

PHY2048: Physics with Calculus 1

Course Section Number 21716

Spring 2026

3 credits

I. General Information

Meeting days and times: N/A

Class location: Online

Instructor:

Name: Prof. Ravin Kodikara

Office Building/Number: NPB 2148

Phone: (352) 846-2548

Email: Use Canvas Mail

Office Hours: TBA

Course Description

This calculus-based course serves as the first in a two-part series, covering topics like kinematics, dynamics, energy, momentum, rotational motion, fluid dynamics, oscillatory motion, and waves. Designed for science and engineering majors, the course integrates critical thinking, analytical skills, and real-world applications.

Purpose of Course

The purpose of this course is to provide you with opportunities to practice gaining a foundation in the concepts, fundamental principles, and analytic techniques needed to solve problems arising in the context of Newtonian mechanics. Designed for science and engineering majors, the course integrates critical thinking, analytical skills, and real-world applications.

Examples include being able to calculate the maximum height of a projectile, the tension in a support beam, the velocity of an object after a collision, the pressure at a given depth in a fluid, and the resonant sound frequencies in an open pipe. The course is designed for people who have already had a basic introduction to physics in high-school or otherwise.

Course Objectivity

All topics in this course will be taught objectively as objects of analysis, without endorsement of particular viewpoints, and will be observed from multiple perspectives. No lesson is intended to espouse, promote, advance, inculcate, or compel a particular feeling, perception, or belief. Students are encouraged to employ critical thinking and to rely on data and verifiable sources

to explore readings and subject matter in this course. All perspectives will be respected in class discussions.

Prerequisites

Prereq: high-school physics, PHY 2020 or the equivalent, and MAC 2311. Coreq: MAC 2312.

General Education Designation: Physical Sciences (P)

Natural Science courses afford students the ability to critically examine and evaluate the principles of the scientific method, model construction, and use the scientific method to explain natural experiences and phenomena.

Physical Science (P) is a sub-designation of Natural Science courses at the University of Florida. These courses provide instruction in the basic concepts, theories and terms of the scientific method in the context of the physical sciences. Courses focus on major scientific developments and their impacts on society, science and the environment, and the relevant processes that govern physical systems. Students will formulate empirically testable hypotheses derived from the study of physical processes, apply logical reasoning skills through scientific criticism and argument, and apply techniques of discovery and critical thinking to evaluate outcomes of experiments.

All General Education area objectives can be found [here](#).

Course Materials**Required:**

Wiley's *Fundamentals of Physics*, 12th ed., Vol. 1 for UF, by Halliday, Resnick, and Walker (WileyPLUS eTextbook and Homework System)

Materials will be available through the following means:

Both the etext and homework system may be purchased with one payment through UF's All-Access program. Please note that while you are welcome to search for and purchase a paper copy of the text (if preferable for your reading and studying habits), you will still need to purchase the All-Access materials so that you are able to submit your homework throughout the semester.

Materials Fee: N/A

II. Course Objectives and Student Learning Outcomes

By the end of this course:

- Students will solve analytical problems describing different types of motion, including translational, rotational, and simple harmonic motion.
- Students will apply Newton's laws, and conservation laws to solve analytical problems of mechanics.
- Students will identify and analyze relevant information presented in various formats such as graphs, tables, diagrams and/or mathematical formulations.
- Students will solve real-world problems using critical thinking skills and knowledge developed from this course.

These student learning outcomes map to the UF general education objectives and assessed in the following ways:

Content

1. By the end of this course, you will be able to define and explain the fundamental concepts that form the basis of calculus-based mechanics, including kinematics, dynamics, energy, momentum, rotational motion, fluid dynamics, oscillatory motion, and waves.
 - **Assessments:** Individual weekly formative reading quizzes.

Critical Analysis

1. By the end of this course, you will be able to identify, analyze, and utilize the information presented in various formats such as graphs, tables, diagrams, and/or mathematical formulations.
 - **Assessments:** Individual weekly homework assignments, 4 summative exams.
2. By the end of this course, you will be able to apply the foundational principles of mechanics, including Newton's laws of motion and the conservation laws, to solve real-world analytical problems describing various types of motion, including translational, rotational, and simple harmonic motion.
 - **Assessments:** Individual weekly homework assignments, 4 summative exams.

Communication

1. By the end of this course, you will be able to unambiguously communicate in writing your present understanding of and further questions about the discipline of physics.
 - **Assessments:** Discussion board posts.

III. Graded Work

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found in the [Catalog](#).

Graded Components

Exam 1 (20%): On Exam 1, you will demonstrate your mastery of the material covered in Modules 1-4 by answering topical conceptual physics questions and solving topical physics problems.

Exam 2 (20%): On Exam 2, you will demonstrate your mastery of the material covered in Modules 5-7 by answering topical conceptual physics questions and solving topical physics problems.

Exam 3 (20%): On Exam 3, you will demonstrate your mastery of the material covered in Modules 8-11 by answering topical conceptual physics questions and solving topical physics problems.

Final Exam (20%): On the Final Exam, you will demonstrate your mastery of all covered course content by answering topical conceptual physics questions and solving topical physics problems.

Reading Quizzes (5%): You will respond to a reading quiz consisting of topical conceptual questions for each module's material throughout the course.

Homework Assignments (10%): You will submit a homework assignment consisting of your answer to topical physics problems for each module's material throughout the course.

Discussion Postings (5%): You will regularly post, in a professional manner and in your own words, your questions about, observations on, and explanations of the material presented in this course. You will also regularly respond to your classmates' posts in a professional manner.

TOTAL: 100%

Grading Scale

Letter Grade	Number Grade
A	100-85
A-	84-80
B+	79-75
B	74-70
B-	69-65
C+	64-60
C	59-55
C-	54-50
D+	49-45
D	44-40
D-	39-35
E	34-0

See the UF Catalog's "[Grades and Grading Policies](#)" for information on how UF assigns grade points.

Note: A minimum grade of C is required to earn General Education credit.

IV. Calendar

Week	Date	Day	Topic	Readings from Halliday, Resnick, & Walker (pp.)	Lecture & Example Videos	Total Standard Viewing Time: hr:min:sec	Work Due (at 11:59 pm)
1	1/12/2026	Monday	Classes Start; Orientation & Module 01: Motion Along a Straight Line	Ch. 2.1-2.6 (pp. 13-31)	(Optional Refreshers: 0.1-0.5b) Lectures 1.1-1.5; Examples 1.1-1.6	(Optional Refreshers: 02:23:29) Lectures: 01:20:07; Examples: 01:16:37 Total: ~2.5 hrs	
	1/13	Tuesday					
	1/14/2026	Wednesday					
	1/15/2026	Thursday					
	1/16/2026	Friday					
	1/17/2026	Saturday					
	1/18/2026	Sunday					
2	1/19/2026	Monday	Holiday: Martin Luther King Jr. Day				
	1/20/2026	Tuesday	Module 02: Vectors & Motion in a Plane	Ch. 3.1-3.3 (pp. 44-57) & 4.1-4.7 (pp. 67-86)	Lectures 2.1a-2.7; Examples 2.1-2.7	Lectures: 03:14:59; Examples: 01:09:22 Total: ~4.33 hrs	Introduce Yourself! Discussion Board Course Orientation Quiz Module 00. Introduction to WileyPLUS: Homework Module 01. Motion Along a Straight Line: Reading Quiz Module 01. Motion Along a Straight Line: Homework

	1/21/ 2026	Wednesday					
	1/22/ 2026	Thursday					Module 02. Vectors & Motion in a Plane: Reading Quiz
	1/23/ 2026	Friday					
	1/24/ 2026	Saturday					
	1/25/ 2026	Sunday					
3	1/26/ 2026	Monday	Module 03: Forces & Newton's Laws of Motion	Ch. 5.1-5.3 (pp. 101- 120)	Lectures 3.1- 3.7c; Examples: 3.1-3.6	Lectures: 02:20:44; Examples: 00:38:13 Total: ~3 hrs	Module 02. Vectors & Motion in a Plane: Homework
	1/27/ 2026	Tuesday					
	1/28/ 2026	Wednesday					
	1/29/ 2026	Thursday					Module 03. Forces & Newton's Laws of Motion: Reading Quiz
	1/30/ 2026	Friday					
	1/31/ 2026	Saturday					
	2/1/2 026	Sunday					
4	2/2/2 026	Monday	Module 04: Applications of Newton's Laws	Ch. 6.1-6.3 (pp. 132- 144)	Lectures 4.1- 4.5; Examples 4.1- 4.4	Lectures: 01:42:40; Examples: 00:32:47 Total: ~2.25 hrs	Module 03. Forces & Newton's Laws of Motion: Homework
	2/3/2 026	Tuesday					
	2/4/2 026	Wednesday					

	2/5/2026	Thursday					Module 04. Applications of Newton's Laws: Reading Quiz First Post to Modules 1-4 Discussion Board
	2/6/2026	Friday					
	2/7/2026	Saturday					
	2/8/2026	Sunday					
5	2/9/2026	Monday	Module 05: Work & Energy	Ch. 7.1-7.6 (pp. 156-175) & 8.1-8.5 (pp. 186-208)	Lectures 5.1-5.8; Examples 5.1a-5.8	Lectures: 02:02:14; Examples: 01:18:49 Total: ~3.33 hrs	Module 04. Applications of Newton's Laws: Homework
	2/10/2026	Tuesday					
	2/11/2026	Wednesday					
	2/12/2026	Thursday					Module 05. Work & Energy: Reading Quiz Modules 1-4 Discussion Board closes at 11:30 pm
	2/13/2026	Friday					Exam 1 (Modules 1-4) opens at 12:00 am
	2/14/2026	Saturday					Exam 1 (Modules 1-4) closes at 11:59 pm
	2/15/2026	Sunday					
6	2/16/2026	Monday	Module 06: Momentum & Center of Mass	Ch. 9.1-9.9 (pp. 225-253)	Lectures 6.1-6.6; Examples 6.1-6.6	Lectures: 01:31:44; Examples: 01:00:13 Total: ~2.5 hrs	Module 05. Work & Energy: Homework
	2/17/2026	Tuesday					First Post to Modules 5-9 Discussion Board
	2/18/2026	Wednesday					

	2/19/2026	Thursday					Module 06. Momentum & Center of Mass: Reading Quiz
	2/20/2026	Friday					
	2/21/2026	Saturday					
	2/22/2026	Sunday					
7	2/23/2026	Monday	Module 07: Rotational Motion	Ch. 10.1-10.8 (pp. 270-298)	Lectures 7.1-7.9; Examples 7.1-7.9	Lectures: 02:04:08; Examples: 01:08:52 Total: ~3.25 hrs	Module 06. Momentum & Center of Mass: Homework
	2/24/2026	Tuesday					
	2/25/2026	Wednesday					
	2/26/2026	Thursday					Module 07. Rotational Motion: Reading Quiz
	2/27/2026	Friday					
	2/28/2026	Saturday					
	3/1/2026	Sunday					
8	3/2/2026	Monday	Module 08: Rotational Dynamics	Ch. 11.1-11.8 (pp. 310-333)	Lectures 8.1a-8.4; Examples 8.1-8.4	Lectures: 01:02:19; Examples: 00:33:04 Total: ~1.5 hrs	Module 07. Rotational Motion: Homework
	3/3/2026	Tuesday					
	3/4/2026	Wednesday					
	3/5/2026	Thursday					Module 08. Rotational Dynamics: Reading Quiz

	3/6/2026	Friday					
	3/7/2026	Saturday					
	3/8/2026	Sunday					
9	3/9/2026	Monday	Module 09: Equilibrium & Elasticity Module 10: Gravitation	Ch. 12.1-12.3 (pp. 344-359); Ch. 13.1-13.7 (pp. 372-392)	Lectures 9.1-9.5; Examples 9.1-9.5 Lectures 10.1-10.5c; Examples: 10.1-10.5	Lectures: 01:50:54; Examples: 00:35:04 Total: ~2.5 hrs Lectures: 01:20:02; Examples: 00:58:24 Total: ~2.33 hrs	Module 08. Rotational Dynamics: Homework
	3/10/2026	Tuesday					
	3/11/2026	Wednesday					
	3/12/2026	Thursday					Module 09. Equilibrium & Elasticity: Reading Quiz Module 10. Gravitation: Reading Quiz
	3/13/2026	Friday					
	3/14/2026	Saturday	Spring Break				
	3/15/2026	Sunday	Spring Break				
10	3/16/2026	Monday	Spring Break				
	3/17/2026	Tuesday	Spring Break				
	3/18/2026	Wednesday	Spring Break				
	3/19/2026	Thursday	Spring Break				
	3/20/2026	Friday	Spring Break				

	3/21/2026	Saturday	Spring Break				
	3/22/2026	Sunday					
11	3/23/2026	Monday	Module 11: Fluids	Ch. 14.1-14.7 (pp. 406-425)	Lectures 11.1-11.8; Examples 11.1-11.8	Lectures: 01:54:22; Examples: 00:41:44 Total: ~2.5 hrs	Module 09. Equilibrium & Elasticity: Homework Module 10. Gravitation: Homework
	3/24/2026	Tuesday					
	3/25/2026	Wednesday					Modules 5-9 Discussion Board closes at 11:30 pm
	3/26/2026	Thursday					Module 11. Fluids: Reading Quiz First Post to Modules 10-13 Discussion Board
	3/27/2026	Friday					Exam 2 (Modules 5-9) opens at 12:00 am
	3/28/2026	Saturday					Exam 2 (Modules 5-9) closes at 11:59 pm
	3/29/2026	Sunday					
12	3/30/2026	Monday	Module 12: Oscillations	Ch. 15.1-15.6 (pp. 436-456)	Lectures 12.1-12.6; Examples 12.1-12.6	Lectures: 02:00:57; Examples: 00:42:44 Total: ~2.75 hrs	Module 11. Fluids: Homework
	3/31/2026	Tuesday					
	4/1/2026	Wednesday					
	4/2/2026	Thursday					Module 12. Oscillations: Reading Quiz Modules 8-11 Discussion Board closes at 11:30 pm
	4/3/2026	Friday					
	4/4/2026	Saturday					

	4/5/2026	Sunday					
13	4/6/2026	Monday	Module 13: Waves	Ch. 16.1-16.7 (pp. 468-494)	Lectures 13.1-13.4b; Examples 13.1-13.4	Lectures: 02:00:25; Examples: 00:33:46 Total: ~2.5 hrs	Module 12. Oscillations: Homework
	4/7/2026	Tuesday					
	4/8/2026	Wednesday					
	4/9/2026	Thursday					Module 13. Waves: Reading Quiz
	4/10/2026	Friday					
	4/11/2026	Saturday					
	4/12/2026	Sunday					
14	4/13/2026	Monday	Module 14: Sound	Ch. 17.1-17.7 (pp. 505-529)	Lectures 14.1a-14.6; Examples 14.1-14.7	Lectures: 02:28:36; Examples: 00:49:22 Total: ~3.25 hrs	Module 13. Waves: Homework
	4/14/2026	Tuesday					
	4/15/2026	Wednesday					
	4/16/2026	Thursday					Module 14. Sound: Reading Quiz First Post to Modules 10-13 Discussion Board
	4/17/2026	Friday					Exam 3 (Modules 10-13) opens 12:00 am
	4/18/2026	Saturday					Exam 3 (Modules 10-13) closes at 11:59 pm
	4/19/2026	Sunday					
15	4/20/2026	Monday	Module 15:	Cumulative, with an			Module 14. Sound: Homework

			Final Exam Review	emphasis on Modules 12-14			
	4/21/2026	Tuesday					
	4/22/2026	Wednesday	Last Day of Classes				All makeups must be completed by 5:00 pm. Modules 12-14 Discussion Board closes at 11:59 pm
	4/23/2026	Thursday	Reading Day				(Optional Reading Days Discussion Board opens at 12:00 am)
	4/24/2026	Friday	Reading Day				
	4/25/2026	Saturday					(Optional Reading Days Discussion Board closes at 11:30 pm)
	4/26/2026	Sunday					Final Exam (cumulative) opens at 12:00 am
16	4/27/2026	Monday					Final Exam (cumulative) closes at 11:59 pm

V. University Policies and Resources

Attendance policy

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>.

Students requiring accommodation

Students who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

UF course evaluation process

Students are expected to provide professional and respectful feedback on the quality of

instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <http://gatorevals.aa.ufl.edu/students>. Students will be notified when the evaluation period opens and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <http://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <http://gatorevals.aa.ufl.edu/public-results/>.

University Honesty Policy

University of Florida students are bound by the Honor Pledge. On all work submitted for credit by a student, the following pledge is required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Student Honor Code and Conduct Code (Regulation 4.040) specifies a number of behaviors that are in violation of this code, as well as the process for reported allegations and sanctions that may be implemented. All potential violations of the code will be reported to Student Conduct and Conflict Resolution. If a student is found responsible for an Honor Code violation in this course, the instructor will enter a Grade Adjustment sanction which may be up to or including failure of the course. For additional information, see <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>.

In-class recording

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A "class lecture" is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or guest lecturer during a class session.

Publication without permission of the instructor is prohibited. To "publish" means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium,

to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third-party-note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

Resources available to students

Health and Wellness

- U Matter, We Care: umatter@ufl.edu; [352-392-1575](tel:352-392-1575).
- Counseling and Wellness Center: <http://www.counseling.ufl.edu>; [352-392-1575](tel:352-392-1575).
- Sexual Assault Recovery Services (SARS): Student Health Care Center; [352-392-1161](tel:352-392-1161).
- University Police Department: <http://www.police.ufl.edu/>; [352-392-1111](tel:352-392-1111) (911 for emergencies).

Academic Resources

- E-learning technical support: learning-support@ufl.edu; <https://elearning.ufl.edu>; [352-392-4357](tel:352-392-4357).
- Career Connections Center: Reitz Union; <http://www.career.ufl.edu/>; [352-392-1601](tel:352-392-1601).
- Library Support: <http://cms.uflib.ufl.edu/ask>.
- Academic Resources: 1317 Turlington Hall; [352-392-2010](tel:352-392-2010); <https://academicresources.clas.ufl.edu>.
- Writing Studio: 2215 Turlington Hall; <http://writing.ufl.edu/writing-studio/>.