



## Physics Fundamentals

<b>Course Number:</b>	PHY 101	<b>Term:</b>	Summer, 2021
<b>Instructor:</b>	TBA	<b>Email:</b>	
<b>Contact Hours:</b>	48	<b>Meeting Times:</b>	TBA
<b>Credits:</b>	3.0		

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### Course Description:

This is an introductory physics course for non-science majors. This course focuses on basic physics concepts and connections to everyday life. Course topics include Newtonian mechanics, fluids, heat, vibrations, electricity and magnetism, light and sound, quantum phenomenon, relativity, and cosmology. We will learn to apply the concepts to simple physical systems. While advanced mathematics is not required for this course, basic math with some trigonometry and simple algebra is utilized. Proportional reasoning, estimating, and graphing skills are emphasized throughout the course.

Overall goals of this course include knowledge about how science is done, an understanding of the major physical principles that explain the functioning of the world, improved problem solving and reasoning skills, and improved scientific literacy.

### Learning Objectives:

Upon successful completion of this course, students will be prepared to:

1. Explain basic physics concepts and laws
2. Use physics equations to determine the motion of physical bodies
3. Translate a written description of a physical scenario into a mathematical expression
4. Apply basic mathematical tools to solve physics problems
5. Explain the interconnectedness of observation, experimentation, and theory in physics

## Required Textbook and Course Materials:

**Textbook:** University Physics with Modern Physics

**Authors:** Hugh D. Young, Roger Freeman, Lewis Ford

**Edition:** 13<sup>th</sup>

**ISBN-13:** 978-0-321-69686-1

## Language of Instruction:

This course is taught entirely in English, including lectures, homework, assignments and examinations. Teaching assistants will be fluent in both English and Mandarin.

## Course Prerequisites:

None

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## University Policies

### Class Format

In Person. Course activities, discussions, assignments and resources will be made available at the start of and during the course.

### Attendance, Participation and Deliverables

Courses are very intensive and in order to be successful, students need to attend every class. Attendance is required for all lectures and class activities. Class participation is expected from every student and form a significant portion of the final course grade

All course deliverables (homework assignments and tests) are due on time as assigned. This course includes *no* make-ups, postponements or additional assignments, except for verified medical emergencies. If you miss an exam/assignment due to a non-sanctioned absence, your score on that exam/assignment will be zero.

## Academic Dishonesty

All cases of academic dishonesty will be diligently pursued. Academic dishonesty includes representing the work of another as one's own work or cheating by any means. Academic dishonesty also includes aiding, abetting, concealing or attempting such activity. The penalty is automatic failure of the course and possible suspension from the university.

## Grading Scale

97 – 100	A+	77 – 79	C+
93 – 96	A	73 – 76	C
90 – 92	A-	70 – 72	C-
87 – 89	B+	67 – 69	D+
83 – 86	B	63 – 66	D
80 – 82	B-	60 – 62	D-
		0 - 59	F

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## Professor- and Course-Specific Policies (*Tentative*)

### Reading

Reading the sections of the textbook corresponding to the class lectures and assigned homework exercises is considered part of the homework assignment; you will be responsible for material in the assigned sections *regardless of whether it is discussed in lecture*. You are expected to read the assigned material in advance of the lecture.

### Homework

You are encouraged to discuss general problem-solving methods with other students, but the solutions you hand in must be uniquely your own. Do not copy your colleague's work because you will not learn the material if you do.

### Exams

There will be four one-hour exams during the semester. Exams are designed to test your understanding of the physics principles you have been taught, not your ability to remember formulas or reproduce homework problems that you have already solved. Most problems on the exams will be variations and elaborations of your homework, designed to test whether you can apply physics principles to other situations

**Grade Components:**

Attendance	10%
Homework	20%
Quizzes	20%
Exams	50%
<b>Total</b>	<b>100%</b>

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**Course Schedule (*Tentative*)**

<b>Module</b>	<b>Topics</b>
1	<b>The Scientific Method and Newtonian Mechanics</b>
	Course Introduction & Units, Physical Quantities, and Vectors (Ch. 1) Motion Along a Straight Line & Motion in Two or Three Dimensions (Ch. 2-3) Newton's Laws of Motion & Applying Newton's Laws (Ch. 4-5)
2	<b>Energy and Gravitation</b>
	Work and Kinetic Energy, Potential Energy and Energy Conservation (Ch. 6-7) Gravitation (Ch. 13) Periodic Motion (Ch. 14)
3	<b>Thermodynamics</b>
	Temperature and Heat & Thermal Properties of Matter (Ch. 17-18) The First Law of Thermodynamics (Ch. 19) The Second Law of Thermodynamics (Ch. 20)
4	<b>Electromagnetism</b>
	Electric Charge and Electric Fields & Gauss's Law (Ch. 21-22) Capacitance and Dielectrics, Current, Resistance, and Electromotive Force (Ch. 24-25) Direct Current Circuits & Magnetic Field and Magnetic Forces (Ch. 26-27)
5	<b>Modern Physics</b>
	Relativity (Ch. 37) Light Waves as Particles and Particles as Waves (Ch. 38-39) Molecules and Condensed Matter (Ch. 42) Exam