

Physics 105

Spring 2017

- Lectures:** Sec: 6: TR 5:30 – 6:45 pm in Moulton 208
- Lab/discussion:** Sec. 7: Mon 8:00 - 10:50 am in MLT 203 (Cory Russ)
Sec. 8: Mon 11:00 - 1:50 pm in MLT 203 (Noah Osman)
Sec. 9: Mon 3:00 - 5:50 pm in MLT 203 (Santiago Pinto)
Sec. 10: Mon 6:00 - 8:50 pm in MLT 203 (Torrey Saxton)
Sec. 11: Wed 8:00 - 10:50 am in MLT 203 (Cory Russ)
Sec. 12: Wed 11:00 - 1:50 pm in MLT 203 (Zachary Romersberger)
Sec. 13: Wed 6:00 - 8:50 pm in MLT 203 (Zachary Romersberger)
- Text book:** W. T. Griffith: “The Physics of Everyday Phenomena” (recommended, any edition)
“Experiments for Fundamentals of Physics” (required)
- Lecturer:** Prof. R. Grobe, MLT 216, [438 - 5470]
- Office hours:** M, W, Th 10:00 - 11:00 (or by appointment, or better: just walk in)
- Req. materials:** Scientific calculator (with EE, EEX or EXP keys)
- Format:** Attendance for the two lectures and one laboratory session per week is required.
- Homework:** Exercise problems should be completed after the initial lecture, but prior to the final chapter lecture in which some of the homework will be discussed. Homework problems (or very similar ones) can appear on quizzes and exams.
- Quizzes:** Short quizzes can be administered at the conclusion of some chapters. In order to be prepared you should have completed all readings and learned how to work all assigned exercises.
- Essay:** You will be asked to write a short essay on lecture topics or readings I will give during the semester. It will be worth 20 points.
- Exams:** Five 55-minute multiple-choice exams will be given during the semester that cover the material from both class and laboratory sessions.
- Final exam:** There is a final exam (100 minutes) tba.
- General policy:** There will be five announced and unannounced quizzes, of which one with the lowest score will be dropped. There will be ten lab experiments (one dropped) and five exams (one dropped). There will be no make-ups for quizzes, labs or exams. A missed final exam can be made up only in unusual circumstances (jobs or vacations are not unusual) in form of an oral exam. It is the student’s responsibility to make arrangements with the instructor (in person).

Grades:	(i)	4 Exams (best of 5)	500
	(ii)	Final exam	200
	(iii)	4 Quizzes (best of 5)	100
	(iv)	Essay	20
	(iv)	9 Lab reports (best of 10)	180
		total:	1000 points

Letter grades for the course will be assigned precisely as follows. The instructor does not negotiate for grades with students who are “borderline”.

Total points earned:	course grade
0 – 499	F
500 – 699	D
700 – 799	C
800 – 899	B
900 – 1000	A

Homework Assignments:

Chapter	Exercises
1. Physics, the fundamental science The scientific enterprise; science and pseudoscience	E1.1, E1.3, E1.5, E1.7, E1.9
2. Description of motion Velocity, acceleration, and uniformly accelerated motion; stopping distance and auto safety	E2.1, 2.3, 5, 7, 9, 11,13
3. Falling objects and projectiles Free fall, trajectories, and time of flight	1, 3, 5, 7, 9, 11,13
4. Newton’s laws: explaining motion Aristotle, Galileo, and inertia, application of the 2nd law: friction and mechanical design	1, 3, 5, 7, 9, 11,13,15
5. Circular motion and gravity The 2nd law and circular motion, Aristotle's universe and Kepler's laws	1, 3, 5, 7, 9, 11
6. Energy and oscillations Work, kinetic energy, and potential energy; Conservation of energy, perpetual motion, "free energy" and other dreams, mass on a spring	1, 3, 5, 7, 9, 11, 13
7. Momentum and impulse Collisions and conservation of momentum, energy in collisions	1, 3, 5, 7, 9, 11, 13, 15
10. Temperature and heat Temperature scales, heat flow, specific heat, and home insulation, greenhouse effect 1st law of thermodynamics	1, 3, 5, 7, 9, 11, 13
12. Electrostatics Electric charge and Coulomb's law, electric field and potential	1, 3, 5, 7, 9, 11
13. Electric circuits Electric current and circuits; resistance and Ohm's law; series/parallel circuits Alternating current and household power; electricity and safety	1,3, 5, 7, 9, 11, 13
15. Waves Waves on a string; interference and standing waves, sound and hearing; electromagnetic waves, hearing, sight, and safety	1, 3, 5, 7, 9, 13

Tentative Lecture Schedule:

Date	Reading Assignment	Date	Reading Assignment
Jan 17	Ch. 1, App. A and B	Mar 14	Spring break
Jan 19	Ch. 2, App. C	Mar 16	Spring break
Jan 24	Ch. 2	Mar 21	Exam III
Jan 26	Ch. 3	Mar 23	Ch. 7
Jan 31	Ch. 3	Mar 28	Ch. 10
Feb 2	Ch. 3	Mar 30	Ch. 10
Feb 7	Exam I	Apr 4	Exam IV
Feb 9	Ch. 4	Apr 6	Ch. 12
Feb 14	Ch. 4	Apr 11	Ch. 12
Feb 16	Ch. 4	Apr 13	Ch. 12
Feb 21	Ch. 5	Apr 18	Ch. 13
Feb 23	Ch. 6	Apr 20	Exam V
Feb 28	Ch. 6	Apr. 25	Ch. 13
Mar 2	Exam II	Apr 27	Ch. 15
Mar 7	Ch. 6	May 2	Ch. 15
Mar 9	Ch. 7	May 4	Review for final

Tentative Laboratory Schedule:

Week of	Experiment	Week of	Experiment
Jan 16	-----	Mar 13	Spring break
Jan 23	-----	Mar 20	(6): Simple harmonic motion
Jan 30	(1): Giant disk	Mar 27	(7): Velocity of projectile
Feb 6	(2): Addition of forces	Apr 3	-----
Feb 13	(3): Acceleration due to gravity	Apr 10	(8): Specific heat of metals
Feb 20	(4): Newton's second law	Apr 17	(9): Latent heat of fusion*
Feb 27	(5): Centripetal motion*	Apr 24	(10): Ohm's law
Mar 6	-----		

Free tutoring available for this course

The Julia N. Visor Academic Center provides free weekly tutoring sessions. To sign up, call (309) 438-7100. Vrooman 012 (between Manchester and Hewett dorms)

Required by isu: 2 more pages on additional information

1) Course objectives, goals and expected student learning outcomes

To understand the relationship between simple physical phenomena and to be able to apply simple mathematical expressions to predict experimental outcomes. The course objective is that the learner becomes familiar with the following physical concepts: Principles of mechanics, heat, wave motion, electricity, magnetism, and light. Applications to everyday life. Lecture and lab. Intended for students not major or minor in the physical sciences. May not be taken under the CT/NC option. Not for credit if had PHY 108, 110 or equivalent. General Education category: NSA- Natural Science Alternatives.

2) Weekly schedule

1. Physics, the fundamental science
The scientific enterprise; science and pseudoscience
2. Description of motion
Velocity, acceleration, and uniformly accelerated motion; stopping distance and
3. Falling objects and projectiles
Free fall, trajectories, and time of flight
4. Newton's laws: explaining motion
Aristotle, Galileo, and inertia, application of the 2nd Law
5. Circular motion and gravity
The 2nd Law and circular motion, Aristotle's universe and Kepler's laws
6. Energy and oscillations
Work, kinetic energy, and potential energy; Conservation of energy
7. Momentum and impulse
Collisions and conservation of momentum, energy in collisions
10. Temperature and heat
Temperature scales, heat flow, specific heat, 1st Law of Thermodynamics
12. Electrostatics
Electric charge and Coulomb's Law, electric field and potential
13. Electric circuits
Electric current and circuits; resistance and Ohm's law; series/parallel circuits
Alternating current and household power; electricity and safety
15. Waves
Waves on a string; interference and standing waves, sound; electromagnetic waves

3) Lab descriptions and delivery method

The labs are described in a very detail in the laboratory manual. They are scheduled for about 3 hours each. The delivery method for the labs can be briefly characterized as follows: The TA who will use air as a main medium to carry the acoustical waves that are generated by his or her mouth. The learner is then encouraged to receive this acoustical signal via his or her ears.

4) IAI code

IAI Course Number Course: P1 900L General Education Physics

IAI Title Semester Hours: 4

In Natural Sciences courses, students learn about the scientific view of the universe, the scientific laws governing its behavior, and the nature of scientific inquiry into these phenomena. The courses emphasize basic scientific principles and the way an understanding of these principles helps individuals understand the physical and natural worlds. Students will be expected to integrate information from the natural and physical sciences, and thus to begin the life-long process of arriving at an understanding of the nature of life, the earth, the universe, and interactions among them.

Courses in the Natural Sciences category of General Education address the following program objectives:

I. knowledge of diverse human cultures and the physical and natural world, allowing students to

- a. use theories and principal concepts, both contemporary and enduring, to understand technologies, diverse cultures, and the physical and natural world
- b. explain how the combination of the humanities, fine arts, natural and social sciences, and technology contribute to the quality of life for individuals and communities
- c. *experience and reflect on global issues*

II. intellectual and practical skills, allowing students to

- a. make informed judgments
- b. analyze data to examine research questions and test hypotheses
- c. report information effectively and responsibly

III. personal and social responsibility, allowing students to

- c. *demonstrate ethical decision making*

IV. integrative and applied learning, allowing students to

- a. identify and solve problems

Primary outcomes are indicated in plain text and secondary outcomes are indicated in italics.

Any student needing to arrange a reasonable accommodation for a documented disability should contact Disability Concerns at 350 Fell Hall, 309-438-5853, www.disabilityconcerns.ilstu.edu.