

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

Winter 2021

FULLY ONLINE COURSE – Asynchronous

Instructor: Kapila Clara Castoldi

Contact: castoldi@oakland.edu

Please do not contact me through Moodle or WebAssign

Phone: (*home*) 734-994-7114 (8 am – 8 pm, daily)

Office hours: upon request – by phone or Zoom video conferencing

Course Management System: Moodle

Supplemental Instruction: TR, 12:00 – 1:00 pm on **e-Space** – SI leader: Katie McAnarney

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:* Reflection and Transmission of 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 for PHY 1010:

This course satisfies the university general education requirement in Natural Science and Technology (NST) knowledge exploration area.

The learning outcomes for NST 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, this course also satisfies the cross-cutting 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 and critical capacities.

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

- **Online Homework** – a mixture of guided examples, problems, conceptual questions and animated 'active' figures.
- **Activities** – a mix of simple hands-on and virtual activities.
- **Chapter Questions** – conceptual questions related to chapter material.
- **Whole-Class-Labs** – the students will analyze three sets of experimental data collected by various groups during in-class lab sessions. This will allow them to study the validity of physics laws when different equipment is utilized and to discuss how different systematic errors are introduced by the various groups.
- **Case Studies** – the students will learn how to apply concepts and equations learned in the course to two real-life situations.

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 the e-book

Cengage Publishing – ISBN: 9781337741569

[Required]

Available options for purchasing the textbook:

- You may purchase the entire 'bundle' for \$203 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/4439120>

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:
 - *Online* – from the publisher for \$125 at
<http://www.cengagebrain.com/course/4439120>
 - *Online* – once you are logged in to WebAssign.net.
Please see the page of the syllabus dedicated to WebAssign
 - *Bookstore* – sells the printed Access Card

Careful: if you will take also PHY 1020, be sure to purchase the **Multi Term** or 12-month Access to Web Assign, not the 1-Term or 4-month one

Supplemental Instruction: Supplemental Instruction is provided by the Tutoring Center on *eSpace*.

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.

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

Other Help: The *Tutoring Center* offers free individual and group peer tutoring. Short videos providing a complete *review of basic Algebra and Trigonometry* are posted on the Tutoring Center's website:

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

Here you will find also a series of short videos showing *how to solve sample problems* for each chapter of the textbook.

You may also **contact Dr. Castoldi** to get help with course material, to discuss ways of improving your performance, etc. Best is to setup an appointment by email. We can then talk over the phone, setup a Zoom meeting.

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 *five Math Review videos* posted on **Moodle**. These 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*

At the end of the first week, a Math Review Homework is due on WebAssign.

Another set of math review videos, which include examples of applications to the material covered in the course, is also available on Moodle. You may want to view these as you progress through the course:

- *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. These clarify common mistakes made when entering equations in a scientific calculator:

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

Lecture Notes: Lecture Notes for each chapter are posted on Moodle. These can be used as a chapter summary or study-guide and are not intended to substitute the textbook.

Power Points: Power Points for all chapters are posted on Moodle. You can print these – for example six slides per page – and use them for note taking when watching the lectures.

Recorded Lectures: the url of the recordings of in-class lectures are posted on Moodle.

I utilized the program *Panopto* for the recording. To access the lectures, you will be prompted to login to the lecturecapture.oakland.edu website. Use *Sign in via Moodle*. You may choose to view just parts of these lectures at a time.

Demonstrations: Videos of in-class demonstrations recorded by Dr. Castoldi are posted on Moodle along with the url of a number of good YouTube videos by other institutions.

Homework: The online program **WebAssign** will be utilized for entering, and automatic grading of, the homework. This requires the Access Card bundled with the textbook. Each chapter's homework consists of:

3 Active Examples, 4 Problems, 3 Conceptual Questions, 1 Active Figure

The homework for each chapter can be submitted a *maximum of 5 times*.

Accessing WebAssign: see attached sheet.

Due time: The assignments are due at 11:30 pm on the specified date.

Extensions: Only in case of serious and documented circumstances a deadline extension may be granted. Please send an e-mail to castoldi@oakland.edu *before* the deadline. **Do not send requests of extension within WebAssign!**

Grace period: there is a 14-day grace period in WebAssign during which you may do the homework & study the e-book even if you do not have an Access Code yet.

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

The WebAssign homework is worth 10% of the final grade.

Activities: A number of simple, hands-on or conceptual Activities will be posted on Moodle. These activities are to be performed by each student individually. They are intended to reinforce understanding of the concepts embedded in the chapter.

No late answers will be accepted after one week from the due date.

For each late day a 10% penalty will be applied.

The Activities are worth 10% of the final grade.

Chapter Questions: For each chapter, one or more Conceptual Questions will be posted on Moodle. These are intended to stimulate Critical Thinking. You are asked to work in groups of three and submit the answers by e-mail to my grader (*one submission per group*).

No late answers will be accepted after one week from the due date.

For each late day a 10% penalty will be applied.

The Chapter Questions are worth 10% of the final grade.

Whole-Class-Labs: Each group will be provided sets of data from experiments related to topics such as the spring constant, rotational dynamics, thermal elongation and thermal conductivity of metals. The group will be directed to analyze this global data with an eye on studying the validity of physics laws when different equipment is utilized, resulting in different systematic errors introduced in the experiment.

The Whole-Class-Labs are worth 15% of the final grade (5% each)

Case Studies: Another type of group activity is Case Studies. Some students are more inductive than deductive reasoners, which means that they learn better from examples. Case Studies allow students to explore how what they have learned in the course applies to real world situations.

The Case Studies are worth 10% of the final grade (5% each)

Study Tips: In order to develop *Critical Thinking*, which is one of the main goals of this course, much emphasis 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 (the answers to these are posted at the end of the textbook) and the end-of-chapter *Conceptual Questions*.

As a practice for the exams, you can try solving some of the *odd-numbered end-of-chapter problems* on the *e-book*. The answers to these are posted at the end of the textbook. Best would be to meet once a week with your group and go over these problems and the conceptual questions. If you cannot meet, you can always organize a Skype meeting or proceed by email. It’s always best to discuss with others.

You will find the end-of-chapter conceptual questions, problems and activities on the eBook within WebAssign.

Conceptual questions will be included in the Exams.

Online Exams: There will be three online exams on WebAssign in the form of problems and conceptual questions. These exams are open book, have the duration of 2 hours and may be taken at any time on the specified dates. Once you access the exam, you cannot take breaks – you have to continue until you are done. Best practice is to prepare a sheet with formulas and short notes/examples for each chapter.

Exam # 1	Chapters 1, 2, 3, 4
Exam # 2	Chapters 5, 6, 7, 8
Exam # 3	Chapters 10, 11, 12, 13

The Online Exams are worth 45% of the final grade (15% each)

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.

In case of documented illness or serious emergency please contact Dr. Castoldi as soon as possible.

Please notice: you cannot pass the course unless you have taken all three exams.

Equipment: Basic scientific calculator with trigonometric functions, angle measure in degrees and radians, logarithms.

Gradebook: All grades will be posted on Moodle's Gradebook.
The Gradebook will be updated regularly as new grades become available.

Grading: Course grade will be based on the following percentages:

WebAssign Homework	10%
Activities	10%
Chapter Questions	10%
Whole-Class-Labs	15%
Case Studies	10%
Exams	45%

Total: 100%

Grading scale:

A	96-100
A-	90-95
B+	85-89
B	80-84
B-	75-79
C+	70-74
C	65-69
C-	60-64
D+	55-59
D	50-54
F	< 50

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

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/>

Bereavement Policy

In the event of the death of certain members within families or among loved ones, the University grants necessary bereavement absences upon student request.

For the official bereavement 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/>

Communication:

Instructor → Student:

Communications from the instructor will happen via the **Announcements** forum in **Moodle**. These are forwarded by Moodle to your Oakland e-mail account.

- ***You are expected to be familiar with Moodle.*** To check how to login to Moodle, the *Technical Requirements* and how to obtain *Support*, please go to:

<https://oakland.edu/online/resources/online-student-orientation/>

- You are expected to ***login to Moodle at least twice a week*** and ***check your email daily***.
- A Weekly format will be used in Moodle. Guidelines for the homework and all other activities will be posted week by week.

You will have to scroll down to check each week of the course.

Student → Instructor:

Contacts with the instructor will happen primarily through **Oakland webmail** at **castoldi@oakland.edu**

The subject of your e-mail should state course name, lastname & reason of your e-mail,

e.g. ***'Phy 1010 – Your lastname – Activity # 1'***

I will read my e-mail twice a day. E-mails with no clear subject will be disregarded.

Do not send me communication through Moodle or WebAssign.

Student → Student:

Contacts among students may happen in a number of ways:

- ***'Student Chat Room'*** Forum – setup on Moodle for students to initiate a chat
- ***'Getting to know each other'*** Forum – setup on Moodle so that each students can share some basic information about himself/herself with others and the instructor. Participation in this forum is ***mandatory***.
- ***'Skype'*** audio/video conferencing sessions can also be setup. I will be happy to help you with this. Please email me and I can setup a session for your group.

Virtual Office Hours:

We can setup a **Zoom** video conference or connect by **phone** to discuss physics concepts, homework or solve group issues.

For **TECHNICAL ISSUES**, please contact:

Moodle:

Read the documents on the e-Learning & Instructional Support (e-LIS) website.

In particular, the '*Online Student Orientation*':

<https://oakland.edu/online/resources/online-student-orientation/>

If this doesn't help, contact the e-LIS at **248-370-4566**

You may also submit a Help Request Form to e-LIS:

<https://www2.oakland.edu/secure/esp/>

Online Homework:

Go to the **WebAssign.net** website and click on 'Student Support.'

There you will find the Student Guide and instructions on how to contact Support by phone, e-mail or live-chat.

Important Note from the Instructor:

Online courses have numerous advantages, including flexibility for those with a busy schedule.

On the other hand I wish to bring to your attention that **not everybody is fit for an online course**.

Remember that to be fit for an online course,

- You must be able to **work independently**.
- You must feel quite **comfortable** working **with computers**.
- You must be **self-motivated** and **disciplined** in order to access all assignments in a timely manner, actively participate in discussion panels and study the textbook in a timely manner.
- You must be able to **follow directions**. Most online activities are announced with written directions. It's important that you understand what the instructor requires.
- You must be **organized**. For example, create a folder on your computer for the class. Within it create other folders for each of the class activities.

Last but not least, **never** wait until the last minute to submit an assignment. Working with computers means that the internet may be down when we least expect it, making us miss an important deadline. To prevent this, we must work ahead of deadlines.

WebAssign: How to Get Started

Day One: Register

1. Go to <https://webassign.net> and click on **SIGN-IN**.
2. Click on **'Enter Class Key'**
3. Enter the **Class Key: oakland 6824 9996** (this allows me to see your homework grades)
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

<http://www.webassign.com/support/student-support/>

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

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 <http://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.

## **Things to do list during the first week:**

### **Syllabus Quiz:**

During the first week of the course, you will have to take this simple quiz on Moodle to make sure that you understand what you have to do for the course.

A nominal grade of 1 point is assigned to the quiz.

### **Are you ready for Online Learning Quiz:**

During the first week of the course you are also required to take this short quiz to highlight whether you are fit for an online course or not.

Please email the results to Dr. Castoldi.

### **Algebra & Trig Review by the Tutoring Center**

On January 7, 2:00 – 7:00 pm the Tutoring Center is offering a math review.

You may join virtually on Zoom. Cut and paste this link on your browser:

<https://oakland-edu.zoom.us/j/93437162435?pwd=MkNpdVFueUkvWVcxVHBqUlladVZFUT09#success>

Passcode: tutoring

### **Math Review Homework:**

After viewing the five Algebra and Trigonometry review videos, test yourself on your Math skills. This homework is on WebAssign.

## PHY 1010 SCHEDULE – WINTER 2021

### Week 1 – January 6 – 12

Chapter 1: Introduction

Due January 9:

- Math Review Homework (WebAssign)

### Week 2 – January 13 – 19

Chapter 2: Motion in One Dimension

Due January 16:

- Ch 1 Homework (WebAssign)
- Ch 1 Activity (individual)
- Syllabus Quiz (Moodle)
- Are you Ready for Online Learning Quiz (Moodle)

### Week 3 – January 20 – 26

Chapter 3: Vectors and Two-Dimensional Motion

Due January 23:

- Ch 2 Homework
- Ch 2 Activity (individual)
- Ch 2 Chapter Questions (group)

### Week 4 – January 27 – February 2

Chapter 4: The Laws of Motion

Due January 30:

- Ch 3 Homework
- Ch 3 Activity
- Ch 3 Chapter Questions

### Week 5 – February 3 – 9

Chapter 5: Energy

Due February 6:

- Ch 4 Homework
- Ch 4 Activity
- Ch 4 Chapter Questions

**Online Exam # 1: Sunday, February 7 – Chapters 1, 2, 3, 4**

*The exam is available 7:00 am – 10:00 pm on WebAssign. Two hours long. Be aware that, once you start, you have to continue until you finish. You may not take breaks. Have your calculator and scrap paper ready.*

## **Week 6 – February 10 – 16**

### Chapter 6: Momentum and Collisions

Due February 13:

- Ch 5 Homework
- Ch 5 Activity
- Ch 5 Chapter Questions
- Whole-Class Lab 1: Energy Conservation (group)

## **Week 7 – February 17 – March 2 (includes recess)**

### Chapter 7: Rotational Motion and the Law of Gravity

Due February 20:

- Ch 6 Homework
- Ch 6 Activity
- Ch 6 Chapter Questions

## **Week 8 – March 3 – 9**

### Chapter 8: Rotational Equilibrium and Rotational Dynamics

Due March 6:

- Ch 7 Homework
- Ch 7 Activity
- Ch 7 Chapter Questions
- Whole-Class Lab 2: Centripetal Force (group)

## **Week 9 – March 10 – 16**

Review

Due March 13:

- Ch 8 Homework
- Ch 8 Activity
- Ch 8 Chapter Questions

### **Online Exam # 2: Sunday, March 14 – Chapters 5, 6, 7, 8**

*The exam is available 7:00 am – 10:00 pm on WebAssign. Two hours long. Be aware that, once you start, you have to continue until you finish. You may not take breaks. Have your calculator and scrap paper ready.*

## **Week 10 – March 17 – 23**

### Chapter 10: Thermal Physics

Due March 20:

- Case Study 1: Football Game (group)

## **Week 11 – March 24 – 30**

### Chapter 11: Energy in Thermal Processes

Due March 27:

- Ch 10 Homework
- Ch 10 Activity
- Ch 10 Chapter Questions

## **Week 12 – March 31 – April 6**

### Chapter 12: The Laws of Thermodynamics

Due April 3:

- Ch 11 Homework
- Ch 11 Activity
- Ch 11 Chapter Questions
- Case Study 2: Heating/Cooling of Homes (group)

## **Week 13 – April 7 – 13**

### Chapter 13: Vibrations and Waves

Due April 10:

- Ch 12 Homework
- Ch 12 Activity
- Ch 12 Chapter Questions

## **Week 14 – April 14 – 20**

Review

Due April 17:

- Ch 13 Homework
- Whole-Class Lab 3: Standing Waves on a String (group)

### **Online Exam # 3: Wednesday, April 21 – Chapters 10, 11, 12, 13**

*The exam is available 7:00 am – 10:00 pm on WebAssign. Two hours long.*

*Be aware that, once you start, you have to continue until you finish.*

*You may not take breaks. Have your calculator and scrap paper ready.*