Advanced Mechanics
PHYS 4319-001

Common Course Information

Instructor: Jonathan Asaadi
Office Number: Chemistry and Physics Building (CPB) 348
Office Phone: 817-272-7439
Email: jonathan.asaadi@uta.edu
Office Hours: Monday 4pm – 5pm & Wednesday 9am – 10am (or by appointment)
Lecture Time: Monday/Wednesday 5:30pm – 6:50pm
Lecture Place:

Required Text:

Classical Dynamics of Particles and Systems 5th Edition(Thornton & Marion)

Recommended Text:

Analytical Mechanics (Fowles and Cassiday)
Classical Mechanics (J. Taylor)

Summary of Course Content:

Coupled oscillators, central forces, Lagrange's equations, Hamilton's canonical equations, the moment of inertia tensor, and the application of Euler's angles to rotational motion. Prerequisite: PHYS 2311, PHYS 3321, and MATH 3318 or MATH 3319, or permission of the instructor.
(See course philosophy for more info)

Overview of Grades

Letter grades will be assigned using the following scale:
A: 90 – 100 %
B: 80 – 90 %
C: 70 – 80 %
D: 60 – 70 %
F: 0 – 60 %
W: Drop by due date Spring 2017

Grade Breakdown

Attendance: 20%

- Your attendance grade will come from two components, each worth ½ of your overall attendance grade
    - **Being present:**
      At some point during each lecture I will ask you to sign a card with your Student Number (as assigned in the course) as a way to take attendance. I do this because I feel the best way to learn the subject material is to be present during lecture. Class is an hour and twenty minutes long, so there is no way you will pay attention the whole time…..but by having you here as much as possible, I maximize the chance that you are paying attention some of time and thus learning some of the material from lecture
    - **Cold Calling:**
      During each lecture I will call on one or more students and ask for their contribution. I will keep a record of each student's contribution (successful or unsuccessful) and use this to tabulate this portion of their grade. Examples of subjects which a student will be cold called on include pre-assigned example problems, questions about derivations being worked in class, questions on readings from your textbook.

Mid-term: 25%

- This will be at the halfway point (March 8th) in the course and cover the material we have reviewed up to that point. The problem will be closed book, closed note, and no calculators, phones, tablets, laptops etc.…

  The exams will be problems which you have to solve. They will be similar to the homework problems and are expected to challenge you as well as prepare you for what you might see on a qualifying exam at a graduate level institution (although not quite as hard)

  I will give you 4 problems to solve. Each problem will be worth 25 points. The exams will have a 3.5 hour time limit. We will start the exams at 5:30pm and you will have till 9pm to complete them. We will administer the exams in one of the physics conference rooms.

Final Exam: 25%

- This will be a cumulative exam covering all the material in the course. The problem will be closed book, closed note, and no calculators, phones, tablets, laptops etc….

  The exams will be problems which you have to solve. They will be similar to the homework problems and are expected to challenge you as well as prepare you for what you might see on a qualifying exam at a graduate level institution (although not quite as hard)

  I will give you 4 problems to solve. Each problem will be worth 25 points. The exams will have a 3.5 hour time limit. We will start the exams at 5:30pm and you will have till 9pm to complete them. We will administer the exams in one of the physics conference rooms.

Homework: 30%

- Homework will be in a different format than what you may be used to. Typically, the best way to learn a subject is to have to teach it….and the best way to evaluate your work is to have it critiqued by your peers. So we will take a hybrid approach and do a little of both.
- Every student is expected to work out all the problems assigned and to turn them in on the due date. **No late homeworks are accepted under any circumstances.** If you have to be absent the day homework is due you have to email me your solutions prior to the start of class.
- On the day the homework is due, 2-3 students will be asked to present their solutions in class. These students will know the week when it is their turn in advance and they will know which problem they are responsible for presenting. Those students will be "graded" by their peers on the quality of their solution. These evaluations will constitute 25% of your homework grade (so 7.5% of your final grade).

You will be evaluated on the following

1) The correctness of your solution (0 - 10)
2) The clarity of your solution, how easy is it to follow what you have written up (0 - 10)
3) Your presentation of your solution (0 - 10)
4) You ability to answer any questions about your solution (0 - 10)

I will take the average of the grades assigned by the students to give you your evaluation grade

I reserve the right to have the final say in what your evaluation grade is on your homework, but the opinions of your peers will matter.

Course Philosophy:

I fully expect that you are **READING** your textbook. I recommend putting aside 2-3 hours a week to review your text book, follow the derivations, and understand the notation. I will be making the assumption that you have READ your text prior to coming to class. Subject material from your textbook is open for cold-calling.

(Note: I realize this is an almost unrealistic assumption every week. You have lots of class, work, and life to get to….but even if you can't do it every week...aim to do it MOST weeks. There is no way to get you the entire formalism you need in lecture...you have to start self-teaching)

Mathematical Review

While this may be the first time you are seeing this subject material as applied to physics, I am going to assume that you have either

1) Seen some of the mathematical formalism before (e.g. linear algebra, vector manipulation, derivatives, integrals, etc….)
2) You have the ability to pick up the formalism on the fly and can review the material as presented in the text book.

Thus, I will only spend a little time "reviewing" the mathematics we will use pretty extensively throughout the course.

Secondly, I will be lecturing from my notes which will be paired with the textbook, but not from the textbook. Thus, you should use your text as an additional resource and another way of understanding the material. Thorton will go into details that I will skip over in lecture….and I will dive into areas that Thorton doesn't cover. Your homework will come from Thorton, so being familiar with its presentation will be essential. The test will come from my lecture and your textbook.

Finally, since most of you are advanced undergraduates, I am expecting this course to be part lecture / part seminar where we spend more time working problems and having discussion than a purely lecture based course you may have had as an early undergraduate.

University wide policies:

Attendance: At The University of Texas at Arlington, taking attendance is not required but attendance is a critical indicator in student success. Each faculty member is free to develop his or her own methods of evaluating students' academic performance, which includes establishing course-specific policies on attendance. As the instructor of this section, **I do require attendance in order to succeed in this course and is part of your final grade, as outlined above.** However, while UT Arlington does not require instructors to take attendance in their courses, the U.S. Department of Education requires that the University have a mechanism in

place to mark when Federal Student Aid recipients "begin attendance in a course." UT Arlington instructors will report when students begin attendance in a course as part of the final grading process. Specifically, when assigning a student a grade of F, faculty report the last date a student attended their class based on evidence such as a test, participation in a class project or presentation, or an engagement online via Blackboard. This date is reported to the Department of Education for federal financial aid recipients.

Drop Policy: Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. Students will not be automatically dropped for non-attendance. Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (http://wweb.uta.edu/aao/fao/).

Disability Accommodations: UT Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including *The Americans with Disabilities Act (ADA), The Americans with Disabilities Amendments Act (ADAAA),* and *Section 504 of the Rehabilitation Act.* All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of disability. Students are responsible for providing the instructor with official notification in the form of a letter certified by the Office for Students with Disabilities (OSD). Only those students who have officially documented a need for an accommodation will have their request honored. Students experiencing a range of conditions (Physical, Learning, Chronic Health, Mental Health, and Sensory) that may cause diminished academic performance or other barriers to learning may seek services and/or accommodations by contacting:

The Office for Students with Disabilities, (OSD) www.uta.edu/disability or calling 817-272-3364. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability.

Counseling and Psychological Services, (CAPS) www.uta.edu/caps/ or calling 817-272-3671 is also available to all students to help increase their understanding of personal issues, address mental and behavioral health problems and make positive changes in their lives.

Non-Discrimination Policy: *The University of Texas at Arlington does not discriminate on the basis of race, color, national origin, religion, age, gender, sexual orientation, disabilities, genetic information, and/or veteran status in its educational programs or activities it operates. For more information, visit uta.edu/eos.*

Title IX Policy: The University of Texas at Arlington ("University") is committed to maintaining a learning and working environment that is free from discrimination based on sex in accordance with Title IX of the Higher Education Amendments of 1972 (Title IX), which prohibits discrimination on the basis of sex in educational programs or activities; Title VII of the Civil Rights Act of 1964 (Title VII), which prohibits sex discrimination in employment; and the Campus

Sexual Violence Elimination Act (SaVE Act). Sexual misconduct is a form of sex discrimination and will not be tolerated. *For information regarding Title IX, visit* www.uta.edu/titleIX or contact Ms. Jean Hood, Vice President and Title IX Coordinator at (817) 272-7091 or jmhood@uta.edu.

Academic Integrity: Students enrolled all UT Arlington courses are expected to adhere to the UT Arlington Honor Code:

I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence. I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

UT Arlington faculty members may employ the Honor Code in their courses by having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System *Regents' Rule* 50101, §2.2, suspected violations of university's standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student's suspension or expulsion from the University. Additional information is available at https://www.uta.edu/conduct/.

Electronic Communication: UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at http://www.uta.edu/oit/cs/email/mavmail.php.

Campus Carry: Effective August 1, 2016, the Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University establishes as prohibited. Under the new law, openly carrying handguns is not allowed on college campuses. For more information, visit http://www.uta.edu/news/info/campus-carry/

Student Feedback Survey: At the end of each term, students enrolled in face-to-face and online classes categorized as "lecture," "seminar," or "laboratory" are directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student's feedback via the SFS database is aggregated with that of other students enrolled in the course. Students' anonymity will be protected to the extent that the law allows. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback is required by state law and aggregate results are posted online. Data from SFS is also used for faculty and program evaluations. For more information, visit http://www.uta.edu/sfs.

Final Review Week: for semester-long courses, a period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During

this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week *unless specified in the class syllabus*. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

Emergency Exit Procedures: Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit, which is located in the back of the room or immediately adjacent to the blackboard. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities.

Student Support Services: UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at http://www.uta.edu/universitycollege/resources/index.php.

Emergency Phone Numbers: In case of an on-campus emergency, call the UT Arlington Police Department at **817-272-3003** (non-campus phone), **2-3003** (campus phone). You may also dial 911. Non-emergency number 817-272-3381

General Class Schedule

Note: Dates given here are subject to change depending on the lecture schedule. Any change in dates will be announced in class as well as email

Homework Assignment	Problem #'s	Due Date	Student Homework Presentation
Chapter 1	4, 9, 10, 14, 31, 40	Monday January 30th	Student 1: #14 Student 5: #40
Chapter 2	12, 24, 25, 32, 41, 53	Monday February 6th	Student 2: #25 Student 6: #53
Chapter 3	1, 7, 12, 29, 40, 43	Wednesday February 15th	Student 19: #40 Student 15: #43
Chapter 5	4, 8, 10, 15, 16	Monday February 27th	Student 3: #15 Student 4: #16
Chapter 6	2, 7, 8, 11, 14	Monday March 6th	Student 8: #8 Student 18: #11
Chapter 7	12, 15, 22, 26, 30, 34, 38, 39	Monday March 27th	Student 12: #15 Student 13: #34 Student 17: #38
Chapter 8	6, 11, 14, 43, 44	Wednesday April 5th	Student 16: #11 Student 9: #44
Chapter 9	10, 15, 21, 23, 37, 52, 53	Wednesday April 19th	Student 10: #15 Student 7: #52
Chapter 11	2, 11, 13, 14, 20, 25	Monday March 1st	Student 11: #13 Student 14: #14
Chapter 12 (Possible) <u>Makeup Homework</u> Could be from students who missed their evals		Wednesday May 3rd	(Open spot)

Homework Feedback Form:

Your Name:_____

Student working the solutions name:_____

Problem being worked (Chapter # and Problem #): _____

Please rate the following on a scale 0 - 10:

1) How correct was the solution which the student presented:_____

Scale Guide:

10: *Problem was worked out without error and the group agrees with the solution*

8-9: *The problem was worked out completely, but had some solutions which were caught and corrected during the solution*

6-7: *Problem was worked out completely, but had errors in the solution*

5-6: *Problem was not worked out completely, but the portions which were worked were correct*

3-4: *Problem was not worked out completely and the portions which were worked has errors present which were caught and corrected during the solution*

1-2: *The student showed up on the day they were suppose to work the solutions, but had nothing to present*

0: *Student was not present*

2) How clear was the solution presented:_____

Scale Guide:

10: *The solution was presented clearly and easy to follow along with*

8-9: *The solution was presented clearly and any gaps in the presented solution were well explained upon questioning*

6-7: *The solution was clear, but certain steps were difficult to follow and no justification was given for these steps*

5-6: *The solution was unclear with some steps and procedures left unexplained*

3-4: *The solution presented was unclear with many steps left unexplained*

1-2: *The student showed up on the day they were suppose to work the solutions, but had nothing to present*

0: *Student was not present*

3) How was the overall presentation of the solution:_____

Scale Guide:

10: *The presentation style was excellent in both the ability to read the work and hear the speaker*

8-9: *The presentation style was very good and the speaker was reasonably easy to hear and the work was easy to follow*

6-7: *The presentation style was acceptable, either the medium of presentation or the clarity of speaking could be improved*

5-6: *The presentation style was in need of improvement because either the material was too difficult to read and follow or the volume of the speaker was hard to hear*

3-4: *The presentation style is in need of work overall*

1-2: *The student showed up on the day they were suppose to work the solutions, but had nothing to present*

0: *Student was not present*

4) How able was the presenter to answer questions:_____

Scale Guide:

10: *The presenter was excellent answering all the questions raised (if no questions were raised they should get 10/10)*

8-9: *The presenter was excellent at answering questions and was able to work with the class to to reach any answers which they did not know*

6-7: *The presenter answered most questions that were raised, but a few were left unanswered*

5-6: *The presenter was not able to answer most of the questions that were raised*

3-4: *The presenter was not able to answer any of the questions raised*

1-2: *The student showed up on the day they were suppose to work the solutions, but had nothing to present*

0: *Student was not present*