**Indiana Academy for Science, Mathematics, and Humanities**

**Syllabus for AP Physics C PHYS 122 (Spring 25): Electricity and Magnetism DC**

**Instructor: Godfrey Walwema Office Location: Elliot Hall B 009F**

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**Office hours** MWF: 2-4pm, R: 4-5pm T:10-1pm, or by appointment

**Meeting Rooms:** Lectures BU 205, Labs 205

**Textbooks and course materials:**

1. The Princeton Review AP Physics C prep

2. [College Physics - OpenStax](https://openstax.org/details/books/college-physics)<https://openstax.org/books/college-physics/pages/preface>

3.Internet Resources: <https://www.nsf.gov/news/classroom/physics.jsp>

**Grade Calculations and weighting**

Exams (Units and Finals) ...........60% of course grade

Laboratory Work…………………….25% of course grade

Homework and Participation….15% of course grade

Grades

**A: 85 - 100% B: 75 -84%**

**C: 65 -74% D\* 55-65% (Retake)**

**The prerequisite for this course is AP Physics C Mechanics (PHYSC 120)**

**Course Description**

The course is a continuation of PHYC 120. Topics include Coulomb's law and the electric field, Ampere's law and the magnetic field, introduction to Maxwell's equation, DC and AC circuits. An optional introduction to selected topics in modern physics may be included if time permits.

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| **Week** | **Topics** |
| 1-2 | 1. **Electrostatics**:   Charges and Electric Fields, Coulomb’s Law (HW) |
| 3 | E-fields, Forces, Gauss’ law (Lab and HW) |
| 4-5 | E-potential, Power, work, and energy due to charges (HW) |
| 6 | 1. **Conductors, Capacitors, and Dielectrics:**   Semiconductors, insulators, and metallic conductors  TopicTest 1 |
| 7 | Electric Circuits (Series/Parallel), power, resistance, RC circuits |
| 8 | Ohm’s and Kirchhoff’s, Applied DC Circuits (Lab and HW) |
| 9 | 1. **Magnetic Fields:**   Solid State magnets and B-fields due to currents/charges, Right Hand Rule 1 |
| 10 | Ampere’s Law and Right Hand Rule 2 (Lab and HW) |
| 11 | Biot-Savart Law, force on current-crying conductors  Topic Test 2 |
| 12 | Lenz’ and Faraday’s Law; AC Circuits (HW) |
| 13 | 1. **Electromagnetic Induction:**   Magnetic Field Applications (consequences of induced currents), Faraday and Lenz’s Laws |
| 14 | LR circuits (Lab and HW) |
| 15 | Maxwell’s equations and their applications |
| 16 | Course Review  Practice Test |
| 17 | **Finals** |

The contents of the course outline are subject to change. Changes will be announced in class.

**Indiana Academy Wireless Device Policy**:

Pursuant to Indiana Code 20-26-5-40.7, The Indiana Academy for Science, Mathematics and Humanities prohibits student use of wireless communication devices for non-instructional purposes in the classroom. As such, any and all portable wireless devices, that have the capability to provide voice, messaging, or other data communication between two or more parties, must only be used for academic purposes directly tied to the classroom activity or related educational task. Exceptions to this wireless device policy are eligible through academic accommodations, individualized education programs, or with instructor approval permitting the use of a wireless device for justification related to health, safety, and/or well-being. The improper use of a wireless device in an active classroom setting is subject to disciplinary action including but not limited to; a verbal warning, temporary seizure of said device by a school official, an unexcused absence for the class in question, written communication to parent/guardian, among other elevated consequences for repeated improper use.

No game-playing, movie-watching, e-mail, or IM’ing allowed in class -- doing so will result in a recorded absence for that day.

Laptops/iPads, if available, should be brought to class during laboratory sessions. This is so you can record, graph, and analyze your data in real-time, both to save you time AND to catch errors as they happen! Use of electronic devices for any other use during lecture is forbidden without prior agreement with the instructor.

**Inclusive Excellence Statement**

Ball State University aspires to be a university that attracts and retains a diverse faculty, staff and student body. We are committed to ensuring that all members of the community are welcome through valuing the various experiences and worldviews represented at Ball State and among those we serve. We promote a culture of respect and civil discourse as expressed in our Beneficence Pledge. As a reflection of Ball State’s commitment to respect, civil discourse, and the Beneficence Pledge, Inclusive Excellence at the Indiana Academy emerges as one of the priorities of our living and learning community. We strive to exist together respectfully and compassionately, creating an environment where every member can thrive. Unfortunately, there might be occasions when something occurs that disrupts our progress toward meeting these objectives. In this case, we encourage any member of the Academy community to file a Campus Climate Report (CCR) https://bsu.qualtrics.com/jfe/form/SV\_6mbRbL5acAntUTI. All reports will be taken seriously, and appropriate responses will be carried out by Academy administration.

I truly believe in this policy, and endeavor to go above and beyond in our classroom setting. If you see any behavior that goes against the above policy, please bring it to my attention (or have someone you trust do so if you are hesitant). Alternatively, you can find the appropriate form at academy.bsu.edu/forms to report the incident directly to your DEI Coordinator.

**Student Accommodation Policy**

Students possessing an educational 504 or IEP should contact the instructor as soon as possible to arrange for any accommodations that may be needed. Likewise, if you feel that you could benefit from an educational 504 or IEP, feel free to contact the instructor to this regard.

**Attendance Policy**

You have made a commitment toward academic achievement by attending the Academy – both attendance and integrity are essential components to that success. Class attendance is mandatory.

An unexcused absence on the day of a lab or test will result in an \*automatic zero for that lab or test\*.

Missing homework, quizzes and/or tests during an excused absence must be made up \*as soon as possible\*. It is the student’s responsibility to make these arrangements with the teacher.

· **Homework**: Homework is graded by completion (attempting all of them and failing is far more important than only trying half of them and succeeding). Late work will be accepted, but will be locked down by a letter grade.

**· Labs**: \*Most\* labs are also graded on completion. Those labs with lab reports will be graded on accuracy on a case-by-case basis. If you miss a lab due to an excused absence, we will make up the lab at a later date. Contact the instructor ASAP to schedule this.

· **Tests:** If you miss a test for excused reasons, please contact the instructor as soon as possible to arrange a make-up test.

It is also important that your brain be here as well as your body. Students who fall asleep in class will receive either a ‘tardy’ or an ‘absent’ mark from the instructor, depending on circumstances. Make sure you avoid this by getting enough sleep the night before! Late arrivals after 7 minutes will get a tardy and after 20 minutes into class-time will result in an absence for that day.

**Academic Dishonesty Policy**

Please refer to the “Academic Dishonesty” portion of your student handbook. In particular, please read the “Academic Integrity Board”. Remember that you always have the right to refute any accusation (or ramification dictated by your instructor) of academic dishonesty by having your case brought before the AIB. Note that if the AIB is used, its decisions are final.

Academic dishonesty includes but not limited to the following:

· Never submitting another person’s work as your own; this includes LLM and other AI generated information (see: LLM and other AI Fair-Use Policy, below)

· Never engage in “drylabing.” (artificially manufacturing lab data and submitting it as part of a lab report)

· Never cheating on quizzes and/or tests.

· Following all ethical standards as described in your student handbook (see “Academic Dishonesty”)

**If you feel you have been unfairly accused of failing an academic integrity standard, you have the option and right to appeal to the Indiana Academy Academic Integrity board.**

**LLM and other AI Fair-Use Policy**

Basic AI tools (spell-check, word-count, grammar, etc.) that assist with correcting errors and gathering information about your own work is not only accepted, but also encouraged!

More advanced AI tools such as LLMs (ChatGPT, LLaMa, Phi-1, etc.) that generate information or code may be used as a starting point for research or creative projects, but generated material should not (for several reasons!) be turned in as your own work. Using these LLMs can be very useful in helping you create a project and/or learn complex topics, but diligence is required to:

· \*Completely\* verify that all information provided by the LLM is accurate (this is a major problem, especially in the sciences!). Remember that these models pull non-vetted information from the internet, which will include non-expert, and sometimes malicious, sources.

§ You (and your grades) are responsible for any and all errors gathered in this manner.

· Resist turning in LLM produced material as your own work. The point of being at the Academy is to use provided information as a spring-board for your own intellect and creativity. Using these tools to help you gather ideas, or to find alternate ways to express your ideas, is both welcomed and encouraged. But make sure that you are not falling for temptation to use likely-erroneous data or logic that LLMs often provide. In other words, treat LLM generated material as you would other non-expert sources of material.

§ Presenting AI-generated material as your own will count as plagiarism, and will be dealt with accordingly (see Academic Dishonesty Policy, above).

**Mask Policy**

There is currently no campus wide mask-mandate, but if the CDC declares another health-emergency, and BSU puts a mask-mandate in place, this policy may change. If and when masks are required by BSU campus, the Indiana Academy will then follow the same procedure.

In case of extreme COVID-19 online emergencies, break glass for online policy

As it is possible that we may have to re-face pandemic conditions this year, there may be periods when some (or all) of us return to masks and/or are moved to online learning due to necessity or mandate. All of the below rules apply during e-learning, but some information may be useful:

Zoom Link: https://bsu.zoom.us/j/9429392891, if a password is required, please use AP1AND2

Lectures: Classes will be provided on Canvas with the same frequency and schedule of the normal school year. It is your responsibility to view these videos w/o 24hours of their posting. It is vitally important to watch them \*in order\*.

Homework: Homework can easily be scanned or photographed and emailed to me on the due-date required.

Laboratory: Labs will be designed to be done either in a discussion format on Zoom, or with common equipment found in standard homes. Any documentation (journals, reports, etc.) expected can be returned to me using the same procedure as HW.

Testing: Tests will be “given” and “collected” at very specific times (TBA). Future circumstances may require different methods, but currently the procedure is as follows:

· The test will be released on Canvas at a very specific day/time that will be announced several days in advance.

· You will have a set amount to time to complete your exam (will be announced on test day, and is tied to the length of that particular test). Returning your test to me will be as simple as scanning or photographing your exam and emailing it back to me before the given time has expired. 504/IEP accommodations (see below) will be honored.