 9/15	3.5, 3.6, 3.7	
9	Tue, 9/20	3.8, 3.9, 3.10, 3.11	HW#4
10	Thu, 9/22	4.1, 4.2, 4.3, 4.4	
11	Tue, 9/27	1st Exam [Chap. 1, 2, 3]	HW#5
12	Thu, 9/29	[Prerecorded] 4.5, 4.6, 4.7, 4.8, 4.9	
13	Tue, 10/4	4.10	HW#6
	Thu, 10/6	No lecture (Fall Break)	
14	Tue, 10/11	5.1, 5.2, 5.3	HW#7
15	Thu, 10/13	5.4	
16	Tue, 10/18	5.5, 5.6	HW#8
17	Thu, 10/20	5.7	
18	Tue, 10/25	8.1	HW#9
19	Thu, 10/27	8.2	
20	Tue, 11/1	2nd Exam [Chap. 4, 5, 8]	HW#10
21	Thu, 11/3	9.5, 9.6	
22	Tue, 11/8	9.7	HW#11
23	Thu, 11/10	9.1, 9.2, 9.3, 9.4	
24	Tue, 11/15	7.1, 7.2	HW#12
25	Thu, 11/17	7.3, 7.4	
	Tue, 11/22	No lecture (Thanksgiving Break)	
	Thu, 11/24	No lecture (Thanksgiving Break)	

Number	Date	Contents	Homework due
26	Tue, 11/29	7.7, 7.8, 7.9	HW#13
27	Thu, 12/1	Chap. 10 or 13 depending on preference	
28	Tue, 12/6	Chap. 10 or 13	HW#14
29	Thu, 12/9	Chap. 10 or 13	
30	Wed, 12/14	Final Exam [two Exams + Chap. 7, 9]	HW#15