Mechanics I Syllabus (2021 Spring Semester)

Course	Mechanics I	Department	Physics	Office Hours	
Course No. and Class	20518	Hours	3.0	Academic Credit	3.0
Professor	William Jo		Office	Sci. Complex Bldg. A521	
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1. Course Description

Mechanics I affords the fundamental principle on classical mechanics which was a triumph achieved by Isaac Newton and a variety of techniques and problems which describe our daily life on and beyond the earth. We will cultivate a building block for professional physicists through this course, which is also strongly connected to other key physics courses like electricity and magnetism, quantum mechanics, and statistical mechanics. We will also try to use somewhat new for computing the physical problems with a programming software.

2. Prerequisites

Students are supposed to finish general physics I and II as well as calculus I and II..

3. Course Format

Lecture	Problem Solving	Experiment/Practicum	Field Study	Other
90%	10%			

4. Course Objectives

What we will learn from this course is to obtain physical reasoning through rigorous calculation and mathematical manipulation. Analytic methods will be explored extensively. Newtonian, Lagrangian, and Hamiltonian formalism of classical mechanics are all carefully addressed on many examples of physical world.

5. Evaluation System (Absolute Grading)

Homework	Midterm exam	Final exam	Attitude	Attendance
30%	30%	30%	5%	5%

- Attendance and Participation: 10% (Attendance is required for every lecture. 6 or more absence will lead to F.)

6. Required Materials

(1) "CLASSICAL DYNAMICS OF PARTICLES AND SYSTEMS" MARION & THORNTON (5th edition)

(2) "ANALYTICAL MECHANICS", FOWLES (7th edition)

7. Supplementary Materials

(1) "MECHANICS", SYMON (3th edition)

8. Optional Additional Readings

Relevant information will be posted on the cybercampus.

9. Course Contents

Week	Topic, Materials, Assignments

Week1	Introduction
Week2	Matrices, Vectors, and Vector Calculus
Week3	Matrices, Vectors, and Vector Calculus
Week4	Newtonian Mechanics--Single Particle
Week5	Newtonian Mechanics--Single Particle
Week6	Oscillations.
Week7	Oscillations.
Week8	Mid-term exam
Week9	Nonlinear Oscillations and Chaos
Week10	Gravitation
Week11	Gravitation
Week12	Some Methods in the Calculus of Variations
Week13	Hamilton''s Principle--Lagrangian and Hamiltonian Dynamics
Week14	Hamilton''s Principle--Lagrangian and Hamiltonian Dynamics
Week15	Supplement Lecture
Week16	Final exam

10. Course Policies

* Problem solving is a key procedure for mechanics. We will assign a time slot for this training. Probably online live or on-demand lecture will be available.

11. Special Accommodations