

# Physics 621: Classical Mechanics

## Syllabus - Fall 2017

**CRN: 76637, F01**

**Lecture:** MWF 9:15-10:15, REIC 207

**Instructor:** Ataur R. Chowdhury

**Office:** REIC 118

**Office Hours:** MWF 10:30-11:30 am, and any other time I am in.

**Contact:** Phone (907) 474-6109  
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**Prerequisites:** Graduate standing or permission of instructor.

**Text:** **Classical Mechanics** by Goldstein, Poole & Safko, Third Edition, Addison Wesley (ISBN 0-201-65702-3).

**Useful Resources:**

1. J. Marion and S. Thornton, *Classical Dynamics of Systems and Particles* (Thomson-Brooks/Cole, 2004). An excellent undergraduate textbook on classical mechanics. If you find Goldstein a little difficult, this will be an excellent resource to bank on.
2. M. Boas, *Mathematical Methods in the Physical Sciences*, Second Edition (Wiley, 1983). A useful mathematical resource for most of the mathematical tools you need for this course. The math course (Phys 611) you have taken or will be taking concurrently with course will also be very useful.
3. L. Landau and Lifshitz, *Mechanics* (Vol. 1 in the Course of Theoretical Physics). It is condensed but very insightful text that is the popular equivalent of Goldstein in Russia.

**Description:** Lagrange's equations, two-body problem, rigid body motion, special relativity, canonical equations, transformation theory, and Hamilton-Jacobi method.

**Schedule:** Materials covered in this course will be based on chapters 1-10 of Goldstein. Additional material will be provided in class as needed.

**Course Objective:**

1. To acquire a basic understanding of advanced concepts and formulation of classical mechanics.
2. To learn advanced mathematical methods that are useful through-out physics.
3. To develop and sharpen high-level problem solving skills.

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4. To be able to apply the knowledge learned in this course to real-world problems in mechanics.

**Credits:** 3 credits: 3 hr. of lecture per week.

### **Course Requirements/ Policies:**

#### Class Attendance/Participation:

For a better understanding of the course material, attendance and participation in classroom activities are very important. For many of you this will be the first graduate physics course that deals with the fundamentals of advanced mechanics and many of you may find this course a little difficult and mathematically intense. However, if you attend classes and work out all the assignments, you will learn and possibly master the material. This is why it is highly expected that the students will commit themselves to attend the class regularly. There will be supplemental materials for this course and the students will be held responsible for all the materials that will be brought in from outside the text. The students will be expected to participate in class activities, and take part in meaningful discussion and ask questions to better comprehend the subject material.

#### Homework:

Homework is the single most important aspect of this course. The best possible way to learn physics, and perhaps any science, is through doing problems. This is a graduate course and you may find homework challenging. However, if you find your homework difficult, please come and ask me for help. On the average, 6-8 problems will be assigned on most Fridays. The homework will be due back at the beginning of class the following Friday. **NO LATE HOMEWORK WILL BE ACCEPTED. NO EXCEPTIONS** (barring emergencies and extreme situations). Group work is extremely effective in achieving a greater understanding of the subject material, and it is highly encouraged for solving problems. For additional help with the homework the students are most welcome to consult the instructor during the office hour or any other time by prior appointment. Any homework you submit should reflect your own best effort. Copying of homework from your friend or any online sources is absolutely not acceptable and will result in a grade of zero for the assignment.

#### Examinations:

There will be two midterm examinations (October 13, Friday 9:15-10:15 and November 10, Friday 9:15-10:15) and a final comprehensive examination (December 14, Wednesday, 10:15-12:15 pm) for this course. Examinations will consist of, in most part, problems similar to those in the homework and those worked out in class. Midterms will cover the material covered in class and homework prior to the date of test, and the final will be comprehensive and will include material covered during the entire semester.

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### Grading Policy:

Homework	34%
Midterm I	18%
Midterm II	18%
<u>Final</u>	<u>30%</u>
Total	100%

The final grading for this course will be based on a curve, the average of which is usually taken to be the break-point of letter grade B and C, and the standard deviation of the grade point distribution will separate subsequent letter grades. No plus-minus letter grades will be given for this course.

### Academic Honesty

UAF expects and requires academic honesty from all members of the University community, and takes any act of plagiarism and cheating seriously. It is expected that all assignments, including homework and reports, that are turned in for this course must be the original work of the individual student. Failure to comply with this policy will result in penalty as stipulated under UAF regulations.

### Disabilities Services

The UAF Office of Disability Services implements the Americans with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials. Any student who may need assistance with disabilities, should feel free to contact the instructor or directly to the Office of Disabilities Services (208 WHIT) by calling 907- 474-5655, or through email: [uaf-disability-service@alaska.edu](mailto:uaf-disability-service@alaska.edu).