Subject to Modification – Nov. 15, 2021

PHYSICS 5710 – ADVANCED CLASSICAL MECHANICS I
Syllabus Fall 2021

Dr. David Shiner (shiner@unt.edu) **Class time: MWF 8:00-8:50 am**
Office: Physics 324 Phone: 565-3874. **Class location: Physics Room 112**
Office Hours: MW 9:00-9:50 am or by appointment

Textbooks

Required: *Classical Mechanics,* by Goldstein, Poole and Safko (3rd edition, Addison Wesley, 2002), ISBN-13: 978-0201657029

Recommended: *Analytical Mechanics*, by Fowles and Cassiday (7th edition, Thomson Brooks/Cole, 2005), ISBN 0-534-49492-7.
Introduction to Classical Mechanics: With Problems and Solutions, by David Morin (1st edition, Cambridge University Press, 2008), ISBN-13: 978-0521876223.

Prerequisites: Physics 3210 (Mechanics I or equivalent first semester junior/senior level mechanics). Math suggested: 2730 Multivariable Calculus (Calculus III), 2700 Linear Algebra and Vector Geometry, 3410 Differential Equations.

Content: Canonical topics of Classical Mechanics, including: Lagrangian and Hamiltonian formulations of mechanics; central force problem; rigid body motion; small vibrations and continuous media; canonical variables and transformations; action-angle variables; Hamilton-Jacobi theory.

Objective To gain appropriate proficiency in the mathematical tools and in the physical formulations necessary to address important problems that arise in classical mechanics.

Homework Assignments will be given each week. Please feel free to discuss and work together with others on these problems if you wish. What is important is that you make a good faith effort on each problem set and that you eventually understand how to do the problems and submit your own work. The problem sets will be collected each week and graded simply pass/not pass. Exams will be largely based on the homework problems assigned.

Office Hours My office is on the third floor of the physics building (room 324), phone number is 565-3874, email is shiner@unt.edu. Office hours are MW 9:50 - 10:50 am or by appointment.

Grading If you pass every homework assignment, your low exam score will be dropped. Scores for homework (1 = Pass, 0 = Not Pass), quizzes, and exams will be posted on Canvas.

Course Grade Exams: 50% (No makeup exams) Quizzes: 10% Final Exam: 40%

You are responsible for modifications to this syllabus and any other information presented in class.

The University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking reasonable accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with a reasonable accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request reasonable accommodations at any time, however, ODA notices of reasonable accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of reasonable accommodation for every semester and must meet with each faculty member prior to implementation in each class. Students are strongly encouraged to deliver letters of reasonable accommodation during faculty office hours or by appointment. Faculty members have the authority to ask students to discuss such letters during their designated office hours to protect the privacy of the student. For additional information see the Office of Disability Accommodation website at http://www.unt.edu/oda. You may also contact them by phone at 940.565.4323.
UNT's policy on Academic Dishonesty can be found at: http://www.vpaa.unt.edu/academic-integrity.htm
Drop information is available in the schedule of classes at: http://essc.unt.edu/registrar/schedule/scheduleclass.html

The Student Perceptions of Teaching (SPOT) is a requirement for all organized classes at UNT. This short survey will be made available to you on-line at the end of the semester and will provide you with an opportunity to provide feedback to your course instructor. SPOT is considered to be an important part of your participation in this class. In addition to SPOT, there will be a brief in-class course survey during the last two weeks of the semester. **For the Spring 2017 semester you will receive an email in April 2017 from "UNT SPOT Course Evaluations via *IASystem* Notification" (no-reply@iasystem.org) with the survey link. Please look for the email in your UNT email inbox. Simply click on the link and complete your survey.**
After logging in to the my.unt.edu portal, students can access the SPOT survey site by clicking on the SPOT icon. A list of their currently enrolled courses will appear. Students complete each course evaluation independently. During the long terms, the SPOT is open for students to complete two weeks prior to final exams. During the summer terms, the SPOT is open for students to complete six days preceding their final exam. See SPOT Calendar for specific dates and deadlines.

Date	Day	Subject (Chapter)	Assignment	Due
Aug. 23	M	Survey of Elementary Principles	Ch. 1: 5, 9, 10, 14, 21, 22, 23	
25	W	Ch. 1		
27	F	"		
30	M	"		
Sept. 1	W	Variational Principles and	Ch. 2: 4, 11, 14, 18, 19, 23	**Ch. 1 due.**
3	F	Lagrange's Equations (Ch. 2)		
6	M	Labor Day		
8	W	Ch. 2 cont.		
10	F	"		
13	M	Ch. 2 cont.		
15	W	"		**Ch. 2 due.**
17	F	**EXAM 1: Chapters 1-2.**		
20	M	Central Force Problem	Ch. 3: 10, 20, 23	
22	W	Ch. 3		
24	F	"		
27	M	Kinematics of Rigid Body Motion	Ch. 4: 5, 14, 15, 22	**Ch. 3 due.**
29	W	Ch. 4		
Oct. 1	F	"		
4	M	Rigid Body Equations of Motion	Ch. 5: 2, 4, 14, 16, 18, 29	**Ch. 4 due.**
6	W	Ch. 5		
8	F	"		
11	M	Oscillations	Ch. 6: 8, 12, 17	**Ch. 5 due.**
13	W	Ch. 6		
15	F	"		
18	M	Classical Mechanics of Relativity	Ch. 7: 6, 13	**Ch. 6 due.**
20	W	Ch. 7		
22	F	**EXAM 2: Chapters 3-6.**		
25	M	Hamilton Equations of Motion	Ch. 8: 1, 2, 7, 26, 35	**Ch. 7 due.**
27	W	Ch. 8		
29	F	"		
Nov. 1	M	Canonical Transformations	Ch. 9: 6, 8, 28	**Ch. 8 due.**
3	W	Ch. 9		
5	F	"		
8	M	Hamilton-Jacobi Theory	Ch. 10: 5, 13, 17	**Ch. 9 due.**
10	W	Ch. 10		
12	F	"		
15	M	Introduction to Fields	Ch. 13: 1, 4, 7	**Ch. 10 due.**
17	W	Ch. 13		
19	F			
22	M	Chaos & Pert. Theory (Ch. 11 & 12)		
24	W	"		**Ch. 13 due.**
26	F	Thanksgiving		
29	M	**EXAM 3: Chapters 7-10, 13**		
Dec. 1	W	Last class, pre-final day		
3	F	Reading Day, No class		

Comprehensive Final Exam: Monday, Dec. 6, 2021, 8:00 a.m. - 10:00 a.m.