Oakland University *College of Arts & Science* *Department of Physics*

PHY 1020 – General Physics II
PHY 1090 – Principles of Physics II
4 credit hours
Winter 2022

Instructor: Evgeniy Khain **E-mail:** khain@oakland.edu
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Class Time: Tuesday, Thursday, 10:00-11:47 am **Office hours:** Tuesday 5:30-6:30 pm
Auditorium: 190 HHS or by appointment

Course (Catalog) Description: Electricity and Magnetism. 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: Basics of Quantum Physics.

Course Prerequisites: PHY 1010

PHY 1020 and PHY 1090 satisfy the university general education requirement in the Knowledge Applications (KA) integration area. Prerequisite for Knowledge Applications integration is the completion of the general education requirement in the Natural Science and Technology knowledge (NSTN) exploration area.

General Education Learning Outcomes for PHY 1020 and PHY 1090:
The learning outcomes for Knowledge Applications courses state that the student will demonstrate:

- How knowledge in a field outside of the student's major can be evaluated and applied to solve problems across a range of applications
- Knowledge of the personal, professional, ethical, and societal implications of these applications

Note: *For the course to satisfy the Knowledge Applications learning outcome, the student must have completed a knowledge exploration course in NSTN prior to enrolling in this course.*

Course Goals: 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.

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

Supplemental Instruction: Supplemental Instruction is provided after the lecture as a support for the students. The SI leader will provide some help with the homework, more problem solving, review difficult concepts, and answer questions. Participation is not mandatory, but strongly suggested.

Textbook: Serway/Vuille, College Physics, 11th edition, Cengage with WebAssign (Multi-term), ISBN: 9781337741569.

For students who choose just WebAssign & e-Book: Access Card to WebAssign for 11th Edition (Multi-term), ISBN: 9781337763486.

The Hybrid format of the textbook is cheaper than the hardcover one. It does not include end-of-chapter problems, but these can be found on the e-book. Register to WebAssign with the following class key: **oakland 4642 1165**

Homework: Every week, I will assign homework and it will contain problems and questions which will be graded. I will use the online program WebAssign, which will accept and automatically grade the homework. This requires the Access Card. The homework for each chapter can be submitted a maximum of 5 times. For accessing WebAssign: see the next page. Due time: The assignments are usually due at 11:59 pm on the specified date. No email homework is accepted. The homework is worth 30% of the final grade.

Lecture problems: One problem will be assigned in class every week during the Tuesday lecture; it will be due on Friday of the same week at 11:59 pm. These written assignments need to be sent by email to khain@oakland.edu (as a single pdf file) before the due time. There will be 10 such problems given during the semester. The overall grade for this part is worth 10% of the final grade.

Exams: There will be two midterm exams. Each midterm exam is worth 20% of the final grade. The exams consist of Problems and Conceptual Questions. All exams will be closed-book. You may bring an 8.5" x 11" hand written sheet containing formulas (one page, two sides, no problems/examples solved); the formula sheet must be submitted with the exam. A scientific calculator is needed plus pencil and ruler. Please notice: clear writing and clarity of expression is a very important component of the exams.

Final Project: To simplify the difficult life of students in the current epidemiological situation, the final exam is replaced by the final project, which is worth 20% of the final grade. The project topics will represent the final third of the course; the list of topics will be given later. The written part of the project must be submitted by email (as a single pdf file) to khain@oakland.edu by Thursday, **April 21**. [In some cases, the written part might be followed by the oral part (conducted during the exam week), where each student will discuss the project with the instructor in a one-on-one online conversation; the details will be given later].

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 tests. If you cannot be present for an exam due to an 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.

Labs (Phy-1020 ONLY) are completely independent part of the course. Prof. Gopalan Srinivasan [srinivas@oakland.edu, 186F SEB, (248) 370-3419] coordinates this course. In order to pass Phy-1020 course, the lab part has to be satisfactory.

Grading Scale:							
Lecture Problems	**10%**						
Midterm Exam 1	**20%**	A	≥96%	C+	70-74%	D+	55-59%
Midterm Exam 2	**20%**	A-	90-95%	C	65-69%	D	50-54%
Final Project	**20%**	B+	85-89%	C-	60-64%	F	0-49%
Homework	**30%**	B	80-84%				
Total	**100%**	B-	75-79%				

Attendance: Attendance to all lectures and zoom meetings is expected. Poor attendance usually correlates with poor course grade.

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/

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.

WEB Assign: 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 4642 1165** (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.

Notice: there is a 14 day grace period to use WebAssign. If you have not purchased your textbook yet, during this time you can do your homework without a registering code.

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~

To access the Homework:

1. Go to http://www.webassign.net/login.html.
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.
- Web Assign 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.

Tentative Course Schedule

Day	Date	Lecture Topics	Chapters
Th	1/6	Electric charge; Coulomb's law; Electric field	15.1 – 15.4
T	1/11	Electric field (examples); Flux of electric field	15.4 – 15.8
Th	1/13	Gauss's law and its applications	15.8
T	1/18	Gauss's law (more examples); Electric potential	16.1 – 16.2
Th	1/20	Electric potential (examples); Potential energy of a system of charges; Conductors	16.2 – 16.4
T	1/25	Capacitors in series and in parallel; Potential energy of a capacitor	16.5 – 16.8
Th	1/27	Dielectrics; Electric current and conduction; Ohm's law, Resistors in series and in parallel	17.1 – 17.4, 18.1 – 18.3
T	2/1	Kirchh. rules; Circuits with 1 and 2 batteries; Power	17.6, 18.1 – 18.4
Th	2/3	RC circuits, Review (solving problems)	18.5
T	2/8	Magnetic field and its action on a charged particle	19.3 – 19.4
Th	**2/10**	**Midterm Exam 1: Chapters 15-18**	
T	2/15	Magnetic forces and torques	19.5 – 19.6
Th	2/17	Ampère's law, examples	19.7 – 19.9
T	2/22	Induced emf; Faraday's law; Lenz's law	20.1 – 20.2
Th	2/24	Motional emf, examples; Self-inductance	20.3, 20.5
	2/26-3/6	**Winter Recess**	
T	3/8	RL circuits; LC circuit; Energy in circuits	20.5 – 20.7
Th	3/10	AC circuits; Resonance; Electromagnetic waves; Doppler effect for light.	21 (certain topics)
T	3/15	Energy in electric and magnetic fields; Reflection and refraction of light	21, 22
Th	3/17	Review (solving problems)	
T	**3/22**	**Midterm Exam 2: Chapters 19-22**	
Th	3/24	Mirrors and Lenses	23.1 – 23.3
T	3/29	Wave properties of light; Wave properties of particles; Uncertainty principle and Wave function	24.1 – 24.2 27.6 – 27.8
Th	3/31	Thermal (Blackbody) radiation; Photoelectric effect	27.1 – 27.2
T	4/5	Early models for atomic structure; Atomic spectra	28.1 – 28.2
Th	4/7	Bohr's model; Atomic transitions	28.3
T	4/12	Beyond Bohr's model: the hydrogen atom	28.4
Th	4/14	Line splitting (Zeeman); Spin; Pauli principle	28.4, 28.5
Th	**4/21**	**Final Project due date**	

Note:
This schedule is subject to change except for dates of exams.