FLORIDA GULF COAST UNIVERSITY

COLLEGE of ARTS and SCIENCES

Department of Chemistry and Physics

Instructor: Alexander Sakharuk
Semester: Summer 2025
Class Meetings:
MWF 9:30 – 11:50 am, Seidler Hall 220

Phone Number: 239-590-7560
e-mail: asakharu@fgcu.edu
Office Location: WH 252

Office Hours: M 8:30 – 9:25 am
F 8:30 – 9:25 am

1. COURSE NUMBER AND TITLE, CATALOG DESCRIPTION, CREDITS:

PHY 2049 GENERAL PHYSICS II (3 CREDITS), CRN 52534

Second semester of a calculus-based two semester sequence of general physics (mechanics, wave motion, sound, thermodynamics, geometrical and physical optics, electricity and magnetism) and laboratory for science, mathematics, and engineering students.

2. PREREQUISITES FOR THIS COURSE:

MAC 2312 for level UG with min. grade of C and PHY 2048C for level UG with min. grade of C

3. GENERAL COURSE INFORMATION: Topic Outline.

- Electric field of discrete and continuous charge distributions
- Electric potential
- Electrostatic energy and capacitance
- Electric current and direct-current circuits
- The magnetic field and sources of the magnetic field
- Magnetic induction
- Alternating-current circuits
- Maxwell's equations and electromagnetic waves
- Properties of light, optical images, interference and diffraction

4. LEARNING OUTCOMES AND ASSESSMENT:

GENERAL EDUCATION COMPETENCIES:

General education courses must meet all of the following outcomes.

Quantitative Reasoning (QR): Analyze, summarize, and interpret quantitative data. Make valid inferences.

Written Communication (WC): To communicate effectively using standard English language.

Critical Thinking (CT): To demonstrate skills necessary for analysis, synthesis, and evaluation.

ADDITIONAL COURSE COMPETENCIES:

At the conclusion of this course, students will be able to demonstrate the following additional competencies:

- Recognize the quantum nature of electric charge.
- Explain the interaction between electric charges and use Coulomb's law to solve problems involving charge distributions.
- Explain the concept of "field" and compare it to "action-at-a-distance" using forces.
- Explain and draw the electric field configuration due to various discrete and continuous charge distributions.
- Relate the theoretical interpretation of electric potential to everyday phenomena and use it to solve problems.
- Explain the meaning of electrostatic energy and apply it to solve problems involving capacitance.
- Identify the theoretical framework for electric current and apply it to solving problems on direct current circuits and alternating current circuits.
- Explain and draw the magnetic field configuration due to various current distributions.
- Explain the concept of electromagnetic induction and use it to explain everyday physical phenomena.
- Describe and use Maxwell's equations to solve problems in electricity and magnetism.
- Investigate the interaction of light with matter and light's properties.

5. **COLLEGE-WIDE POLICIES:**

Attendance policy from FGCU Academic Catalog

Regular and punctual attendance and participation are expected. Although students are graded on intellectual effort and performance rather than attendance, absences may lower the student's grade when the instructor deems class attendance and class participation as essential. In those classes where attendance is considered part of the grade, the instructor must inform students at the beginning of the term in the syllabus. Any instructor who informs students in writing about the necessity of class attendance may request Records & Registration to drop a student from the class. The instructor will need to indicate the student's last date of attendance in their request to Records & Registration. A grade of W will be posted to the student's record if Records & Registration is notified prior to the deadline for withdrawal without academic penalty. After that date, the instructor may assign a punitive letter grade for any student who does not abide by attendance requirements. Colleges have the authority to establish college-wide, program-wide, or course-wide policies on attendance in accordance with the above guidelines.

Core Syllabus Policies:

FGCU has a set of central policies related to student recording class sessions, academic integrity and grievances, student accessibility services, academic disruption, and religious observances that apply to all courses at FGCU. Be sure to review these online at: https://www.fgcu.edu/about/leadership/officeoftheprovost/core-syllabus-policy-statements

6. **REQUIREMENTS FOR THE STUDENTS:**

Computers: You are not allowed to bring any computers (laptop, notebook, etc.) to the exams. In case of violation, you will be asked to leave. **Your grade for the exam will be zero.** Report will be sent to the Dean of Students office.

Cell Phones: You must turn off your cell phones before coming to the class. No talk and no text are allowed during the class. In case of violation, you will be asked to leave. **Your grade for the exam will be zero if you will use cell phone.** Report will be sent to the Dean of Students office.

Reading the Textbook:

The course textbook is a good one, written by a physics professor who knows his physics *and* teaching physics. I will be assigning regular reading from the text that I expect you to read before class. It is crucial that you read what I expect you to read. Only by actually doing this reading and any assignments I give will you be prepared to learn during the next class. If you do not prepare, you will be lost and frustrated during class. Furthermore, any learning you do will be rushed and more damage control than actual progress.

Homework:

The purposes of the homework are so that you can gain some practice solving problems, and so that I may assess your grasp of the material before you are tested on it. We will use the LON-CAPA website for most homework. The online homework assignments will be frequent. "Copying" homework from a friend or working with them online may result in a higher homework grade for you, but it almost guarantees lower test scores. The online homework will only be available for a limited time, so plan your time carefully when the assignments are announced. I can occasionally assign problems to be handed in on good old-fashioned paper, too.

For all quizzes and exams, relevant "equation sheets" will be provided. The memorization of formulas is less important than knowing *when and how to use* the formulas. I will provide you with copies of these equation sheets for studying. Thus, you should become familiar with the equation sheets and use them when doing your homework.

In addition to graded homework, I will probably give you lists of practice problems for each chapter. I will never collect and grade these problems, but they will be a valuable tool for test preparation.

Quizzes:

The quizzes are based upon recent homework and reading. I plan on having 14 online quizzes, each of which will take about 10 minutes of time. You can work with the particular quiz anytime during the announced day but you will have only one attempt to finish quiz. Missed quizzes will be counted as zeroes. Quiz contribution to the final score is 5%.

Exams:

The exams will be composed primarily of problems which must be solved. Problem solving is a skill. Like riding a bicycle or cat juggling, it must be practiced. Therefore, the homework is an essential part of your test preparation. You cannot "cram" for a physics test. Do practice early and practice often. The exam dates are given in the course schedule.
Everyone can have a bad day, and this can happen on an exam day. If you "bomb" a test there is still hope. Some of exams you will participate in could have a few extra problems (usually a little bit more difficult than the mandatory problems) and you can raise your score. Extra problems will be included or not based on the average performance of the class. If you miss an exam, you will be given a zero grade for that exam. Make-up exams will be given only in situations where you have special circumstances of which **1**. ***I am notified in advance and 2. You provide an appropriate medical/legal documents with valid justification of your absence at exactly exam time, name and phone of the office issued that document.*** Final exam is c**omprehensive and mandatory** though I reserved the right to release student from final exam due to high cumulative score.

Please note that the cheating during exam will automatically lead to zero score for that exam. Report will be sent to the Dean of Students office as well. You can not leave the room before the end of exam.

7. **ATTENDANCE POLICY:**

I suggest very strongly that you attend every class. Missing class will have a significant negative impact upon your understanding of the material and consequently your grade. Solutions to most typical or difficult problems will be covered in lecture sections. In general, students who attend lectures will be far better prepared for the course examinations.

8. **GRADING POLICY:**

Your final grade will be comprised of the following

Area	Grade
Homework	**20%**
Online Quizzes	**5%**
4 in Class Exams	**60%**
Final Exam	**15%**

The overall grading scale will be as follows:

Total Score [%]	Grade
88.0 - 100.0	**A**
84.0 - 87.9	**A-**
80.0 - 83.9	**B+**
76.0 - 79.9	**B**
72.0 - 75.9	**B-**
68.0 - 71.9	**C+**
60.0 - 67.9	**C**
55.0 - 59.9	**D**
Below 54.9	**F**

Note: For a required course in your major, a C- is an unacceptable grade! The "incomplete" grade ["I"] should be given only when unusual circumstances warrant. An "incomplete" is not a substitute for a "D," "F," or "W." Refer to the policy on "incomplete grades.

9. **REQUIRED COURSE MATERIALS:**

Text: You do not have required textbook assign for that class. But you can use one of the following options in addition to the resources posted in Canvas files folder:

1. Open source OpenStax University Physics Volume I (https://openstax.org/details/books/university-physics-volume-1)

and University Physics Volume II

(https://openstax.org/details/books/university-physics-volume-2).

You can freely download these books in a few formats.

2. You can any standard University textbooks, for example, Physics for Scientists and Engineers with Modern, Hybrid, 8th Edition, by Raymond A. Serway and John W. Jewett, published by Cengage, ISBN-10: 113310360X ISBN-13: 9781133103608 You can use either hard copy or e-text book.

Calculator: You should have at your disposal a scientific calculator. Required functions are; $\sqrt{x}$, x^2, log, natural log, e^x, sin, cos, tan, y^x. If do you not already own one, expect to pay $1 to $200, depending on how fancy you want to get. Oh, and once you've spent the bucks, bring it to class.

Webassign : You do not have to obtain webassign access code in my class.

10. **WEB LINKS:**

Canvas: Login with your FGCU email login and look for your CRN. You will find there the syllabus, class schedule and all other essential course documents, like the equation sheet (for exams) lab procedures and so forth. http://canvas.fgcu.edu/ **.** Use the following link to explore Canvas: https://fgcu.instructure.com/courses/7692 . This is also where you will turn in electronic copies of your lab reports. See the Lessons tab. Paper copies must be handed in in class. The purpose of the electronic submission here is so that the reports can be checked for plagiarism and other naughtiness. It is your job to make sure that you submit both your electronic copy and your paper copy and to make sure that they are the SAME file. (Your paper copy may contain handwritten items not present in the electronic copy.)

LON-CAPA: http://orion.cas.fgcu.edu

User ID : your UIN (on your FGCU ID card…9 digits starting with 814)

Password : also your UIN (initial password ; you can change it later)

LON-CAPA course management system will be used for all HW assignments. Log in ASAP and let me know if there are any problems.

11. **CLASS SCHEDULE:**

The following is a very tentative schedule! I reserve the right to change or add requirements at any time. These changes will be announced/discussed in class and you can find them on the class Angel page. There is generally one homework for each chapter. The Homeworks will be due on LON-CAPA unless otherwise specified (there may be some on Webassign, especially later in the semester.)

Date	What we're doing	Due	Comments
May **M 12** **Session 1**	Course overview, *Electric Forces, Electric Fields, Gauss's Law*		Introduction to the web-based homework (HW) service.
W 14 **Session 2**	*Gauss's Law, Electric Potential*		
F 16 **Session 3**	*Electric Potential,* *Capacitance and Dielectrics*		
M 19 **Session 4**	***Test 1***, *Current and Resistance*		Don't forget to have your own calculator!
W 21 **Session 5**	*Direct-Current Circuits*		
F 23 **Session 6**			
M 26	**Memorial Day Observed**		
W 28 **Session 7**	***Test 2***, *Magnetic Fields*		Don't forget to have your own calculator!

F 30 **Session 8**	*Magnetic Fields,* *Sources of the Magnetic Field*		
June **M 2** **Session 9**	*Sources of the Magnetic Field,* *Faraday's Law*		
W 4 **Session 10**	*Faraday's Law,* *Inductance*		
F 6 **Session 11**	***Test 3***, *Alternating-Current Circuits*		Don't forget to have your own calculator!
M 9 **Session 12**	*Electromagnetic Waves,* *Wave Motion*		
W 11 **Session 13**	*Sound Waves,* *Superposition and Standing Waves*		
F 13 **Session 14**	***Test 4***, *The Nature of Light and the Principles of Ray Optics*		Don't forget to have your own calculator!
M 16 **Session 15**	*The Nature of Light and the Principles of Ray Optics, Image Formation*		
W 18 **Session 16**	*Image Formation,* *Wave Optics*		
F 20 **Session 17**	***Test 5***		Don't forget to have your own calculator!

12. **ANY OTHER INFORMATION OR CLASS PROCEDURES OR POLICIES:**

Center for Academic Achievement Syllabus Statement:

The Center for Academic Achievement (CAA) offers academic support services for any FGCU student. The services are at no extra charge to students and include: peer tutoring, Supplemental Instruction, Student Success Workshops, and individualized academic coaching. If you would like to participate in or learn more about these services, please visit the CAA in Library 103. You may also email the CAA at caa@fgcu.edu or call at (239) 590-7906. The CAA website is www.fgcu.edu/caa.