SYLLABUS

MECHANICS I

SPRING SEMESTER 2019

http://www.phys.uconn.edu/~rozman/Courses/P3101_19S/

Last modified: January 23, 2019

Course description: Physics 3101 Mechanics I covers the following topics: Newton's laws of motion, Euler-Lagrange equations, variational principles, Hamilton's equations, rotational motion of rigid bodies, introduction to nonlinear dynamics and chaos.

Lectures: MoWe 5:00PM – 6:15PM, Gant West 121

Course webpage: http://www.phys.uconn.edu/~rozman/Courses/P3101_19S/

Instructor: Michael Rozman

email: michael.rozman@uconn.edu

office hours: Mo 6:15 PM – 7:15 PM in GW121,
We 6:15 PM – 7:15 PM in GW121, and by appointments

Textbook: No required textbook; handouts will be provided.

Exams: Two midterm exams and a *cumulative* final exam. Parts of the exams may be substituted by take-home projects.

Grading scheme:

The course grade will be calculated using the following scheme.

Homework assignments	35%
2 Midterms	35%
Final exam	30%

Course grade = 0.35*HW + 0.35*(M1 + M2) + 0.3*F, correctly rounded to integers and capped at 100%.

The percent grades are converted to the letter grades as following.

Percent grade	**Letter grade**
94+	A
90-93	A-
87-89	B+
83-86	B
80-82	B-
77-79	C+
73-76	C
70-72	C-
67-69	D+
63-66	D
60-62	D-
0-59	I

Honors conversion:

Students interested in honors conversion should contact the instructor during the *second* week of classes.

Class schedule: this is a *preliminary* schedule.

Week(s)	Subject
1	Strategies for solving problems; dimensional analysis; approximations.
2	Newton's laws of motion
3	Problems in particle dynamics
4	Oscillations
5	Conservation laws
	Midterm I - Mon, Feb 25
6-8	Lagrangian mechanics
9	**Spring recess**
10	Central forces
	Midterm II - Mon, Apr 1
11-13	Dynamics of rigid bodies
14	Accelerating reference frames
15	Hamiltonian mechanics

Communications: talking in person is the preferred method to communicate with the instructor; email is the next best option.

- use your UConn email address for class communications.
- please include the tag ``[math3510]'' (without quotes, no spaces) in the subject of your email, e.g. "[math3510] midterm II review session".
- the subject line of your email should communicate exactly what the email is about so that the recipient can prioritize the email's importance without opening it. E.g. "[math3510] Tacoma bridge collapsed - cannot come to the final" would be a good email subject (assuming email existed in 1940 ...); "urgent", "important", "a question" are bad ones. Do not use your name as subject – the sender name is already visible as a part of email header.
- please no emails with attachments unless requested by the instructor. Use *UConn File DropBox* https://dropbox.uconn.edu/dropbox or *UConn FileLocker*

http://web2.uconn.edu/filelocker/ for submitting large files

Homework: Homework assignments submitted on time may be returned (at the discretion of the instructor) for corrections after initial grading.

Homework assignments are not accepted after the solutions had been discussed in class, and/or had been posted online, and/or graded assignments returned. Individual emergencies can be accommodated by extra credit assignments.

You are welcome to discuss the homework's problems with others in order to better understand them but the work you turn in must be your own. In particular, you must run your own calculations (where applicable) and communicate and explain the results in your own words.

Members of collaborating groups must consistently list all collaborators names and submit assignments together.

Assignments that are hard to understand are also hard to grade correctly, therefore: (a) use words and pictures to supplement your equations; (b) work must progress linearly down the page – recopy solutions that are too nonlinear.

Requirements for written assignments:

- Use letter-size paper. Use only one side of each sheet.
- Box your final answer(s) and important intermediate results.
- Staple your notes together, (i.e. no paper clips, torn or folded corners) with the assignment cover page (if applicable).

Highly recommended: make copies of homework assignments for your own files.

Recommended reading:

- David Morin, *Introduction to Classical Mechanics With Problems and Solutions*, Cambridge University Press, 2008
- R. Douglas Gregory, *Classical Mechanics*, Cambridge University Press, 2006
- John R. Taylor, Classical Mechanics, University Science Books, 2005

  Standard undergraduate text; was used for PHYS3101 by the previous instructors; ca. 800 pages!

- L. D. Landau, E. M. Lifshitz, *Mechanics*, any edition

  Concise and advanced; timeless classics;