

**PHY 1610 Fundamentals of Physics I**  
**4 Credit Hours**  
**Fall 2020**

**PHY 1610 Fundamentals of Physics I • 4 Credit Hours**

**Tuesday/Thursday between 1pm to 2:47pm**

**FALL 2020: Sep 03 – Dec 15**

**THIS IS A FULLY ONLINE COURSE**

**Instructor:** Dr. RAO BIDTHANAPALLY

**Contact:** [bura0@oakland.edu](mailto:bura0@oakland.edu)

*Contact me through direct Oakland email (put PHY1610 in the subject line) or QUICK MAIL within Moodle.*

*No Face-to-face contact/office hours.*

*Course TA (Teaching Assistant): Alexander Machi [amachi@oakland.edu](mailto:amachi@oakland.edu)*

*Course S.I. (Supplemental Instruction through E-space)*

**Office hours:** upon request – by phone or audio/video conferencing

***This is an ONLINE course and lectures will not be live during class meeting times.***

***Online Class Exams will be held during the class times of Tue/Thu between 1pm to 2:47pm. You are expected to make yourself available during the class times on the exam dates.***

**Course Management System: Moodle**

**Course Home-Work/Exams: WebAssign**

Supplemental Instruction will be offered online. Log in to E-space at [espace.oakland.edu](http://espace.oakland.edu) to attend live sessions of SI with your peers, meet virtually with your SI Leader to ask questions, and access additional study resources. Please check your OU email frequently for updates from your SI Leader. Tutoring will also be available online. For more information, please visit [oakland.edu/tutoring](http://oakland.edu/tutoring)

**Course (Catalog) Description:** Topics include:

***Kinematics:*** Description of motion of a point in one and two dimensions: position, displacement, velocity, acceleration, free fall, projectile motion, circular motion, radial acceleration, relative velocity.

***Dynamics:*** Newton's laws, force of gravity, weight, friction, centripetal force, applications.

***Energy:*** Work done by force, work-energy theorem, kinetic and potential energy, conservation and non-conservation of mechanical energy, potential energy and bound states.

***Momentum:*** Linear momentum and its conservation, application to collisions, center of mass.

**Rotational motion:** Rotational kinematics, rolling; Dynamics: kinetic energy, torque, angular momentum, generalization of equilibrium. Application of rotational dynamics to planetary motion, Kepler's laws.

**Fluid mechanics:** Pressure and density; Torricelli's, Pascal's, Archimedes' laws/principles; continuity and Bernoulli's equations.

**Description of gases:** Definitions of temperature; 0<sup>th</sup> law of thermodynamics; descriptions of an ideal gas: equation of state (processes) and kinetic theory.

**Thermodynamics:** Heat, internal energy, phase changes, work, 1<sup>st</sup> law of thermodynamics, application to processes; heat engines, 2<sup>nd</sup> law of thermodynamics, entropy.

**Oscillations and waves:** Oscillatory motion, harmonic motion, pendulum.

**Prerequisites:** Score of 28 or higher on ACT math test or 660 or higher on SAT math test; or MTH 1441 or equivalent, or placement above MTH 0662. MTH 1554 recommended.

**PHY 1510 (4 credits with Lab)** satisfies the university general education requirement in Natural Science and Technology knowledge exploration area.

**PHY 1610 (4 credits, no lab)** does **not** satisfy the university general education requirement.

**General Education Learning Outcomes for PHY 1510:** 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, this course also includes the crosscutting capacity of Critical Thinking.

**Course Goals and Objectives:** Goals of this course include: introducing students to basic Physics concepts and principles; applying the material learned in a Calculus course for problem solving; learning to utilize Calculus methods to produce a mathematical representation of a physical situation and to analyze and solve; introduce a wide range of applications of physics to the other fields of science and engineering.

To achieve these goals:

- Strong emphasis is given to sound physical arguments and conceptual learning, to strengthen the student's logical capacities.
- Emphasis is given to problem-solving methodology: a modeling approach, based on four types of models commonly used by physicists, is introduced for the students to understand they are solving problems that approximate reality. Then they learn how to test the validity of the model. This approach helps the students see the unity in physics, as a large fraction of problems can

be solved using a small number of models.

- Quite often problems require the student to relate to concepts covered in previous chapters.
- Some problems require the use of a computer or graphing calculator. Modeling of physical phenomena enables the students to obtain graphical representations of variables and to perform numerical analyses.
- The course includes practical examples that demonstrate the role of Physics in other disciplines, including engineering, chemistry, life sciences and medicine, and applications relating to modern technology.
- The course connects physics principles to examples of
  - o Natural phenomena – such as planetary motion and astronomy, hurricanes.
  - o Technology and everyday life – such as car and driving-, sports-, cooking-, heating and cooling-related issues.
  - o Ethical and societal issues – such as energy and ecology concerns.
  - o Philosophical issues – such as design of a physical theory and its principles.

### **Textbooks for Fall 2020 – PHY 1510 and PHY 1610**

#### **PHY 1510 & PHY1610 – required**

Principles of Physics, 5<sup>th</sup> edition, Serway and Jewett

Hybrid – Cengage bundled with WebAssign (Multi-term)

ISBN: 9781305586871

#### **PHY 1510 & PHY 1610 – optional**

Student Solutions Manual with Study Guide, Volume 1

ISBN: 9781133110767      **For students who choose just**

#### **WebAssign & e-Book:**

Access Card to WebAssign (Multi-term)

ISBN: 9781285858418

<http://www.cengagebrain.com/course/4439136>

Check this Microsite for more information and deals

**Getting Help:** The *Tutoring Center* offers free tutoring. This term the service will be online. Tutoring is available Monday-Friday from 9 am to 5 pm. To setup an appointment, go to [Oakland.edu/tutoring](http://Oakland.edu/tutoring) and click on “Find a Tutor”.

Short videos providing a complete *review of basic Algebra and Trigonometry* are posted on the Tutoring Center’s website:

[www.oakland.edu/tutoring/study-aids/physics-videos](http://www.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. Rao** to get help with course material, to discuss ways of improving your performance. Best is to setup an appointment by email. We can then talk over the phone, setup a Google meet or WebEx 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*

## Teaching will comprise of the following four teaching modules:

- **Online Class Meetings:** There will be a few scheduled Online meetings via WebEx/Panopto/YuJa during the class meeting days. This means that I will host short half-hour online sessions for important introductions/presentations etc.
- **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 will use the programs **Panopto** or **YuJa** for the recordings. To access the lectures, you will be prompted to login to the [lecturecapture.oakland.edu](http://lecturecapture.oakland.edu) website.
- Use **Sign in via Moodle** to view lectures at any time.
- **Demonstrations:** A number of videos of in-class demonstrations are posted on Moodle. You will also find on Moodle pointers to a number of good YouTube videos recorded by other institutions.
- **Math Review:** A list of useful Math review links are available on course page.
- **Supplemental instruction:** The S.I. leader for this course will be announced shortly. He/she will provide more details during first/second week of class.

**Supplemental Instruction will be offered online. Log in to E-space at [espace.oakland.edu](http://espace.oakland.edu) to attend live sessions of SI with your peers, meet virtually with your SI Leader to ask questions, and access additional study resources. Please check your OU email frequently for updates from your SI Leader. Tutoring will also be available online. For more information, please visit [oakland.edu/tutoring](http://oakland.edu/tutoring)**

**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 a mix of Active Examples, Problems, Conceptual Questions, Active Figures.

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 11:59 pm on the specified date. (Make note)

**Extensions:** Only in case of serious and **documented** circumstances a deadline extension may be granted. Please send an e-mail to [bura0@oakland.edu](mailto:bura0@oakland.edu) **before** the deadline. You can apply for a one-time automatic extension via WebAssign. This allows you to get an extension for just one assignment with a 10% late penalty.

**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.

- **PLEASE NOTE: Online Homework due dates are clearly mentioned in WebAssign, so please make a note of it.**
- **You may apply for an extension request to complete the assignment after the due date but you will incur a penalty of 10% of the points.**
- **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 deadline**

**Chapter Activities:** For each chapter, Conceptual Questions/Activities will be posted on Moodle. These are intended to stimulate Critical Thinking.

**All Chapter Activity files should be in pdf or word format and submitted directly to the Moodle dropbox. Alexander Machi (Course TA, amachi@oakland.edu), will grade these activities as well as handle all questions pertaining to it.**

***No late answers will be accepted after the due date.***

**The Chapter Activity/Questions are worth 15% of the final grade.**

**Quizzes:** Quizzes are worth 5% of your grade. These will include Syllabus Quiz on Moodle as well as Reading and Lecture Quizzes during the semester.

**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 1 hour, and MUST be taken between **1pm – 2:47pm** 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 3 is a final exam and no other Exams will be given during the Finals week.

<b>Exam # 1</b>	<b>Chapters 1, 2, 3, 4</b>	<b>Oct 1<sup>st</sup>, Thu</b>
<b>Exam # 2</b>	<b>Chapters 5, 6, 7, 8</b>	<b>Oct 29<sup>th</sup>, Thu</b>
<b>Exam # 3 (Final Exam)</b>	<b>Chapters 10, 11, 12, 13</b>	<b>Dec 1<sup>st</sup>, Tue</b>

**The online exams are worth 45% of the final grade.**

**Exam 1: 15%, Exam 2: 15%, Exam 3: 15%**

**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 assigned for any missed test.

Only in rare cases of serious and ***well documented emergencies*** an exception will be made. Please contact the instructor as soon as possible.

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

**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 *Tutorials*, *Active Examples* in and the animated *Active Figure* tutorials in the *e-book and WebAssign*.

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. 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.***



**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. Currently, in-person services, such as face-to-face meetings and proctoring services, are not available. You may call the office at 248-370-3266 or visit <https://www.oakland.edu/dss> and click on "Request Accommodation Form".

### **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**

The University recognizes that as a community many of its members use names other than their legal names to identify themselves. As long as the use of this different name is not for the purposes of misrepresentation or a legal name is required by University business, policy or legal need, the University acknowledges that a "preferred name" will be used wherever possible. The University reserves the right to not accept a preferred name if it is deemed inappropriate, including a preferred name that is vulgar, offensive, fanciful, or creates confusion with another person.

## Communication:

### Instructor to 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 to Instructor:

- **The best way to send me an email is via the QUICKMAIL block in Moodle. This automatically tells me the course you are in.**
- You may send a direct email through **Oakland webmail: [burao@oakland.edu](mailto:burao@oakland.edu)** (put **PHY 1610** in the subject line). *The subject of your e-mail should state course name, last name and subject.*

e.g. *'Phy 1610 – Your lastname first initial – Homework # 1'*

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

Emails after 5 pm will be responded to the next day.

***Do not send me communication through WebAssign.***

### Student □ Student:

Contacts among students may happen in a number of ways:

- *'Questions and Answers'* Forum – setup on Moodle for students.
- *'Introduce Yourself'* Forum – setup on Moodle so that each student can share some basic information about himself/herself with others and the instructor. Participation in this forum is *mandatory*.
- *'Google Meet'*, *'YuJa'*, or *'WebEx'* audio/video conferencing sessions can also be setup.

### Virtual Office Hours:

We can setup a **Google Meet** or **WebEx** or **YuJa** video conferencing to discuss physics concepts, homework or solve any issues.

## **FORUMS: Summary**

There are 3 Forums for this course. This is for Instructor to student. Student to Instructor and Student to Student communication.

**Forum 1:** Questions and Answers Forum: Instructor to Student and Student to Instructor as well as Student to Student.

**Forum 2:** Introductions Forum: Introduce Yourself

**Forum 3:** Student Chat Room: Student to Student discussions.

Note: All rules for of proper Netiquette must be followed. Any student who violates these rules by being disrespectful will face disciplinary action. Watch your language, tone and professionalism here.

<https://youtu.be/80uRE972uQ0>

**View this video on Netiquette rules.**

## Guide for Learning Remotely

You may want to read the **Student Guide to Learning Remotely** published by the E-Learning department under 'Face-to-face Suspension Tools':

<https://www.oakland.edu/elis/>

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. Please use help desk for all your technical issues. They are prompt and can be your first line of contact for any WebAssign issues.

### **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.

**WebAssign: How to Get Started: Will be posted on Moodle separately**

## 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 is assigned to the quiz.

### **Math Review Homework:**

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

**PHY 1510/1610 SCHEDULE – Fall 2020 (Tentative, Subject to Change)**

**Week 1: Sep 3 – Sep 4 (You can complete these activities over the week end)**

- Read the course syllabus on Moodle, Take Syllabus quiz on Moodle.
- Enroll in WebAssign.
- Take Introduction to WebAssign Quiz on WebAssign
- Take the Math Review Home Work on WebAssign
- Introduce yourself in the Forums (Mandatory)

**Week 2: Sep 8 – Sep 11**

- **CHAPTER 1**
- **CHAPTER 2**

**Week 3: Sep 14 – Sep 18**

- **CHAPTER 3**

**Week 4: Sep 21 – Sep 25**

- **CHAPTER 4**

**Week 5: Sep 28 – Oct 2**

- **CHAPTER 5**

**Online Exam # 1: Thursday, October 1st – Chapters 1, 2, 3, 4**

*The exam is available on WebAssign from 1pm – 2:47pm. It is one hour 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: Oct 5 – Oct 9**

- **CHAPTER 6**

**Week 7: Oct 12 – Oct 15**

- **CHAPTER 7**

**Week 8: Oct 19 – Oct 23**

- **CHAPTER 8**

**Week 9: Oct 26 – Oct 30**

- **CHAPTER 10**

**Online Exam # 2: Thursday, October 29th – Chapters 5, 6, 7, 8**

*The exam is available on WebAssign from 1pm – 2:47pm. One hour 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: Nov 2 – Nov 6**

- **CHAPTER 11**

**Week 11: Nov 9 – Nov 13**

- **CHAPTER 12**

**Week 12: Nov 16 – Nov 20**

- **CHAPTER 13**

**Week 13: Nov 23 – Nov 25**

- **CHAPTER 13**

**Week 14: Nov 30 – Dec 4**

**Online Exam # 3: Final Exam: Tuesday, December 1st – Chapters 10, 11, 12, 13**

*The exam is available on WebAssign from 1pm– 2:47pm. One hour 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 15: Dec 7 Classes end**

**Week 16: Dec 09 – Dec 15**

Important dates:

**Sept. 10, 2020** Last day 100% tuition refund – 1st half courses. Emailed and/or in-person course drop requests must be submitted to the Registrar's Office by 4 p.m. SAIL adjustments can be made until 11:59 p.m. Please send email requests to [regservices@oakland.edu](mailto:regservices@oakland.edu).

**Sept.17, 2020** Last day 100% tuition refund – full semester courses. Emailed and/or in-person course drop requests must be submitted to the Registrar's Office by 4 p.m. SAIL adjustments can be made until 11:59 p.m. Please send email requests to [regservices@oakland.edu](mailto:regservices@oakland.edu).