

CLASSICAL PHYSICS III, PHYS 343

Syllabus - Fall 2023

CRN: 75525, F01

MWF 11:45-12:45, REIC 203 (Lecture)
R 9:30-10:30 AM, REIC 203 (Tutorial)

Instructor: Ataur R. Chowdhury

Office: REIC 118

Office Hours: M 3:00-4:30
W 3:00-4:30

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Prerequisites: Phys 220, phys 301, and phys 342; or permission of instructor.

Texts: **Classical Mechanics** by J. R. Taylor, University Science Books, 2005 (ISBN 1-891389-22-X), and
Introduction to Electrodynamics by D. J. Griffiths, 3rd edition, Prentice Hall Publishing, 1999 (ISBN 0-13-805326-X).

Description: Normal modes and vibrations, continuum systems, wave mechanics, electromagnetic waves, and radiation. Relativistic mechanics and electromagnetism.

Schedule: Materials covered in this course will be based on chapters 7, 11, and 16 of Taylor, and chapters 9-12 of Griffiths. Additional material will be provided in class as needed.

Course Objective: To acquire a basic understanding of advanced topics in classical mechanics and electrodynamics, and the fundamentals of relativistic formulation of mechanics and electromagnetism.

Student Learning Outcomes:

1. Students should be able to understand the physics of vibrational modes of coupled discrete systems and continuum systems.
2. Students should have acquired a solid foundation of wave mechanics in both classical mechanics and electrodynamics.
3. Students should be able to understand basic properties of radiation physics from a classical perspective.
4. Students should be able to understand the fundamentals of basic relativistic framework of mechanics and electromagnetism.

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Instructional methods: Interactive lecture-based instruction.

Mode of Instruction: Face-to face live lectures in class.

Credits: 4 credits: 3 hr. of lecture, and 1 hr. of tutorial 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. This course is generally regarded as one of the founding courses that deal with the fundamentals of advanced mechanics and electrodynamics, and 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 discussions and ask questions to better comprehend the subject material.

Homework:

On average, 6-8 problems/exercises/questions will be assigned each week on 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 highly encouraged for solving problems, and for additional help with the homework the students are most welcome to consult the instructor during office hours or any other time by prior appointment. Any homework you submit should reflect your own best effort. **Copying homework from any online sources, including AI sources, is not acceptable and will result in a grade of zero for the assignment.**

Tutorial Session:

One hour per week will be devoted to doing problems. Both the instructor and students will take part in solving a pre-selected set of problems during this session. Students may also take advantage of this session to bring in subject material for further discussion. This session is intended to foster a better understanding of the subject and will not be a part of the grade.

Quizzes: There will be one quiz every week of the semester on Fridays, except the first week and weeks of midterms and final. These quizzes will be administered during the last 10-15 minutes of the class and are designed to test students' understanding of the subject material covered during the preceding week. The quiz may include problems like the homework and may also include 'intuitive' question pertaining to the subject materials. Of all the quizzes only ten bests will be considered for grading. **Make-up quizzes, if you miss class for valid reasons, may be arranged with approval from the instructor.**

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Examinations:

There will be two midterm examinations (October 09, Monday 11:45-12:45 and November 13, Monday 11:45-12:45) and a final comprehensive examination (December 15, Friday, 10:15-12:15 pm) for this course. Examinations will consist of, in the most part, problems like 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. **Exams missed due to valid excuses may be made up with the permission of the instructor.**

Grading Policy:

Homework	30%
Quiz	15%
Midterm I	15%
Midterm II	15%
<u>Final</u>	<u>25%</u>
Total	100%

The final grading for this course will be based on a curve. For a given score, your letter grade will not be lower than what it would be expected based on standard grading scale (90-100 = A, 80-90 = B, etc.). Allowed grades are limited to letter grades A, B, C, D, F, I, NB and no plus-minus grades will be given for this course.

Incomplete Grade Policy: “The letter “I” (Incomplete) is a temporary grade used to indicate that the student has satisfactorily completed (C or better) the majority of work in a course but for personal reasons beyond the student’s control, such as sickness, has not been able to complete the course during the regular semester. Negligence or indifference are not acceptable reasons for an “I” grade.”

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 a penalty as stipulated under UAF regulations.

Syllabus Addendum (Revised 8/22/2022)

COVID-19 statement: Students should keep up-to-date on the university’s policies, practices, and mandates related to COVID-19 by regularly checking this website:

<https://sites.google.com/alaska.edu/coronavirus/uaf?authuser=0>

Further, students are expected to adhere to the university’s policies, practices, and mandates and are subject to disciplinary actions if they do not comply.

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Student protections statement: UAF embraces and grows a culture of respect, diversity, inclusion, and caring. Students at this university are protected against sexual harassment and discrimination (Title IX). Faculty members are designated as responsible employees which means they are required to report sexual misconduct. Graduate teaching assistants do not share the same reporting obligations. For more information on your rights as a student and the resources available to you to resolve problems, please go to the following site: <https://catalog.uaf.edu/academics-regulations/students-rights-responsibilities/>.

Disability services statement: I will work with the Office of Disability Services to provide reasonable accommodation to students with disabilities.

ASUAF advocacy statement: The Associated Students of the University of Alaska Fairbanks, the student government of UAF, offers advocacy services to students who feel they are facing issues with staff, faculty, and/or other students specifically if these issues are hindering the ability of the student to succeed in their academics or go about their lives at the university. Students who wish to utilize these services can contact the Student Advocacy Director by visiting the ASUAF office or emailing asuaf.office@alaska.edu.

Student Academic Support:

- Speaking Center (907-474-5470, uaf-speakingcenter@alaska.edu, Gruening 507)
- Writing Center (907-474-5314, uaf-writing-center@alaska.edu, Gruening 8th floor)
- UAF Math Services, uaf-traccloud@alaska.edu, Chapman Building (for math fee paying students only)
- Developmental Math Lab, Gruening 406
- The Debbie Moses Learning Center at CTC (907-455-2860, 604 Barnette St, Room 120, <https://www.ctc.uaf.edu/student-services/student-success-center/>)
- For more information and resources, please see the Academic Advising Resource List (https://www.uaf.edu/advising/lr/SKM_364e19011717281.pdf)

Student Resources:

- Disability Services (907-474-5655, uaf-disability-services@alaska.edu, Whitaker 208)
- Student Health & Counseling [6 free counseling sessions] (907-474-7043, <https://www.uaf.edu/chc/appointments.php>, Gruening 215)
- Center for Student Rights and Responsibilities (907-474-7317, uaf-studentrights@alaska.edu, Eielson 110)
- Associated Students of the University of Alaska Fairbanks (ASUAF) or ASUAF Student Government (907-474-7355, asuaf.office@alaska.edu, Wood Center 119)

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Nondiscrimination statement: The University of Alaska is an affirmative action/equal opportunity employer and educational institution. The University of Alaska does not discriminate on the basis of race, religion, color, national origin, citizenship, age, sex, physical or mental disability, status as a protected veteran, marital status, changes in marital status, pregnancy, childbirth or related medical conditions, parenthood, sexual orientation, gender identity, political affiliation or belief, genetic information, or other legally protected status. The University's commitment to nondiscrimination, including against sex discrimination, applies to students, employees, and applicants for admission and employment. Contact information, applicable laws, and complaint procedures are included on UA's statement of nondiscrimination available at www.alaska.edu/nondiscrimination. For more information, contact:

UAF Department of Equity and Compliance
1692 Tok Lane, 3rd floor, Constitution Hall, Fairbanks, AK 99775
907-474-7300
uaf-deo@alaska.edu

Additional syllabi statement for courses including off-campus programs and research activities:

University Sponsored Off-Campus Programs and Research Activities

We want you to know that:

1. UA is an AA/EO employer and educational institution and prohibits illegal discrimination against any individual: www.alaska.edu/nondiscrimination.
2. Incidents can be reported to your university's Equity and Compliance office (listed below) or online reporting portal. University of Alaska takes immediate, effective, and appropriate action to respond to reported acts of discrimination and harassment.
3. There are supportive measures available to individuals that may have experienced discrimination.
4. University of Alaska's Board of Regents' Policy & University Regulations (UA BoR P&R) 01.02.020 Nondiscrimination and 01.04 Sex and Gender-Based Discrimination Under Title IX, go to: <http://alaska.edu/bor/policy-regulations/>.
5. UA BoR P&R apply at all university owned or operated sites, university sanctioned events, clinical sites and during all academic or research related travel that are university sponsored.

For further information on your rights and resources [click here](#)

General Remarks

"Physics is just the refinement of everyday thinking," A. Einstein

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Physics is the subject that requires you to think and ponder. Physics is not mathematics, but it does require mathematics to make it useful. In order for you to succeed in this course you may pay heed to the following suggestions.

1. Read the chapter before it is discussed in class so that you know the material and know what questions to ask for clarification.
2. Start your homework on day one so that you have ample time to think about the questions and get the help you need.
3. Think the problems through and follow the logical sequence to get the result.
4. Do not hesitate to ask for help. We wish all of you to excel and we are here to help.

Tentative Schedule

Lecture, Reading, Paper and Exam

<u>Week</u>	<u>Date</u>	<u>Topics</u>	<u>Reading Assignment</u>
1	8/28-9/1	review of Lagrange mechanics	Taylor chapter 7
2	9/4-9/8 9/4	review of Lagrange mechanics Labor Day (no classes)	Taylor chapter 7
3	9/11-9/15	oscillations of coupled systems	Taylor chapter 11
4	9/18-9/22	Lagrange treatment of small oscillations	Taylor chapter 11
5	9/25-9/29	continuum mechanics and wave equations	Taylor chapter 16
6	10/2-10/6	stress and strain tensors	Taylor chapter 16
7	10/9-10/13	em waves in vacuum Midterm I Monday 10/09	Griffiths chapter 9
8	10/16-10/20	em waves in matter	Griffiths chapter 9

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9	10/23-10/27	wave guides	Griffiths chapter 9
10	10/30-11/3	scalar and vector potentials	Griffiths chapter 10
11	11/06-11/10	retarded potentials	Griffiths chapter 10
12	11/13-11/17	electric and magnetic dipole radiation Midterm II Monday 11/13	Griffiths chapter 11
13	11/20-11/24 11/23-24	radiation of point charges radiation of point charges Fall Break (no classes)	Griffiths chapter 11
14	11/27-12/1	relativistic mechanics	Griffiths chapter 12
15	12/4-12/8	relativistic dynamics	Griffiths chapter 12
16	12/15	FINAL: Friday, 10:15-12:15All the best...	
