ATENEO DE MANILA UNIVERSITY
LOYOLA SCHOOLS

Course Syllabus

A. Course Information

Course Number	Phys 20.01			**No. of Units**	2
Course Title	Elementary Physics I, Lecture				
Prerequisite/s	None				
Department/Program	Physics			**School**	Science and Engineering
School Year	2025–2026			**Semester**	1
Instructor/s	Ralph Torres				
Venue	F-304	**Section**	M	**Schedule**	T-F 1230–1400

B. Course Description

This course is the first of three undergraduate physics courses for Health Sciences majors. The mathematical approach is non-calculus-based and strikes a balance between the conceptual and practical physics that shall prove helpful in the field of medicine. This course covers the topics of general mechanics, fluid mechanics and thermodynamics.

Where is the course situated within the formation stages in the framework of the Loyola Schools curricula?	
	Foundations: Exploring and Equipping the Self
	Rootedness: Investigating and Knowing the World
✓	**Deepening**: Defining the Self in the World
	Leadership: Engaging and Transforming the World

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C. Course Learning Outcomes

By the end of this course, students should be able to

Course learning outcomes	
CLO1	Formulate logical science-based answers to conceptual, practical and quantitative problems **Knowledge**: apply the relevant physics laws and principles when answering conceptual questions and solving problems **Skills**: infer answers from data presented in different formats, and solve quantitative problems using multiple representations

	Attitudes: apply physics laws and principles to real-life situations especially in the medical field, and reflect on the course and its importance in everyday life
CLO2	Communicate ideas, results and solutions in clear and logical manner
	Knowledge: use applicable methods for verbal and written communications
	Skills: write clear and concise explanations and solutions, and apply appropriate mathematical methods in data analysis
	Attitudes: accept new ideas with an open mind
CLO3	Actively and productively collaborate with peers
	Knowledge: work as part of a team in completing assigned group activities
	Skills: manage group activities, and create performance tasks
	Attitudes: evaluate self and peers

D. Course Outline and Learning Hours

Main reference sections are in parentheses. Key topics are marked with a star ⋆. Optional but recommended topics are marked with a triangle ▵. See schedule and deadlines at ralphptorr.es/class/phys-20.

Course outline	CLOs	Learning hours
Module 1: One and two dimensional kinematics • Displacement, velocity, acceleration (2.1–2.4) • Motion with constant acceleration, falling objects (2.5, 2.7) • Vectors, motion in two dimensions (3.1–3.3) • Projectile motion, velocity addition (3.4, 3.5) • ⋆ Problem solving, graphical analysis (2.6, 2.8)	1, 2, 3	10 hr / 2.5 wk
Module 2: Newton's laws of motion, its applications, and gravitation • Forces (4.1, 4.5, 4.8) • Newton's laws of motion (4.2–4.4) • Friction, drag, stress, strain (5.1–5.3) • Uniform circular motion, gravitation (6.1–6.5) • ⋆ Problem solving (4.6, 4.7) • ▵ Kepler's laws (6.6)	1, 2, 3	10 hr / 2.5 wk
Module 3: Work, energy, and momentum • Work, energy, W-E theorem, gravitational energy (7.1–7.3) • Potential energy, energy conservation (7.4–7.6) • Impulse, momentum conservation (8.1–8.3) • Elastic, inelastic collisions (8.4–8.6) • ⋆ Work, energy, power in humans (7.7–7.9) • ▵ Rocket propulsion (8.7)	1, 2, 3	10 hr / 2.5 wk
Module 4: Torque and rotational motion • Torque, static equilibrium conditions (9.1–9.3) • Statics applications (9.4, 9.5) • Rotational motion (10.1–10.4) • Angular momentum conservation (10.5, 10.6) • ⋆ Forces, torques in muscles and joints (9.6) • ▵ Gyroscopic effects (10.7)	1, 2, 3	10 hr / 2.5 wk
Module 5: Fluids • Density, pressure (11.2–11.4, 11.6) • Pascal's and Archimedes' principle (11.5, 11.7)	1, 2, 3	10 hr / 2.5 wk

- Flow (12.1, 12.4a)
- Bernoulli's equation (12.2, 12.3)
- ⋆ Pressures in the body (11.9)
- ⋆ Poiseuille's law, molecular transport (12.4b, 12.7)
- ▵ Cohesion and adhesion (11.8)

Module 6: Temperature, heat, and modes of heat transfer 1, 2, 3 10 hr / 2.5 wk

- Temperature, thermal processes, kinetic theory (13.1–13.6)
- Heat, heat transfer (14.1–14.7)
- Laws of thermodynamics (15.1–15.3)
- ⋆ Thermodynamics applications (15.5)
- ▵ Second law reformulated (15.4, 15.6, 15.7)

E. Assessments and Rubrics

Students taking this course will be assessed based on

Assessment tasks	Weight (%)	CLOs
Pair in-class works Group homeworks (6)	30	1, 2, 3
Long exams (6)	60	1, 2
Reflection paper	5	2, 3
Self and peer evaluation	5	2, 3
Practice exercises	0	1, 2, 3

Rubrics will be given for each requirement.

F. Teaching and Learning Methods

Teaching and learning methods and activities	CLOs
Lectures, demonstrations, discussions	1, 2, 3
Long exams (individual assessment)	1, 2
Reflection and evaluation (critical self-assessment)	2, 3
In-class works, group homeworks (collaborative assessment)	1, 2, 3
Practice exercises, supplementary readings (individual or collaborative enrichment)	1, 2, 3

G. Required Readings

The primary reference for the course is

- P.P. Urone and R. Hinrichs, College Physics 2e, OpenStax (2022), open access.

Other references relevant to health science may be accessed via bit.ly/rl_offcampus_access and include

- P. Davidovits, Physics in Biology and Medicine 5e, Academic (2019)
- I.P. Herman, Physics of the Human Body 2e, Springer (2016)
- E. Okuno and L. Fratin, Biomechanics of the Human Body, Springer (2014).

H. Suggested Readings

The following may be used to supplement the required readings:

- J.D. Cutnell and K.W. Johnson, Introduction to Physics 9e, Wiley (2013)
- D.C. Giancoli, Physics: Principles with Applications 7e, Pearson (2014)
- P.G. Hewitt, Conceptual Physics 13e, Pearson (2021)
- R.A. Serway and J.W. Jewett, Physics for Scientists and Engineers 10e, Cengage (2019)

- P.A. Tipler and G. Mosca, Physics for Scientists and Engineers 6e, Freeman (2008)
- H.D. Young and R.A. Freedman, University Physics with Modern Physics 15e, Pearson (2019).

I. Grading System

Let g be the final percentage grade. The letter grade $L(g)$ is assigned using the highest applicable threshold:

$$\geq 92 \ \ \text{A}, \quad \geq 86 \ \ \text{B+}, \quad \geq 81 \ \ \text{B}, \quad \geq 76 \ \ \text{C+}, \quad \geq 69 \ \ \text{C}, \quad \geq 60 \ \ \text{D}, \quad < 60 \ \ \text{F}.$$

J. Class Policies

1. **Learning platform**. The official learning management system for this course is Canvas. Only students who are officially enrolled will be included in the Canvas course. Requirements will be submitted in Canvas.
2. **Course materials**. All materials in the course and recordings of any synchronous session are CC-BY-NC-SA-4.0 unless otherwise noted. Please do not share assessment materials to avoid unfair advantages.
3. **Attendance**. As this is a 2-unit class, students are allowed 4 cuts maximum, after which they will automatically receive a grade of W. Half cuts are given if they arrive within the first 11–15 minutes.
4. **Communications and consultations**. The instructor will communicate with the students via Canvas announcements or their student.ateneo.edu emails. Online consultations should include at least 3 people.
5. **Late submissions**. Late submissions of take-home assessments (group homeworks) are not penalized but only accepted until the until-date in Canvas. Early submissions (+1 dy) get 2 extra points per submission.
6. **Exams**. A long exam will be held onsite, synchronously, during designated times, for 1.5 hours after each module. There is no final exam. A make-up exam may be given for valid absences with proper documents.
7. **Rechecking of work**. Requests for a re-check on any graded work should be made not later than 2 working days after the results are released.
8. **Sitting in**. Students are allowed to attend the lecture session of another section. However, their attendance and any in-class activity done will not be credited towards what they missed.
9. **Grades**. The overall grade reflected in Canvas is not necessarily official. The official grade of the student in the course is the grade that is posted by the registrar and reflected in the student's AISIS account.
10. **Academic integrity**. Students are expected to exercise the highest level of academic integrity. Cheating or plagiarism will not be tolerated and will be treated as a grave offense, subject to disciplinary action.
11. **On AI tools**. When using generative AI for submission, students are expected to cite and document their use in an appendix, verify the accuracy of their content, and take ownership of their submission.
12. **Academic conduct and the Loyola Schools (LS) Gender Policy**. The University does not discriminate on the basis of sex, gender, marital or parental status, sexual orientation, or gender identity or expression. See the following links for more information.
    - Undergraduate Student Handbook 2023: ateneo.edu/college/current-students/handbook
    - LS Code of Decorum: ateneo.edu/central/policies/code-of-decorum
    - LS Gender Policy: ateneo.edu/ls/genderpolicy

K. Consultation Hours

Tue 1100–1230, 1400–1500, or Fri 1100–1230, or by appointment (via rtorres@ateneo.edu), at Phys Department