

Physics (Honors)— 2021-2022 — Fred Kral — The Marin School

Teacher: Fred Kral, Ph.D.

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Course Description

Physics is the branch of science concerned with the study of the physical world: energy, matter, forces, motion, phenomena, and the relationships between them. The topics of this introductory laboratory course are selected from mechanics, waves, electromagnetism, light, the physics of the 20th century, and contemporary physics. Students use the scientific method, conceptual reasoning, mathematical modeling, hands-on experimentation in the laboratory, computer simulation, and investigation of objects of daily life. Scientific ideas and problem-solving approaches are communicated using graphical, numerical, algebraic, verbal, diagrammatic, and physical approaches. In the data analysis component of the lab projects, students learn statistical methods that help scientists make inferences and evaluate experimental results. Students who qualify for this Honors course are enrolled in Pre-Calculus or Calculus and are self-starters who want to know more about the physical world and are excited about sharpening their abstract reasoning and analytical problem solving skills.

Required text and supplemental materials

- Giancoli, Douglas C., Physics: Principles with Applications, 7th Edition. Boston: Pearson, 2014. ISBN-13: 978-0-321-62592-2. Primary. Required.
- Serway, Raymond A. and Jerry S. Faughn, Holt Physics, Austin: Holt, 2002. ISBN 13: 978-0-030-56544-1. Secondary. Required.
- Bloomfield, Louis A., How Things Work: The Physics of Everyday Life, 5th Edition. New Jersey: Wiley, 2013. ISBN-13: 978-1118237762. Secondary. Optional.
- HP Prime CAS Graphing Calculator and charger. Required.
- Laptop computer. Required. Can be borrowed.
- *For Remote Learning*: Tablet with stylus. Strongly recommended.
- Organizer of paper: holes punched and not; Pencils (mechanical recommended).

Expected School-wide Learning Results (ESLRs):

1. Self-reliant learners. 2. Self-directed individuals. 3. Critical and creative thinkers. 4. Effective communicators. 5. Responsible members of society. Each of the components of this course prepare students to obtain these results.

Assessment

		ESLRs
Homework: timely completion of homework assignments. Assessed formally and informally.	2 points per homework	1, 2
Tests and Midterms: written and graphical solutions of problems.	150 points per midterm, 100 points per test	3, 4
End-Semester Assessments: Final project.	150 points (no more than 20% of the total)	1, 3, 4
Joining in: Safe, Space, Time, True; Lights, Camera, Action; Phone-away, Packet, Pencil/stylus are a short-hand for remembering foundational Handbook rules and our top secret tips for effective students .	Prerequisites for class	
In-Class work: contributing positive energy and interest level during in-class work including discussing, problem solving, performing experiments, and practicing during class. Earned by students who joined in. Assessed informally.	150 points per quarter	1, 3, 4, 5
Projects, Presentations, and Labs: quality and correctness of written and graphical results, and quality of delivery.	5 to 100 points depending on scope	3, 4, 5
Commitment to learning: Taking on what is challenging to you, getting help, communicating with the teacher, engaging with the material, and documenting work in the notebook. Assessed informally.	up to 100 points per semester, if it raises the grade	1, 2

Safety policy: only use equipment when and as instructed

Late work policy

The teacher enters grades once per week. Students get credit for late or partial work up to that weekly deadline.

Cell phone, computer, and device policy

Devices are not allowed in class, except by explicit permission to do class work. In the remote classroom, phones may be used to photograph your work. Personal and school computers shall be used for only for class. The Marin School supports the responsible use of technology. See the Parent and Student Handbook.

Collaboration policy

I encourage study groups. You may work with others (not just students) unless instructed otherwise as long as all of you contribute. It is wise to put the name of each contributing student on an assignment to avoid issues with plagiarism.

Please connect and email! – Fred