

PHY 1620 – Fundamentals of Physics II • 4 Credit Hours (no Lab) 41839
Fall, 2020 **THIS IS AN ONLINE COURSE**

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Office hours: Email bowyer@oakland.edu for an appointment time. *Please do not contact me through Moodle or WebAssign*
Class Time: TR - Tuesday & Thursday from 3pm -4:47pm. **ONLY for Exams and Quizzes**
Suppl Instr: TR - Tuesday & Thursday from 5pm-6pm. Optional/Recommended

Course (Catalog) Description: Sound, light, electricity and magnetism. Satisfies the university general education requirement in the knowledge applications integration area.

Topics include:

Electricity: The Electric Charge; Conductors; Electric Force; Electric Field; Electric Potential; Storage of Electric Charge; Basic Electric Circuits.

Magnetism: Magnetic Polarities; Magnetic Force; Magnetic Field.

Electromagnetism: Magnetic Force on a Current; Electromagnetic Induction; Electromagnetic Waves.

Optics: Reflection and Refraction of Light; Diffraction and Interference; the Wave Nature of Light.

Modern Physics: Quantum physics, Basics of Atomic and Nuclear Physics.

Course Prerequisites: Introductory Physics I; Calculus II (recommended co-requisite)

Course Corequisite for PHY 1520: PHY 1520 students are required to enroll in a section of lab.

PHY 1520 (4 credits with Lab) satisfies the university general education requirement in Natural Science and Technology knowledge exploration area.

PHY 1620 (4 credits, no lab) does **NOT** satisfy the university general education requirement.

General Education Learning Outcomes for PHY 1520/1620:

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 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, and conceptual questions.
- **Activities** – Simple hands-on and conceptual activities.
- **Laboratories (for PHY 1520 only)** – these include data-taking and analysis and serve to reinforce the understanding of fundamental concepts.

TESTBOOK: Serway, Raymond A. and John W. Jewett, Jr. Principles of Physics: A calculus-based text (hybrid) Edition 5th packaged with:

WebAssign – Multi-term Access Card

- Access to e-Book
- Access to Student Study Guide and Solutions Manual

Cengage Publishing – ISBN: 9781305586871 **[Required]**

Serway, Raymond A. and John W. Jewett, Jr. Student Solutions Manual with Study Guide for “Principles of Physics”. 5th edition. (Vol. 2)

Cengage Publishing – ISBN 9781133110750 **[NOT Required]**

Please notice:

- The Access to Web Assign is valid for multiple terms (PHY 1510 & PHY 1520)
- If you wish to *purchase just the access to WebAssign*, you may do so:
 - *Online* – once you are logged in to WebAssign.net.
Please see the page of the syllabus dedicated to WebAssign

Equipment: Basic scientific calculator with trigonometric functions, pencil

Teaching Method: This class will utilize the learner-centered method. This means that we will use a variety of activities which allow students with different learning styles and strengths to demonstrate what they are learning. In-class activities include:

- short lecture, addressing the most difficult/least understood concepts, and including plenty of visual materials and demonstrations
- problem-solving tasks

Pre-class Assignments: Prior to accessing the ONLINE lecture you are *required* to have read the assigned chapter of the textbook. You may also want to print the PowerPoint to take notes on.

Lecture Power Points are available online on Moodle.

Study Tips: In order to develop *Critical Thinking* (one of the main goals of this course) the 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 (answers to be found at the end of the textbook) and the end-of-chapter *Conceptual Questions*.

Conceptual questions will be included in the Exams

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 will provide and discuss extra problem, review difficult concepts, and answer any questions about current and/or past material.

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

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

If you missed a session, you can find on *eSpace* study material that is regularly posted by the SI instructor. (<https://espace.oakland.edu/course>)

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:

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

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

Math Review: Good Math skills are an essential pre-requisite for a Physics course. Review the following *five Math videos* posted on Moodle if you need a refresher. 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*

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 lectures are posted on Moodle.

Demonstrations: A number of videos of demonstrations are posted on Moodle.

Activities: Three activities will be introduced. These are simple experiments to be performed individually. The individual reports will be graded. **The activities are worth 10% of the final grade (3.33% each).**

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 at 11:59pm on the date specified on WebAssign. Only in case of serious circumstances an extension may be granted. Please send me an e-mail at bowyer@oakland.edu about this *before* the deadline.

The homework is worth 20% of the final grade.

There are 13 assigned homework sections. I will drop the lowest one.

Quizzes: There will be 3 quizzes that are worth 5% each (15% of your final grade). These will be downloaded so you can show your work and put in your answer. Then create a pdf and email back these will be done in a the last 30-minute time before the end of the class time.

Online Exams: There will be three online exams on WebAssign in the form of problems and conceptual questions. These exams are open book, and have the duration of 2 hours

- Exam # 1: Chapters 19, 20, 21
- Exam # 2: Chapters 22, 23, 24, 25, 26
- Exam # 3: Chapters 27, 28, 29, 30, 31

The exams are worth 55% of the final grade (Ex 1: 15%, Ex2: 20%, Ex3: 20%)

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 based on the following percentages. Your grades will be posted on **Web assign**.

Homework	20 %
Activities	10 %
Quizzes	15 %
Exam 1	15 %
Exam 2	20 %
Exam 3	20 %

Grading scale:

100 – 95%	A
94 – 90%	A-
89 – 87%	B+
86 – 84%	B
83 – 80%	B-
79 – 77%	C+
76 – 74%	C
73 – 70%	C-
69 – 67 %	D+
66 – 64 %	D
63 – 0 %	F

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.

Special Considerations

Students with a documented learning or physical disability must contact the Office of *Disability and Support Services*, 121 North Foundation Hall, (248) 370-3266, and inform the instructor of special needs during the first week of classes. For more information, visit <http://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 0.0, 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

University excused absences 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 <http://www.oakland.edu/?id=6850&sid=175>

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/>

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 **LOG-IN**.
2. Click on **'I have a Class Key'**
3. Enter the **Class Key: oakland 6666 5666** (this allows me to see your homework)
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** click on **Help** or go to
<http://www.webassign.net/info/support/report.html>
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### To access the Homework:

1. Go to <http://www.webassign.net/login.html> (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 1620 TENTATIVE SCHEDULE – Fall 2020**

| Tuesday                                                                            | Thursday                                                          |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| NO class                                                                           | 9/3 Intro & Chapter 19<br>Electromotive Forces                    |
| 9/8 Chapter 19<br>Electromotive Fields                                             | 9/10 Chapter 20<br>Electric potential<br><b>Activity #1</b>       |
| 9/15 Chapter 20<br>Electric potential<br><i>Ch 19 due</i>                          | 9/17 Chapter 21<br>Current<br><b>Quiz #1</b>                      |
| 9/22 Chapter 21<br>Direct current<br><i>Ch 20 due</i>                              | 9/24 Chapter 22<br>Magnetic Forces<br><i>Activity 1 due</i>       |
| 9/29 Chapter 22<br>Magnetic Forces<br><i>Ch 21 due</i>                             | 10/1 <b>Exam 1 (Ch 19-21)</b>                                     |
| 10/6 Chapter 23<br>Faradays Law<br><i>Ch 22 due</i>                                | 10/8 Chapter 23<br>Induction<br><b>Activity #2</b>                |
| 10/13 Chapter 24<br>Electromotive waves<br><i>Ch 23 due</i>                        | 10/15 Chapter 24<br>Electromotive waves<br><b>Quiz #2</b>         |
| 10/20 Chapter 25<br>Reflection of light<br><i>Ch 24 due</i>                        | 10/22 Chapter 25<br>Refraction of light<br><i>Activity #2 due</i> |
| 10/27 Chapter 26<br>Mirror images<br><i>Ch 25 due</i>                              | 10/29 Chapter 27<br>Wave optics<br><b>Activity #3</b>             |
| 11/3 Chapter 27<br>Wave optics<br><i>Ch 26 due</i>                                 | 11/5 <b>Exam 2 (Ch 22-26)</b>                                     |
| 11/10 Chapter 28<br>Quantum<br><i>Ch 27 due</i>                                    | 11/12 Chapter 28<br>Quantum<br><b>Quiz #3</b>                     |
| 11/17 Chapter 29<br>Atomic Physics<br><i>Ch 28 due</i>                             | 11/19 Chapter 29<br>Atomic Physics<br><i>Activity #3 due</i>      |
| 11/24 Chapter 30<br>Nuclear Physics<br><i>Ch 29 due</i>                            | 11/26 thanksgiving<br><br>No Class                                |
| 12/1 Chapter 30<br>Nuclear Physics                                                 | 12/3 Chapter 31<br>Particle Physics                               |
| 12/8 <b><i>Saturday 12/5</i></b><br><b><i>CH 30 and 31 due before the exam</i></b> | 12/10??? Time TO BE DETERMINED<br><b>Final EXAM 3 (Ch 27-31)</b>  |



