

PHYSICS 298-02

Sections 02A, 02B, 02C

Introductory Mechanics, Heat and Sound - S

*Spring 2025
Nat. Science 112
MW 3:30 pm - 4:45 pm
4 credit hours*

<i>Instructor:</i>	Dr. C. L. Davis
<i>Office:</i>	Room 205, Natural Science Building
<i>Office Hours:</i>	Monday, 1:00 - 2:00 pm Tuesday, 12:00 - 1:00 pm Wednesday, 1:00 - 2:00 pm or by appointment
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<i>Email:</i>	c.l.davis@louisville.edu
<i>WWW:</i>	http://www.physics.louisville.edu/cldavis/phys298/spring25/index.html
<i>Text:</i>	University Physics, Volumes 1&2 – Various Authors Available through OpenStax at https://openstax.org/details/books/university-physics-volume-1 https://openstax.org/details/books/university-physics-volume-2

COURSE DESCRIPTION

4 credits (3 hour lecture, 1 hour conference). Basic methods of physics with calculus applied to topics in mechanics, heat, and wave motion. This course is the first semester of the introductory physics sequence with calculus. Prerequisite: concurrent registration in MATH 205.

COURSE OBJECTIVES

Upon completion of this course, students should be able to:

- Describe the fundamental laws of physics and recognize how those laws are exhibited across a wide array of physical scenarios.
- Understand the core conceptual models used in introductory physics and use these models to make accurate predictions about how systems will behave under given circumstances.
- Apply physical concepts when solving problems.
- Translate between multiple representations of the same concept, including how concepts can be represented verbally, using equations, graphs, or diagrams.
- Demonstrate an understanding of the methods scientists use to explore natural phenomena.

INTRODUCTION

This course is the first semester of the introductory physics with calculus sequence. The prerequisite for Physics 298 is listed as completion or concurrent registration in Math 205. As far as I know Math 205 is roughly equivalent to the second calculus course in Speed School (ENGR 101). The required mathematics will not go beyond the content of Math 205, however, it may be necessary to introduce certain concepts prior to their presentation in the mathematics course. It is possible to be successful in Physics 298 while concurrently taking Math 205, but you will almost certainly be more comfortable if you complete Math 205 (or equivalent) before taking this course.

You are strongly urged to **read** a few sections ahead, **before** each class. Ideally, you should treat the lectures as a review of what you have already read. You will gain most from the lectures if you can concentrate on what I am **saying** not on what I am writing and this can only be achieved if you have some idea of what I am talking about in the first place. Most of the lectures will be spent in a formal development of the topic of discussion. Only on limited occasions will there be time to completely solve any problems. You are encouraged to make use of recitations, worked examples in the text, discussion with fellow class members and the instructor's office hours to solve assigned problems.

On the course home page (address above) you will find links to the course syllabus, the OpenStax textbook, class announcements, lecture notes, homework assignments, test summary notes, sample tests and other useful information. A link to the course home page will be placed on "Blackboard". Course assessment scores will be available through Blackboard.

As part of the course assessment, you will be required to complete quizzes and homework through the on-line learning system provided by **Lumen OHM**. The Lumen system tasks are accessed through Blackboard. There is a nominal fee for the use of Lumen OHM.

The laboratory course associated with this lecture course, Physics 295, is completely independent of this class as far as registration and grading is concerned. However, the experiments performed in Physics 295 are designed to demonstrate the concepts and ideas introduced in Physics 298. As far as possible we have made sure that topics will be covered in the lecture before being investigated experimentally.

SYLLABUS

The course will be based upon material contained in Chapters 1-17 of Volume 1 and Chapters 1, 3, 4 of Volume 2 of the above text. A brief summary of material I hope to cover is indicated below.

Mechanics:	Volume 1, Chapters 1-13 (Excluding sections 9.7, 12.3, 12.4)
Oscillations and Waves:	Volume 1, Chapters 14 – 17 (Excluding sections 14.5-14.7, 17.3, 17.8)
Heat and Thermodynamics:	Volume 2, Chapters 1, 3, 4 (Excluding sections 3.5, 3.6)

GRADING

- Grades will be assigned according to the scale indicated below,

		A	≥	73
73	>	A-	≥	68
68	>	B+	≥	63
63	>	B	≥	58
58	>	B-	≥	53
53	>	C+	≥	48
48	>	C	≥	43

43	>	C-	≥	38
38	>	D+	≥	34
34	>	D	≥	30
30	>	F		

- The final scores, upon which the final grade is based, will be obtained from the performance in three tests and homework/quizzes as follows,

Task	Likely coverage	Date	Weight
Test 1	Volume 1, Chapters 1-6	February 10	27%
Test 2	Volume 1, Chapters 7-13	March 5	27%
Test 3	Volume 1, Chapters 14-17 Volume 2, Chapters 1, 3, 4	April 21	27%
On-Line Assessments – Lumen OHM			10%
Homework – Conventional “Paper” or BB Submission			7%
Quizzes			2%

- No matter what your course average you will be assigned an "F" unless you sit all three tests **and** submit more than 50% of the conventional (paper) homework assignments collected for grading.
- The above dates are subject to change.
- The instructor reserves the right to lower letter grade boundaries, but will not raise them.

TESTS

As you can see your final grade will largely be determined by your performance in three tests. Do not be deceived by the grading scale. It may be significantly "easier" than you are used to. The difficulty of the tests will compensate quite adequately...

- Test 3 is **not** a comprehensive final
- The test dates indicated above are tentative, but are not expected to change by more than a few classes either way.
- Questions regarding grading of tests must be brought to the attention of the instructor no later than one week after the graded tests are returned.
- “Make-up” tests will be given only in extreme situations.*** It is the instructor who will decide whether the situation is extreme. In all such cases written verification will be required. If a “make-up” test is approved, barring extenuating circumstances, it must be taken no more than 10 days after the original date of the test.

HOMEWORK/QUIZZES

Homework problems from the OpenStax textbook will be assigned weekly. The due date for homework will

be midnight every Sunday, unless otherwise stated. A selection of problems in each assignment will be graded electronically through Blackboard. In addition to the OpenStax homework you will be required to complete assessments (quizzes and problems) through the on-line learning system Lumen OHM. There may also be one or two quizzes which may be given in recitation or class. The exact details regarding homework and quizzes will be explained during the first week of the semester.

RECITATIONS

In addition to the MW class meetings at 3:30 pm in NS112 you are expected to attend one recitation session each week.

Section	Time	Location	Instructor
02A	Tuesday 10:00 - 10:50	NS 030	Davis
02B	Tuesday 11:00 - 11:50	NS 030	Davis
02C	Tuesday 1:00 - 1:50	NS 030	Davis

Recitations are used primarily for demonstration of solutions of the assigned homework problems. Solutions to homework problems **will not** be given in lectures. Periodically a quiz may be given in recitations. In most recitations one problem will be solved for you and designated a “potential test question”. Each test will contain at least **one** of the “potential test questions” presented in recitations since the previous test. You are strongly advised to attend your assigned recitation section to gain experience in solving problems. The ability to solve problems is essential to a complete understanding of the subject as well as the key to successful test performance.

AUDITING

Anyone is welcome to audit this course. However, there is a minimum requirement necessary to maintain audit status. You must attend all three tests, in each case submitting a paper for grading, and you must submit more than 50% of the conventional (paper) homework assignments collected for grading. There is no stipulation on the quality of work in either case. In fact, a paper on which your name is clearly written is sufficient. But be warned, if you choose to audit, a record will be kept of the tests and homework/quizzes you submit. If the minimum requirements are not met your audit (AU) will be changed to withdraw (W).

CARDINAL CORE

This course may be used to satisfy a Natural Science (S) requirement in the Cardinal Core curriculum.

Natural Sciences are concerned with understanding the laws of nature and the physical world. Students who satisfy this requirement will be able to do all of the following:

- 1. Demonstrate an understanding of the nature and methods of science inquiry.*
- 2. Apply scientific principles: to interpret evidence, to make predictions, and/or to explain cross-cutting concepts in one or more of the sciences.*
- 3. Explain how scientific principles relate to issues of personal and/or societal importance.*
- 4. Communicate effectively an understanding of scientific concepts and experimental outcomes in speech or writing, using sound scientific terminology and citation appropriate to the discipline.*

Assessment of student mastery of the course’s learning outcomes is described below.

Learning outcome	Assessment strategy
Demonstrate an understanding of the nature and methods of science inquiry.	Students will solve word problems demonstrating an understanding of the application of fundamental laws of physics.
Apply scientific principles: to interpret evidence, to make predictions, and/or to explain cross-cutting concepts in one or more of the sciences.	Students will answer test questions that will ask them to predict an outcome from a given scenario.
Explain how scientific principles relate to issues of personal and/or societal importance.	Students will solve word problems describing the societal impact of physical principles.
Communicate effectively an understanding of scientific concepts and experimental outcomes in speech or writing, using sound scientific terminology and citation appropriate to the discipline.	This outcome will be met in the lab associated with this course, PHYS 295. Students write lab reports in which they use professional scientific language and format.

TITLE IX STATEMENT

*Sexual misconduct (including sexual harassment, sexual assault, and any other nonconsensual behavior of a sexual nature) and sex discrimination violate University policies. Students experiencing such behavior may obtain **confidential** support from the PEACC Program (852-2663), Counseling Center (852-6585), and Campus Health Services (852-6479). To report sexual misconduct or sex discrimination, contact the Dean of Students (852-5787) or University of Louisville Police (852-6111).*

*Disclosure to **University faculty or instructors** of sexual misconduct, domestic violence, dating violence, or sex discrimination occurring on campus, in a University-sponsored program, or involving a campus visitor or University student or employee (whether current or former) is **not confidential** under Title IX. Faculty and instructors must forward such reports, including names and circumstances, to the University's Title IX officer.*

For more information, see the Sexual Misconduct Resource Guide (<http://louisville.edu/hr/employeerelations/sexual-misconduct-brochure>).

DISABILITY RESOURCE CENTER

Individuals with disabilities who need reasonable modifications to complete assignments and course criteria successfully are encouraged to meet with the instructor as early in the course as possible to identify and plan specific accommodations. Students requesting an accommodation will be asked to supply a letter from the Disability Resource Center (DRC) or other documentation that will assist in planning modifications. The instructor will not recognize requested accommodations without DRC approval/endorsement. The DRC is located in Stevenson Hall. Its staff can be reached by telephone at (502) 852-6938 or online at <http://louisville.edu/disability/>