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

**Syllabus for AP Physics C/ Phys 120 DC (Fall 25): Mechanics Course**

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

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**Office hours** MWF: 2- 4pm, T: 10 - 1pm R: 4 - 5pm; 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)**

**Prerequisite:** Completion of a General Physics course and/or concurrent enrollment in AP Calculus BC (MAT 165) or permission of the Science Division Chair.

**Course Description:**

This is a calculus-based physics course for students in pre-engineering, the physical sciences, or mathematics majors. Topics include Newtonian mechanics, work and energy, motion, impulse and momentum, elasticity and wave motion, rotational kinematics.

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| **Week** | **Topics** |
| 1 | 1. **Kinematics**

Metric System, Standard form, Measurement, and Vectors |
| 2 | 1D Kinematics (HW and Lab) |
| 3 | 2D Kinematics (HW and Lab) |
| 4 | 1. **Newton’s Laws**

Introduction to Forces and Newton’s LawsTopic Test |
| 5 | Normal and Friction forces (HW and Lab) |
| 6 | Centripetal Acceleration and Gravitation (HW and Lab) |
| 7 | Testing and Introduction to Conservation Laws  |
| 8 | 1. **Work, Energy, and Power**

Work-Energy, Energy types, Conservation of Energy (HW) |
| 9 | Gravitational energy, and Impulsive Forces (HW) |
| 10 |  Conservation of Momentum in 1-Dim / 2-Dim |
| 11 | Testing and Intro to Rotational Dynamics (kinematics) |
| 12 | 1. **Rotation**

Angular Kinematic Applications, and Torque (HW and Lab) |
| 13 | Torque Applications and Rotational Energy (HW) |
| 14 | Angular Momentum, and Applications (HW) |
| 15 | Testing and Intro to Wave Mechanics (Sound and Intensity) |
| 16 | 1. **Oscillations**

Doppler Effect, and SHM (Pendulum and Spring) (HW and Lab) |
| 17 | 1. **Fluid Dynamics**

Fluids (Pressure, Archimedes, and Bernoulli’s) |
| 18 | **Finals** |

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

**Ball State University beneficence pledge:**

Ball State University aspires to be a university that attracts and retains outstanding faculty, staff, and students. Ball State is committed to ensuring that all members of the campus community are welcome through our practice of valuing the varied experiences and worldviews of the people whom we serve. We promote a culture of respect and civil discourse as evident in our Beneficence Pledge. As a reflection of Ball State’s commitment to respect, civil discourse, and the Beneficence Pledge, inclusiveness 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.

**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.

**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**

Attendance is mandatory. Students may receive excused absences at the professional discretion of the school nurse, the associate director of mental health services, the associate director of college counseling and student engagement, the director of academic affairs, and the executive director of the Indiana Academy. Unexcused absences occur when students miss class without prior approval from the aforementioned designated school officials. Continued absences (both excused and unexcused) from Academy classes increase the likelihood of unsuccessful completion.

Alongside steady attendance, students are expected to maintain consistent healthy habits of decorum, respect, and kindness towards their classmates, instructors, and teaching assistants. When students fail to meet these classroom behavioral standards and academic habits, it is the expectation faculty engage appropriately to bring quick and immediate resolution. When students consistently fail to meet these behavioral standards and academic habits in the classroom, an administrative consequence ladder will be adopted, and recorded, in attempt to administratively address, engage, and rectify ongoing challenges.

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 instructor.

**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. 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 “Discipline and Due Process” portion of your student handbook. In particular, please read the “Academic Integrity” section. 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 Academic Integrity Board. 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 Integrity policy, above).