PHY-251: UNIVERSITY PHYSICS I
COURSE SYLLABUS – FALL 2024

Instructor: Matthew Cochran
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Course Time: Monday, Wednesday, and Friday from 8:30 to 9:20. Thursday 1:00 to 1:50
Monday, Wednesday, and Friday from 9:30 to 10:20. Thursday 5:30 to 6:20.

Prerequisites: MA-210. Concurrent enrollment in PHY-251L is assumed.

Text: Randall D. Knight, *Physics for Scientists and Engineers: A Strategic Approach with Modern Physics*, 5th edition

- Can buy eText through Pearson+ for around $11 per month
- Do not buy eHomework (Mastering Physics)
- Can use 3rd or 4th edition
- Copies are on reserve in the library

Other Materials: Scientific calculator

COURSE DESCRIPTION:
This course is the first part of a year-long introductory physics sequence focusing on the application of physical principles, logical reasoning, and mathematical analysis needed to understand a broad range of natural phenomena. Topics include classical mechanics, fluid dynamics, and thermodynamics.

EVALUATIONS AND GRADING SCALE:

Exam 1	20%
Exam 2	20%
Exam 3	20%
Homework	20%
Final	20%

90%	–	100%	A
80%	–	90%	B
70%	–	80%	C
60%	–	70%	D
0%	–	60%	F

Incomplete grades (I) will be given in accordance with college regulations as outlined in the college catalog. Withdrawals (W) from the class are the responsibility of the student and deadlines are set by the college.

EXAMS:
There will be four examinations as part of the requirements for the course. The exams will be, by necessity, cumulative. Physics is sequential and its concepts must be learned in order. Material for exams will be drawn primarily from homework problems. Hence, the best way to review for an exam is to review homework assignments.

Make-up exams will only be given under extenuating circumstances beyond the student's control. Persons missing an exam due to illness or injury must present a doctor's note. Make-up exams must be completed within one week of the scheduled exam date or on the day the student returns to school (whichever comes first). Scheduling is the responsibility of the student.

HOMEWORK:
To be successful in this course, it is essential that you complete all homework assignments. Be prepared to spend three hours or more on homework every week. If you are having trouble, get help from the instructor or your classmates. Do not fall behind. Homework is due at the beginning of class. Late homework is not accepted.

ATTENDANCE:
Regular attendance is expected of all students. Read material prior to lecture. If a topic is still not clear after it has been discussed in class, ask questions. Time will be spent working through homework problems and reviewing for exams in addition to lecturing. You will work with partners in class. It is important that partners engage in discussion of their work and avoid working as isolated individuals.

DISABILITY ACCESS:
If you need individual accommodations to meet course outcomes because of a documented disability, please speak with me to discuss your needs as soon as possible so that we can ensure your full participation in class and fair assessment of your work. Students with special needs who meet criteria for the Americans with Disabilities Act (ADA) provisions must provide written documentation of the need for accommodations from the Counseling Center by the end of week three of the class, in order for instructors to plan accordingly. If a student would like to determine if they meet the criteria for accommodations, they should contact the Kōkua ʻIke Coordinator at (808) 739-8305 for further information (ada@chaminade.edu).

TITLE IX COMPLIANCE:
Chaminade University of Honolulu recognizes the inherent dignity of all individuals and promotes respect for all people. Sexual misconduct, physical and/or psychological abuse will NOT be tolerated at CUH. If you have been the victim of sexual misconduct, physical and/or psychological abuse, we encourage you to report this matter promptly. As a faculty member, I am interested in promoting a safe and healthy environment, and should I learn of any sexual misconduct, physical and/or psychological abuse, I must report the matter to the Title IX Coordinator. If you or someone you know has been harassed or assaulted, you can find the appropriate resources by visiting Campus Ministry, the Dean of Students Office, the Counseling Center, or the Office for Compliance and Personnel Services.

MARIANIST VALUES

This class represents one component of your education at Chaminade University of Honolulu. An education in the Marianist Tradition is marked by five principles and you should take every opportunity possible to reflect upon the role of these characteristics in your education and development:

1. Education for formation in faith
2. Provide an integral, quality education
3. Educate in family spirit
4. Educate for service, justice and peace
5. Educate for adaptation and change

WEEKLY SCHEDULE:

Week	Date	L#	Topic	Reading
1	Aug 19	1	Course intro	
	Aug 21	2	Motion diagrams	1.1 to 1.4
	Aug 22	3	Position; Velocity	1.1 to 1.4
	Aug 23	4	Acceleration; Units	1.5 to 1.8
2	Aug 26	5	Velocity in 1D	2.1 to 2.3
	Aug 28	6	Acceleration in 1D	2.4
	Aug 29	7	Free fall; Inclined plane	2.5 & 2.6
	Aug 30	8	Vectors; Trig review	3.1 to 3.4
3	Sep 02	**H1**	**Labor Day – No Class**	
	Sep 04	9	Vectors; Trig review	3.1 to 3.4
	Sep 05	10	Motion in two dimensions	4.1
	Sep 06	11	Projectile motion	4.2
4	Sep 09	12	Circular motion	4.4 & 4.5
	Sep 11	13	Forces and Newton's Laws	5.1 to 5.6
	Sep 12	14	Review	
	Sep 13	**E1**	**EXAM 1**	
5	Sep 16	15	Free body diagrams	5.7
	Sep 18	16	Statics	6.1
	Sep 19	17	Mass and weight	6.2 & 6.3
	Sep 20	18	Friction and drag	6.4 & 6.5
6	Sep 23	19	Second Law examples	6.6
	Sep 25	20	Newton's Third law	7.1 to 7.3
	Sep 26	21	Ropes and Pulleys	7.4
	Sep 27	22	Dynamics in two dimensions	8.1 & 8.2
7	Sep 30	23	Energy; Work	9.1 to 9.3
	Oct 02	24	Work done by a spring	9.4
	Oct 03	25	Thermal energy; Power	9.5 & 9.6
	Oct 04	26	Potential energy	10.1 to 10.3
8	Oct 07	27	Conservation of energy	10.4 & 10.5
	Oct 09	28	Impulse and momentum	11.1
	Oct 10	29	Review	
	Oct 11	**E2**	**EXAM 2**	

WEEKLY SCHEDULE:

Week	Date	L#	Topic	Reading
9	Oct 14	**H2**	**Indigenous Peoples' Day – No Class**	
	Oct 16	30	Conservation of momentum	11.2 to 11.4
	Oct 17	31	Explosions; Momentum in 2D	11.5
	Oct 18	32	Torque	12.5
10	Oct 21	33	Torque and statics	12.8
	Oct 23	34	Fluids; Pressure	14.1 & 14.2
	Oct 24	35	Measuring pressure	14.3
	Oct 25	36	Buoyancy	14.4
11	Oct 28	37	Dynamics in two dimensions	14.5
	Oct 30	38	Moles	18.1 to 18.3
	Oct 31	39	Temperature	18.1 to 18.3
	Nov 01	40	Ideal gasses	18.6
12	Nov 04	41	Ideal gas processes	18.7
	Nov 06	42	Energy and gasses	19.1
	Nov 07	43	Work and gasses	19.2
	Nov 08	**E3**	**EXAM 3**	
13	Nov 11	**H3**	**Veteran's Day – No Class**	
	Nov 13	44	Heat and the First Law of Thermodynamics	19.3 & 19.4
	Nov 14	45	Thermal properties of matter	19.5
	Nov 15	46	Calorimetry	19.6
14	Nov 18	47	Specific heat of gasses	19.7
	Nov 20	48	Molecular speed and collisions	20.1 & 20.2
	Nov 21	49	Pressure in a gas	20.3
	Nov 22	50	Temperature	20.4
15	Nov 25	51	Thermal energy and specific heat	20.5
	Nov 27	52	Review	
	Nov 28	**H4**	**Thanksgiving Recess – No Class**	
	Nov 29			
Finals	Dec 03	**FE**	**FINAL for 8:30 Section (Tuesday 8:30 – 10:30)**	
	Dec 04	**FE**	**FINAL for 9:30 Section (Wednesday 11:00 – 1:00)**	

COURSE LEARNING OUTCOMES:
Upon successful completion of the course, students will demonstrate:

1. The ability to apply quantitative reasoning and appropriate mathematics to describe or explain phenomena in the natural world.
2. The ability to interpret multiple scientific representations (e.g., verbal descriptions, diagrams, graphs, and formulas) and translate between them.
3. An understanding of mechanics (e.g., translational motion, forces and equilibrium, work, energy, and momentum).
4. An understanding of the principles of thermodynamics and fluids.
5. The ability to apply physics principles to understand humans, living systems, and scientific instrumentation.

PROGRAM LEARNING OUTCOMES
Students completing a minor in physics will be able to:

1. Apply quantitative reasoning and appropriate mathematics to describe phenomena in the natural world.
2. Interpret multiple scientific representations, including verbal descriptions, diagrams, graphs, formulas, and translate between them.
3. Apply physics principles to understand living systems, scientific instrumentation, and everyday experiences.

CREDIT HOUR POLICY:
The unit of semester credit is defined as university-level credit that is awarded for the completion of coursework. One credit hour reflects the amount of work represented in the intended learning outcomes and verified by evidence of student achievement for those learning outcomes. Each credit hour earned at Chaminade University should result in 45 hours of engagement. This equates to one hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work each week for approximately fifteen weeks for one semester, 10 week term, or equivalent amount of work over a different amount of time. Direct instructor engagement and out-of-class work result in total student engagement time of 45 hours for one credit.

The minimum 45 hours of engagement per credit hour can be satisfied in fully online, internship, or other specialized courses through several means, including (a) regular online instruction or interaction with the faculty member and fellow students and (b) academic engagement through extensive reading, research, online discussion, online quizzes or exams; instruction, collaborative group work, internships, laboratory work, practica, studio work, and preparation of papers, presentations, or other forms of assessment. This policy is in accordance with federal regulations and regional accrediting agencies.

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Weekly:	3.5 hours seat × 15 weeks = 52.5 hours
	1.5 hours reading × 15 weeks = 22.5 hours
	5.0 hours homework × 15 weeks = 75.0 hours
Midterms:	7.0 hours study × 3 midterms = 21.0 hours
Final:	2.0 hours seat + 7 hours study = 9.0 hours