Honors Physics Syllabus

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Rm. 119 / Lab 133
Monday Make-Ups or Tutoring Thursday: 6:45 – 7:30 am

Course Description
Physics is the branch of science that describes motion, electricity, sound, light, and many other topics. This year, students will learn about the pursuit of science and scientific data, velocity, acceleration, gravity, Newton's Laws of Motion, vectors, momentum, energy, heat, sound, light, electricity, magnetism and more! Students can expect to apply content to laboratory procedures and safety, scientific thinking and reasoning, problem solving, hands-on application projects and research-based/application projects.

This course will take an algebraic and conceptual approach to explaining the fundamentals of classical physics. The concepts will then be extended and applied to numerous word problems of varying complexity. Students will be challenged to complete multiple application-based projects.

This course utilizes more math than standard physics, but has more concept foundations than AP Physics. The course will also differ from standard physics in the length, depth, and/or complexity per topic. For example, we may move quickly through one topic to gain additional time to cover a second topic with more depth. This course prepares students for introductory college-level physics courses such as those regularly required for degrees in engineering, science or some pre-med fields.

Course Expectations
Students will be expected to integrate mathematical equations into their conceptual understanding of physics. Students will, on a regular basis, manipulate algebraic equations to solve for the determined variable, meanwhile recognizing the physical laws that restrict the usage of the equation or variables within. Students will also use basic trigonometry in conjunction with physics formulas. Students will be expected to understand, explain, and predict outcomes of proposed scenarios based on the known laws of physics. As such, students are expected to be strong math students as well as strong science students.

This is an upper-level, college-prep course. I believe it is my responsibility as your teacher to give you the tools needed for success, including hands-on opportunities for learning, explanations of complex topics, assigning meaningful homework questions that will allow for concept and math practice, and worked out example scenarios. I believe it is your responsibility as a student to put forth quality effort on all tasks and to accept that the responsibility for learning and understanding is ultimately yours. If you do not understand the material, you may need to reread the text, use outside resources, ask for peer help, or ask me additional questions before or after class. Success in this class is primarily determined by the following factors: work ethic, quality effort, problem-solving ability.
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Course Schedule
Detailed Unit Plans will be given out for each unit to indicate assignments and due dates.

1st Semester
Linear Motion
Vectors and Projectiles
Newton’s 1st, 2nd, 3rd Laws of Motion
Momentum, Energy, & Collisions
Circular Motion & Torque
Fluids

2nd Semester
Heat, Temperature & Thermodynamics
Waves & Sound
Optics
Electrostatics
Circuits
Magnetism
Nuclear & Atomic Physics

Supplies
Graph paper (for lab graphs)
Binder & looseleaf paper
Protractor (selected units)
Metric ruler (selected units)  *additional supplies will be necessary for group projects
Scientific calculator
Writing Utensils
Textbook

Grading
1. The term/semester grade will be calculated with 20% of the grade from the term semester exam and the remaining 80% from the classroom grade.
2. The classroom grade will consist of quizzes, practice problems or questions, tests, projects, labs, and any other activities deemed appropriate by the teacher. This grade will be based on total points.
3. Typical Assignment Values (variation may occur due to unique needs of assignment/unit)
   a. Tests = 100 points
   b. Labs = 20 - 50 points
   c. Classwork = 10 – 30 points
   d. Quizzes = 10 – 30 points
   e. Projects = 100 points
4. Homework: Practice and review questions are assigned to provide the necessary practice to gain mastery. It is recommended that students complete all homework questions independently and in a timely manner. Homework will be collected on test day and will be counted as extra credit. Late homework will not be accepted due to the fact that it counts as extra.
5. Quizzes will be given during a unit to determine progress towards mastery.
6. All graphs for labs should be completed on graph paper.
7. Any student who willfully violates lab safety policy and the lab safety contract will suffer academically for the lack of a quality experiment, and may also face disciplinary measures for endangering the safety of the school population. On the first offense, students will be penalized 25% of the lab grade, on the second offense, students will be penalized 50% of the lab grade, and on the third offense, students will be penalized 50% of the lab grade and will be removed from the lab environment for the remainder of the term. In extreme situations, students will be denied laboratory privileges on the first or second offense.
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8. Daily classroom participation is expected. Excessive sleeping or talking (5 instances per semester) will also result in a lowered conduct grade.

9. All GMSD grading policies, including minimum number of assignments and grading scale will be in effect.

Classroom Rules

1. Students are to be respectful of all people, including themselves, their peers, and teachers. Hurtful comments or disrupting anyone at anytime is not allowed.
2. Students are to be respectful of their physical surroundings. This includes proper use of the materials supplied and the classroom environment. Gum, food, and drinks are prohibited, as they may lead to a pest problem or a dirty classroom.
3. Students will refrain from the usage of electronic devices, including cell phones and personal music players. Usage of these devices will be handled according to GMSD policy SP 6.312
4. Students are expected to follow all rules printed in the school handbook and the system handbook at all times.
5. Behavior Plan: I will attempt to handle the problem as simply, yet effectively as possible.
   a. Offense 1: Private conversation with student
   b. Offense 2: Move seat, change group, or work alone (depending on situation)
   c. Offense 3: Contact parents (email, phone call, and/or conference)
   d. Offense 4: Discipline referral
   e. Serious offenses may require skipping steps in the behavior plan.

Late Work / Make-Up Work / Retests

1. When a student is absent, most information about what was missed can be found on their “unit plan.” It is the student’s responsibility to confirm with the teacher regarding what was missed. If something was due on the day the student was absent, the student should turn in the item on their day of return. If a student is absent for 2 or more days, they have a time equal to the number of absent days to turn in late work without penalty.
2. Tests and quizzes can be made up during study hall or before school on “Make-Up Mondays” from 6:45 am – 7:30 am.
3. Late classwork, labs, or projects will be reduced by 10% for each day late.
4. Late or missing assignments will automatically be reported as a “zero” until the assignment has been made up.
5. Retesting: Because the goal is student mastery, students who do not demonstrate mastery have an opportunity to “Request to Retest.” To be eligible to retest, all of the following criteria must be met: The student must earn below a 70% on the test, the student must have turned in their completed homework on test day, and must turn in the “Request to Retest” form.
6. Window of Opportunity: The timeline for all late work, make ups, and retests is no more than 2 weeks from the date of absence (or test in the case of a retest). This should provide students ample opportunity to pursue remediation (I am available for tutoring on Thursday mornings) and gives students 2 possible Monday mornings to schedule make-ups or retests.
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General Policies
1. All supplies should be brought to each class. Students will not be allowed to leave class to retrieve materials from their locker.
2. Students are not allowed to regularly leave class for any reason, including to use the bathroom.
3. Students are considered tardy if not in their assigned seat by the end of the tardy bell. If students drop off books before leaving to take care of personal business, they should be back before the bell rings or a tardy will result.
4. I am available for student questions Thursday mornings from 6:45 – 7:30.
5. Students will not be allowed to make up work in the event of an unexcused absence.
6. Projects, lab reports, etc. lose 10% PER DAY if they are turned in late.
7. If a school documented medical condition requires exemption from any of the above stated rules and policies, it will be handled on a case by case basis.

Guidelines for Lab Reports
For selected labs we complete this year, you will be required to complete a formal lab write-up. Below, find the guidelines universal to all lab or activity pages to be turned in:
1. Information must be written legibly.
2. Formal lab report MUST be done on graph paper.
3. Each lab must include, in this order: student name & lab partners’ names, lab title, date, purpose/problem, hypothesis, materials, procedure, data, analysis & graphs, and a conclusion.
   a. Student Name (top right corner) & lab partners’ names (below student’s name)
   b. Lab Title (centered on line below last student’s name)
   c. Date (centered on line below title)
   d. Purpose/Problem (one or two sentences describing what is to be determined from the experiment). The purpose of this lab is to...
   e. Hypothesis (one or two sentences predicting the lab results). It is predicted that...
   f. Materials (copy material list given on lab page)
   g. Procedure (summary/paraphrase of the given instructions)  
   h. Data (using a ruler, complete the data table. All data tables must be clearly labeled. Data MUST include units and should be reported with the correct number of significant digits)
   i. Graphs
      i. **GRAPHS MUST BE DONE ON GRAPH PAPER!** (1/2 of page or larger)
      ii. Origin = 0,0
      iii. Titled (ex: Distance vs time for a falling object)
      iv. Axes labeled with units (ex: distance, m) and increments even & labeled
      v. Shape analysis (linear, inverse/hyperbolic, parabolic)
      vi. Mathematical model (equation to fit graph)
   j. Conclusion. It was determined that... **You MUST support all claims with data collected from the lab.**
4. The problem statement, hypothesis, and conclusions should be written with complete sentences. These 3 pieces of information should all tie together and should all relate to the procedures. Make sure that your purpose, hypothesis, and conclusion relate to what is/was tested!
5. Grading: 50 points total (variations possible, based on each individual lab. Rubrics will be given before report is due)
6. Informal labs MUST have graphs done on graph paper and attached behind the lab handout (see 3i above)
Word Problem Guidelines
- these guidelines MUST be used on quizzes and tests, so it is therefore recommended that you get in the habit of using these guidelines during homework and other practice opportunities.
  1. Define terms & variables
  2. Identify equation(s).
  3. Plug in variables
  4. Calculate final answer (please show work for complex problems) and report with correct unit and sig figs.

Example:

\[ v_f = ? \]
\[ v_i = 3.21 \text{ m/s} \]
\[ a = 0.520 \text{ m/s}^2 \]
\[ t = 5.78 \text{s} \]

\[ v_f = at + v_i \]
\[ v_f = (0.520)(5.78) + 3.21 \]
\[ v_f = 6.22 \text{ m/s} \]