

PHYSICS 610
ANALYTICAL MECHANICS
FALL 2017 / Watanabe Hall 417A / TTh, 1:30 PM - 2:45 PM
Monday, August 21 – Friday, December 15
Last Day of Instruction: Thursday, December 7

Instructor

Dr. Chester Vause
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Office Hours: See instructor after class to make an appointment.

Prerequisites (UHM Catalog)

Physics 600 (or concurrent); or Math 402 (Partial Differential Equations I)

Textbooks

“Mechanics” (3rd ed.) Course of Theoretical Physics, Volume 1, L. D. Landau and E. M. Lifshitz (Butterworth-Heinemann Ltd., Oxford, 1976) [required]

“The Classical Theory of Fields” (4th revised English ed.) Course of Theoretical Physics, Volume 2, L. D. Landau and E. M. Lifshitz (Pergamon Press, Oxford, 1975) [recommended]

“Classical Mechanics,” 3rd edition, H. Goldstein, C Poole, and J. Safko (Addison Welsey, N.Y.,2002) [recommended]

Student Learning Outcomes

Among the student learning outcomes of this course are the abilities to:

- (a) Understand the formal fundamental principles of mechanics in its most generalized forms such as the Principle of Relativity, Lagrangian and Hamiltonian formulations, Hamilton-Jacobi theory, Action-Angle Variables, Poisson Brackets
- (b) Study applications of Analytical Mechanics in selected topics such as: many-particle (body) oscillations, rigid-body motion, central-force motion
- (c) Use of various mathematical techniques such as variational principles, tensor analysis, Legendre transformations, partial differential equations in the formulation of Classical Mechanics
- (d) Apply tensor analysis methods to geometric concepts in Einstein’s formulation of Special Relativity, and introductory concepts in the general theory of gravity (General Relativity) as a branch of Classical Mechanics.

Exams

Exams are closed-book, two student-generated note pages per new material (2 for Exam 1, 4 for Exam 2, 6 for Final Exam), and scientific calculator, only. No internet devices or electronic storage media. Exam dates are:

Exam 1	Thursday	October 5, 2017
Exam 2	Thursday	November 9, 2017
Final Exam	Thursday	December 14, 2017, 12:00PM-2:00PM

Each Exam (including the Final Exam) is based on material covered since the previous Exam. Each Exam is worth 1/3 of the final grade total score:

$$\text{TOTAL SCORE(\%)} = (\text{EX1(\%)} + \text{EX2(\%)} + \text{FNL(\%)})/3$$

Grade Scale

Letter grade is determined from the total score according to the following scale:

A- (86%-90%)	A (91%-95%)	A+ (96%-100%)
B- (61%-70%)	B (71%-80%)	B+ (81%-85%)
C- (31%-40%)	C (41%-50%)	C+ (51%-60%)
	F (0%-20%)	D (21%-30%)

NO INCOMPLETE GRADE GIVEN

NOTICE

Be prepared to take the tests in-class as assigned. This is not negotiable. If you have time conflicts, decide if this course is your first priority. I do not “work around” student’s personal plans (travel and otherwise) and schedules.

This course is a lecture format. If you come to class, plan to stay. Excessive coming and going will not be tolerated. If you are late, enter quietly through the back door. Do not disturb the class.

No electronic recording and no electronic storage of any kind of lectures and lecture board writing.

No internet devices (electronic smart phones, pads/tablets, computers, etc.). Turn off your wireless telephones, etc., and PUT THESE AWAY. Do not attend to these during class (no texting, etc.) as such behavior is distracting to the instructor and your classmates.