

**General College Physics  
Wisconsin Lutheran High School  
2023-2024**

**Physics:** The world around us is in a state of constant change: the sun and moon rise and set, waves crash, mists rise, rain falls, fires burn, rocks form, and mountains crumble. Amidst all of these changes, there are certain patterns; there is a discernible *order*. In other words: the stars, the seas, the clouds, the rocks, and the earth itself each seem to each have a particular *nature*. Physics is the careful study of the *natures* of things. In fact, the word *physics* literally means "natures" in the Greek language.

**Course overview:** General College Physics is a year-long introductory course for advanced (typically junior or senior level) students at Wisconsin Lutheran High School who want to better understand the natures of the things we see around us. It is a dual-credit course offered at Wisconsin Lutheran High School in collaboration with Wisconsin Lutheran College. For a detailed overview of the topics we will be covering, refer to the course website ([www.greatphysics.com](http://www.greatphysics.com)) and the tentative calendar on the following page. Emphasis on theoretical topics, careful thinking, laboratory experiments, and problem solving makes this course challenging. My aim is to help you succeed in this course, and to have fun while learning physics. So please do not hesitate to contact me with any problems you may run into this semester!

**Advanced Placement credit:** While this is not designated as an AP course, students who have successfully taken the AP Physics test at the end of the year for college credit.

**Course textbook:** The course will be organized around a book: the Pocket Guide to accompany Physics for Scientists and Engineers (4th edition) by Serway. (I'll call this PSE for short.) I would highly recommend obtaining a copy of this book. It is inexpensive, compact, and well-written. It will make a very handy addition to your home science library. If you don't want to buy it, I will have copies to loan out for the semester.

**Course time and location:** The course meets every day (Monday through Friday) during the academic year from 2:16 until 3 pm in WLHS 223—in the science wing on the first floor of WLHS. Wednesdays, the course begins at 2:24, instead.

**Professor:** Dr. Kuehn from Wisconsin Lutheran College (WLC) is the professor for this course. Contact info: [kerry.kuehn@wlhs.org](mailto:kerry.kuehn@wlhs.org),

**Teaching Assistant contact info:** The Wednesday course sections (beginning in September) will be overseen by two teaching assistants. Alyssa Ebeling and Zeke Micheel are upper-level physics majors from

Wisconsin Lutheran College. Here is their contact info: [alyssa.ebeling@wlc.edu](mailto:alyssa.ebeling@wlc.edu), [ezekiel.micheel@wlc.edu](mailto:ezekiel.micheel@wlc.edu)

**Course websites:** In addition to the course information provided through WLHS's OnCampus system, we will be also using a website I've designed for this course: [www.greatphysics.com/AP1/](http://www.greatphysics.com/AP1/)

**Homework exercises:** I will assign weekly homework problems. These are designed to deepen your understanding of lecture material and to prepare you for the quizzes and tests. I do not intend to grade your homework solutions; I will merely give you credit for handing in your best attempt by the due date. Please refer to the late work policy for more details.

**Laboratory exercises:** Some of our weekly assignments will include laboratory work. Labs will typically take up at least two class periods. Your laboratory notebook pages must be submitted by the assigned due date. More details about the required format and expectations will be discussed before the first laboratory period. You will need to order/purchase a dedicated laboratory notebook.

**Quizzes:** We will have in-class quizzes almost every week on Monday. To prepare for quizzes, you should read the assigned book chapter (at least once), review the lecture material, complete all of the homework problems, and review the homework solutions.

**Tests:** We will have a midterm exam before the end of the first (and third) quarters and a comprehensive final examination before the end of the second (and fourth) quarters.

**Semester Grade components:**

Home work and laboratory	20%
Weekly quizzes	30%
Midterm exam	25%
Final exam	25%

**Grading scale:**

A+	99-100%
A	95-98%
A-	93-94%
B+	91-92%
B	87-90%
B-	85-86%
C+	83-84%
C	79-82%
C-	77-78%
D+	75-76%
D	72-74%
D-	70-71%

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**Approximate weekly schedule (including readings, key topics, and laboratory activities) for fall, 2023:**

<b>Week</b>	<b>Serway Textbook Chapter</b>	<b>Key topics and laboratory activities</b>
<b>1</b>	1: measurement	units, dimensional analysis, measurement & estimation
<b>2</b>	1: measurement	lab experiment: pendular motion
<b>3</b>	2: motion in 1 dimension	displacement, speed, acceleration, kinematics
<b>4</b>	3: vectors	lab experiment: kinematics of rolling balls
<b>5</b>	4: motion in 2 dimensions	vector description of 2d kinematics, circular motion
<b>6</b>	4: motion in 2 dimensions	lab experiment: projectile motion
<b>7</b>	5: laws of motion	inertia, force, mass, acceleration, newton's laws
<b>8</b>	5: laws of motion	problem solving with friction, tension, gravity, drag, buoyancy,
<b>9</b>	6: circular motion	lab experiment: centripetal force; midterm exam
<b>10</b>	7: work & energy	work, kinetic energy, work-energy theorem
<b>11</b>	8: potential energy	potential energy, conservation of energy, power
<b>12</b>	9: linear momentum	impulse, momentum, collisions, center of mass
<b>13</b>	10: rigid body rotation	angular velocity, rotational kinematics and energy
<b>14</b>	11: angular momentum	angular momentum, torque, gyroscopes
<b>15</b>	12: angular momentum	lab experiment: rotational kinematics
<b>16</b>	13: statics/elasticity	equilibrium, center of gravity, elasticity
<b>17</b>	14: oscillations	simple harmonic motion, pendulums, forced oscillations
<b>18</b>	15: gravitation	kepler's laws, gravitational potential energy, scattering
<b>19</b>	16: final exam	