PHY 1010 – General Physics I • 4 Credit Hours (with Lab)
PHY 1080 – Principles of Physics I • 4 Credit Hours (no Lab)
Fall 2018

Instructor: Yuejian Wang   **E-mail:** ywang235@oakland.edu
Office: 164 Hannah Hall   **Office phone:** 248-370-3423
Office hours: MW 10:30-11:30 AM
Lecture Hall: 190HHS   **Class Time:** MWF 2:40-3:47 pm
Suppl. Instr.: MWF 4:00-5:00 pm (190HHS)

Course (Catalog) Description: Mechanics, heat, mechanical waves and sound.

Topics include:

Mechanics: Linear Motion in one and two dimensions; Newton's Laws of Motion and their applications to our everyday world; Mechanical Energy--potential and kinetic; Energy transfer; Work. *Rotational Motion*. *The Gravitational Field;* the Law of Universal Gravitation; Kepler's Laws of Planetary Motion; the Hydrogen atom. *Oscillatory Motion:* Harmonic Motion; Pendulum and Damped Oscillations. *Mechanical Waves:* Vibrations and Waves.

Thermodynamics: Temperature and Kinetic Theory of Gases; Thermal Energy and Heat; the Laws of Thermodynamics and their applications.

Prerequisites: Score of 22 or higher on ACT math test or 550 or higher on SAT math test; or MTH 0662 or equivalent, or placement above MTH 0662.

Corequisite for PHY 1010: PHY 1100 – General Physics Lab I.

PHY 1010 (4 credits with Lab) satisfies the university general education requirement in Natural Science and Technology knowledge exploration area.

PHY 1080 (4 credits, no lab) does **not** satisfy the university general education requirement.

General Education Learning Outcomes:
The learning outcomes for Natural Science and Technology courses state that the student will demonstrate:

- Knowledge of major concepts from natural science or technology, including developing and testing of hypotheses; drawing conclusions; and reporting of findings through some laboratory experience or an effective substitute (Laboratory experiences are met by either a limited number of interactive experiences, collecting and interpreting raw data, or other effective experiences such as a virtual laboratory). Requires at least 3 laboratory experiences during the course.

- How to evaluate sources of information in science and technology.

In addition to the general-education learning outcomes, PHY 1010 also includes the crosscutting capacity of Critical Thinking.

Course Goals and Objectives: Goals of this course include becoming aware of basic concepts and principles of physics; learning to utilize mathematical methods to analyze physical situations; strengthening the understanding of concepts and principles through a broad range of applications to our daily world, including applications to other disciplines such as biology and medicine and applications relating to modern technology. Strong emphasis is given to conceptual learning, to strengthen the student's logical capacities.

To deepen the understanding of concepts, a number of tools will be used:

- **Online Homework** – this includes a mixture of active/guided examples, problems, conceptual questions and animated 'active' figures.
- Conceptual questions during class.
- **Laboratories** *(for PHY 1010 only)* – these include data-taking and analysis and serve to reinforce the understanding of fundamental concepts.

Upon completion of this course, the student will be able to:

- Utilize general methods of problem solving to sharpen his/her critical thinking capacity.
- Convert between systems of units and use these as an aid in problem solving.
- Add and subtract vectors graphically and be able to resolve them into components.
- Describe the motion of an object moving in one dimension.
- Describe the motion of an object moving along a curved path; apply kinematic equations
- Construct free-body diagrams and use these to analyze mechanical systems using Newton's Laws of Motion.
- Analyze the motion of a satellite in a circular orbit, as well as other objects moving in circular paths.
- Utilize the principle of Conservation of Energy to solve problems, such as the motion of a roller coaster.
- Utilize the principle of Conservation of Linear Momentum to solve problems, such as a collision between two cars.
- Describe the motion of an object moving in a circular path using angular quantities.
- Apply Newton's Laws to circular motion and understand the concepts of torque, moment of inertia, and angular momentum.
- Understand the dynamics of a mass-spring system and an oscillating pendulum.
- Compare concepts of pressure and density in solids, liquids, and gases and apply to medical phenomena.
- Convert temperature readings in one scale to any other and apply concepts of specific heat and latent heat to thermal transfer situations, such as cooking.
- Analyze the behavior of gases utilizing the Ideal Gas Law.
- Apply the Laws of Thermodynamics to systems and relate them to the increasing entropy of the universe.
- Calculate the efficiency of any engine that utilizes heat transfer.

Textbook: Serway/Vuille: College Physics – 11th Edition

packaged with:

- WebAssign – Multi-term Access Card
- Access to e-Book
- Access to Student Study Guide and Solutions Manual

Cengage Publishing – ISBN: 9781337741569   [Required]

Castoldi: General Physics Laboratory 1 – 4th edition   [Required for PHY 1010]
Kendall-Hunt Publishing – ISBN: 9781524920500

Available options for purchasing the textbook:

- You may purchase the entire 'bundle' for $190 at

  Campus bookstore – Barnes & Noble – at the Oakland Center

- You may purchase the 'bundle' online, directly from the publisher for $161 at

  http://www.cengagebrain.com/course/2815095

Please notice:
- The Access to Web Assign is valid for multiple terms (PHY 1010 & PHY 1020)

- If you wish to *purchase **just** the access to **WebAssign***, you may do so:

  o   *Online* – once you are logged in to WebAssign.net
  Please see the page of the syllabus dedicated to WebAssign

  o   *Bookstore* – the ISBN for the printed EWA Multi Term Access Card is 9781337763486

Equipment: Protractor, metric ruler, fine point retractable pencil, basic scientific calculator

Pre-class Preparation: Prior to the class, the lecture notes (power Points) will be posted on Moodle. You are **required** to have read the lecture notes as well as the corresponding contents in the textbook. It is suggested that you print a copy of the notes and bring those to class, so that you can focus more on the conceptual understanding of the topics discussed in class and maybe add just a few notes on the side of the sheets.

Study Tips: In order to develop *Critical Thinking* (one of the main goals of this course) much emphasis in this class will be on the understanding and assimilation of 'concepts'.

You are strongly encouraged to review the chapter's *Active Examples* on the textbook and the animated *Active Figure* tutorials on the *e-book*.

Also, in order to test your understanding of concepts, you should test yourself by trying all the *Quick Quizzes* interspersed in each chapter (answers to be found at the

end of the textbook) and the end-of-chapter *Conceptual Questions*.

Ideally, you should find one or two partners in the class and work with them at least once a week for a few hours outside class time.

Supplemental Instruction: Supplemental Instruction is provided by the Tutoring Center.

SI will meet for an hour after each lecture as a support for the students. The SI leader is a student, who will provide and discuss extra problem, review difficult concepts, and answer any questions about current and/or past material. SI will also allow you to work in a smaller environment than our large class.

Please be aware that the SI leader *will not* solve the homework for you.

Participation to the SI is not mandatory, but it is strongly encouraged.

If you missed a session, you can find on ***eSpace*** study material that is regularly posted by the SI instructor.SI will also allow you to work in a much smaller environment than our large class.

Other Help: The ***Tutoring Center*** offers free individual and group peer tutoring and also space to gather and study with peers.

A series of short videos providing a complete review of High School Algebra and Trigonometry can be found on the Tutoring Center's website:

wwwp.oakland.edu/tutoring/study-aids/physics-videos

Here you will also find videos of solved sample problems for each chapter of the entire textbook.

Last but not least, you may meet me during ***office hours*** (or request a special appointment) to get help with course material, discuss ways of improving your performance, but also to get known personally by the instructor.

Math Review: Good Math skills are an essential pre-requisite for a Physics course. During the first week of classes you are requested to view the following ***five Math videos*** that are posted on Moodle. The videos summarize the essential math required for the course:

- *Ratios, Proportions and Units*
- *Powers, Roots and Scientific Notation*
- *Equations and Graphing*
- *Geometry and Trigonometry*
- *Significant Figures*

Another set of math review videos that you may want to view during the course, also available on Moodle, are:

- *Equations Involving Fractions*
- *Systems of Equations*
- *Interpreting Graphs*
- *Area Under a Curve*
- *Exponentials and Logarithms*

- *Limits and Instantaneous Velocity*
- *Angle Basics*
- *Waves and Superposition*
- *Simple Harmonic Motion*

Three videos on '*How to use the Calculator*' are also available, to clarify common mistakes made when entering equations in a scientific calculator:

- *Orders of Operations*
- *Radian versus Degree*
- *Scientific Notation*

Homework: The online program **WebAssign** will be utilized for entering and automatic grading of the homework. This requires the Access Card to be found inside the textbook.

The homework for each chapter can be submitted a *maximum of 5 times*.
*Accessing WebAssign***:** see attached sheet.
Due time: The assignments are due on the date specified on WebAssign. Only in case of serious circumstances an extension may be granted. If you need an extension for a certain chapter's homework, please show your official documents evidencing the serious circumstance you encountered which makes you impossible to complete the homework on time. No e-mailed homework is accepted.

Grace period: *there is a grace period in Web Assign during which you may do the homework even if you do not have an Access Code. After passing the grace period, you cannot access your homework in Web Assign without an Access Code. So please purchase your Access Code as early as possible.*

An ***Algebra Review*** tool is also available on WebAssign. It provides students with a self-paced environment for extra practice with the mathematical skills required for success in the physics course.

During class, conceptual questions will be raised by the instructor and the students who give correct answer will receive extra credits.

The homework + extra credits is worth 20% of the final grade.

Exams: There will be a total of three exams, consisting of multiple choice problems.
All exams are closed-book. You may bring a 4.25" x 5.5" sheet with formulae;
You can write on both sides of the sheet with hand written formulae, relevant constant, and personal notes, but no examples of solved problems that are taught during lectures or answers of homework. Notice: The index card may not be photocopied, reduced or computer generated. Violation of this rule will result in failure of the examination.
Please notice that clear writing and clarity of expression is a very important component of the exam.
A calculator is required, plus a fine point pencil, and an eraser.

Exam # 1:   Monday, October 8   (Chapters 1, 2, 3, 4)
Exam # 2:   Wednesday, November 7   (Chapters 5, 6, 7, 8)
Exam # 3:   Tuesday, December 11 at 3:30 PM   (Chapters 9, 10, 11, 12, 13)

Make-up Policy: In order to be fair to the majority of students who take the exams on time, the general policy is: ***No make-up exams*** will be given.

A score of zero will be entered for missed a test.

If you cannot be present for an exam due to a documentable serious and unavoidable emergency, contact me before the exam, if possible, or as quickly as possible after the exam to see if an exception can be made.

Grading: Course grades will be posted on Moodle.

Homework+extra credit	**20%**
Exam 1	**25%**
Exam 2	**25%**
Exam 3	**30%**

Grading Scale:

Final grade	Total grade	Honor points
A	96-100	4
A-	90-95	3.7
B+	85-89	3.3
B	80-84	3
B-	75-79	2.7
C+	70-74	2.3
C	65-69	2.0
C-	60-64	1.7
D+	55-59	1.3
D	50-54	1.0
F	< 50	0

Note: *the first and second exams will be curved. The third exam and the grade of this class will not be curved.*

Common Courtesy Guidelines:

For the benefit of your fellow students and your instructor, you are expected to practice common courtesy with regards to all course interactions.

For example:

- Show up for class on time.
- Turn off your cell phones and put away iPods and other devices before class begins.

- Do not leave class early, and do not rustle papers in preparation to leave before class is dismissed.
- Be attentive in class and participate. Stay awake; no text messaging, listening to iPods, or surfing the internet...
- If you must be late or leave early on a particular day, please inform your instructor in advance.
- Be kind and respectful to your fellow students and the instructor.

You can expect your grade to be lowered if you do not practice common courtesy.

Add/Drops

The University's add/drop policy will be explicitly followed. It is the student's responsibility to be aware of the university deadline dates for dropping courses.

Reasonable Accommodations

Accessibility and Accommodations: It is the University's goal that learning experiences be as accessible as possible. Students with disabilities who have questions about course accessibility are encouraged to contact the instructor immediately. The Office of Disability and Support Services (DSS) is available to help. The DSS office is located in room 103A North Foundation Hall.
For more information, call 248-370-3266 or visit **https://www.oakland.edu/dss**

Policy on Academic Misconduct

The University's regulations that relate to academic misconduct will be fully enforced. Any student suspected of cheating and/or plagiarism will be reported to the Dean of Students and, thereafter, to the Academic Conduct Committee for adjudication. Anyone found guilty of academic misconduct in this course may receive a course grade of F, in addition to any penalty assigned by the Academic Conduct Committee. Students found guilty of academic misconduct by the Academic Conduct Committee may face suspension or permanent dismissal. The full policy on academic misconduct can be found in the General Information section of the Undergraduate Catalog.

Excused Absence Policy

The University excused absence policy applies to participation as an athlete, manager or student trainer in NCAA intercollegiate competitions, or participation as a representative of Oakland University at academic events and artistic performances approved by the Provost or designee.
For the excused absence policy, see:
https://www.oakland.edu/provost/policies-and-procedures/

Student Preferred Name/Pronoun Policy

Course rosters are typically provided to the instructor with the student's legal names. If you do not identify with the name that is listed with the Registrar's

office, please notify me. I will gladly honor your request to address you by an alternate name or gender pronoun. For more information on indicating a preferred first name on university records, please visit:
https://www.oakland.edu/uts/common-good-core-resources/name-services/

WebAssign: How to Get Started

Day One: Register

1. Go to **https://webassign.net** and click on **LOGIN**.

2. Click on **'Enter Class Key'**

3. Enter the **Class Key**: **oakland 8762 4766**
4. Enter your chosen Login name and the required information

5. Click on **'Create my Account'**

     A review screen will appear with your Username, Institution code & Password.
     Print and retain a copy of this information.

6. Once you Login, you need to enter the **WebAssign Access Code**.
   - If you purchased a new textbook, the Access Code card is inside the book.
   - If you purchased a used book, you may choose to purchase the Access Code online.

7. Once you have logged in, you will see the **Homepage**.
   - I suggest you click on **Guide** (upper right corner) and read the **Student Guide**.
   - For **Technical Support** call **800-354-9706** or go to

     https://www.webassign.com/support/student-support/

Notice: there is a 14-day grace period in Web Assign during which you may do the homework even if you do not have an Access Code.

You may want to watch the short Student Self-Enrollment video:
http://www.wadsworthmedia.com/tlc/EWA_StudentVideos/Self_Enrollment/EWA_Student_Self
Enrollment.html

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To access the Homework:

1. Go to **https://www.webassign.net/wa-auth/login** (I suggest you Bookmark this page)

2. After you Login, click on **'My Assignments'.**

Please notice:

   - You may save your work without grading by clicking on **'Save Work'** at the end of the question. Next time you access the assignment, your work will still be available.
   - WebAssign will not automatically submit your answer if you only 'Save' your work. Make sure you **'Submit'** it before the due date and time.
   - You may also choose to **'Submit New Answers to Question xx'** or **'Submit All New Answers'**.

     Remember that there is a **maximum of 5 submissions** for each problem.

PHY 1010/1080 TENTATIVE SCHEDULE – FALL 2018

Week	Day	Date	Lecture contents	
			Chapter	Topics
1	W	9/5		Syllabus; Standards of Length; Mass; and Time; Structure of Matter
	F	9/7	1	Dimensional Analysis; Uncertainty and Significant Numbers; Conversion of Units; Order of Magnitude; Coordinates Systems; Trigonometry
2	M	9/10		Vector
	W	9/12		Displacement; Velocity
	F	9/14	2	Acceleration; Motion Diagram; One-dimensional Motion with Constant Acceleration;
3	M	9/17		Freely Falling Objects
	W	9/19	3	Displacement, Velocity, and Acceleration, and Projectile Motion
	F	9/21		Projectile motion; Relative Velocity
4	M	9/24		Forces, Newton's first and Second Laws
	W	9/26	4	Gravitational Force; Newton's Third Law;
	F	9/28		Friction Force; Tension; Application of Newton's Laws.
5	M	10/1		Work; Kinetic Energy and the Work-Energy Theorem
	W	10/3	5	Gravitational Potential Energy; Spring Potential Energy
	F	10/5		Energy Conservation; Power; Work Done by a Varying Force
6	**M**	**10/8**	**EXAM 1 (Chapters 1-4)**	
	W	10/10		Momentum and Impulse
	F	10/12	6	Conservation of Momentum; Collision
7	M	10/15		Glancing Collisions; Rocket Propulsion
	W	10/17		Rotational motion; Angular Speed and Angular Acceleration
	F	10/19	7	Relations Between angular and Linear Quantities; Centripetal Acceleration; Uniform Circular Motion
8	M	10/22		Newtonian Gravitation; Kepler's Laws
	W	10/24		Torque; the Center of Gravity
	F	10/26	8	Mechanical Equilibrium
9	M	10/29		Rotational Second Law of Motion; Rotational Kinetic Energy; Angular Momentum
	W	10/31		States of Matter; Density and Pressure; Variation of Pressure with Depth; Pascal's Principle; Pressure Measurements; Buoyant Forces and Archimedes' Principles;
	F	11/2	9	Buoyant Forces and Archimedes' Principles; Fluids in the motion; Applications of Fluid Dynamics; Fluids in the motion; Surface Tension; Capillary Action
10	M	11/5		Viscous Fluid Flow; Transport Phenomena; The Deformation of Solids
	W	**11/7**	**EXAM 2 (Chapters 5-8)**	
	F	11/9		Temperature; Thermometers and Temperature scales
11	M	11/12	10	Thermal Expansion; Ideal Gas
	W	11/14		Kinetic Theory of Gases
	F	11/16	11	Heat and Internal Energy; Specific heat; Calorimetry;

12	M	11/19		Latent Heat and Phase Change; Methods of Energy Transfer	
	W	11/21		Energy Transfer	
	F	11/23	**Thanksgiving**, *classes suspended*		
13	M	11/26	12	Work in Thermodynamic Process; The First Law of Thermodynamics; Thermal Processes	
	W	11/28		Thermal Processes; Heat Engines; the Second law of Thermodynamics	
	F	**11/30**		Reversible and Irreversible Processes; Carnot Engine; Entropy	
14	M	12/3	13	Hooke's Law; Elastic Potential Energy	
	W	12/5		Simple Harmonic Motion; Position, Velocity, and Acceleration as a Function of Time; Motion of a Pendulum; Damped Oscillations	
	F	12/7		Waves; Frequency, Amplitude, and Wavelength; The Speed of Waves on Strings; Interference of Waves; Reflection of Waves	
15	M	**12/10**	**REVIEW**		
	T	**12/11**	**FINAL EXAM (CHAPTERS 9-13), 3:30-6:00 PM**		