Honors Physics 2023 – 2024

Instructor: Mr. Ropes

Course Description: Honors Physics is an introductory course covering a broad range of topics that help to explain and increase understanding of the physical world we live in. The topics covered include mechanics, waves, energy, electricity, and magnetism, light and modern physics. The course concludes with the New York State Regents Physics Exam at the end of June.

Course Goals:

1. Students will understand and be able to apply scientific concepts, principles and theories to the physical environment in a meaningful and authentic context.
2. Students will develop skills in problem solving and critical thinking.
3. Students will be successful on the NYS Regents examination in Physics at the end of the year.
4. Students will be prepared to take college level physics such as AP Physics C (calculus based).

Student Expectations: Students are expected to come to class on time and prepared to learn. Since this is a lab class, we will meet for two periods on odd days (1, 3, 5).

Grading: The grading is based on a weighted average of Do Nows, homework, quizzes, tests, labs, and projects work as follows:

|  |  |  |
| --- | --- | --- |
| Quarterly Grade |  | Final Grade |
| Do Now | 15% |  | 1st Quarter | 25% |
| Homework | 20% |  | 2nd Quarter | 25% |
| Labs | 15% |  | 3rd Quarter | 25% |
| Unit and/or Quarterly Exam(s) | 20% |  | 4th Quarter  | 25% |
| Quizzes | 20% |  | Total | 100% |
| Projects | 10% |  |  |  |
| Total | 100% |  |  |  |

Do Now: Since our school is now one-to-one, the students will have a Chromebook where they will be able to connect in real time to the Internet. The students should expect to have a Do Now assignment in a Google Form two to three times a week. Therefore, it is imperative that they bring their Chromebooks to school. The questions that they will be asked are primarily comprised of Regents questions, though in some cases, the material may be a bit harder. Students can expect that I will be going over the material immediately after completion of these assignments.

Homework: Homework will be assigned on a weekly basis primarily using worksheets consisting of questions from their textbook as well as other topical specific questions from other sources. A portion of these will be done in class and/or at home and handed in or checked by me. Students are expected to show all work when solving homework questions. Answers are generally given so that they will know whether or not they solved the problem correctly. Homework will also be disseminated digitally with Problem-Attic through Google Classroom. The questions from this resource will consist entirely of Regents Questions. Homework is due on the due date. Extensions will only be given under extenuating circumstances.

Labs: Students will be required to keep a lab book for each laboratory investigation done in class. Lab books will be collected and graded on a periodic basis. Those lab books handed in after the due date will be marked down accordingly. In addition, New York State requires all students to complete at least 1200 minutes of hands-on laboratory experience throughout the course of the year in order to sit and take the Regents exam. Students who do not meet the minimum requirements will be barred. A separate handout will be provided that discusses expectations for a satisfactory lab write-up.

Quizzes and Test: Quizzes and tests will be given on a periodic basis when appropriate. They will typically consist of a combination of multiple choice and constructed response questions. However, they may also be given in a practical setting.

Projects: A project will typically be assigned during each marking period. The nature of them will vary from individual work to group work.

Edpuzzle: The changing environment of education, especially now due to the Coronavirus has led many to a flipped model for instruction. While this may work for some teachers and certain types of courses, it hasn’t worked for me quite the way I would like. As a teacher, I have to be “me” in front of the class. My notes are often broken up with a variety of demonstrations pertaining to specific concepts being taught. Watching a video removes the authenticity of me being a teacher for my students. That being said, I think that the videos of my lecture notes are a good supplement to my daily lectures. In them, the student will find numerous questions that target an understanding of the material being discussed. And if they missed something in class, they can go back and review it. Another advantage to having my notes videotaped is that the students who miss class do not have to fall behind if they watch the videos.

Textbook Use: The textbook primarily used in this class is Physics, Cutnell & Johnson, Wiley, 2007. As previously mentioned, a portion of your homework will consist of questions out of this textbook. Though readings may not be specifically assigned, students should understand that they may need to use it from time to time as a reference to help them answer homework questions. Students may also find that the textbook is a useful resource when working on projects.

Communication: Our district uses the Google platform for many things. We are currently moving to a new grading program (Infinite Campus). Since it is new, I am not sure how it will fit into sending out announcements to my classes. In the meantime, I will most likely use the Google Classrroom stream to disseminate announcements to the students. Please refer to the table below for the class code for your class.

|  |  |
| --- | --- |
| Period | Google Class Code |
| 1 – 2 | p2ojtzo |
| 4 – 5  | keokzca |

I also use Remind as a quick means to keep in contact with my students. To sign up for Remind, send a text to 81010. Then in the body of the text, type @rckhonphys

I will also post material to my website ([http://www.wappingersschools.org//Domain/1439](http://www.wappingersschools.org/Domain/1439)).

I may also be contacted by phone at 298-5100x31070

**Extra Help/Office Hours:**Students may come for help during the following times:

* Period 3
* Period 1 (Days 2, 4, 6)
* Period 8 (Days 1, 3, 5)

***Honors Course Syllabus***

Code: S661 Full Year (11-12)

(rank weight 1.05)

Prerequisite: Successful completion of Honors Geometry or Honors Algebra 2/Trigonometry (or a course deemed equivalent) with an 85 or better, concurrently enrolled in Math Honors Algebra 2/Trigonometry or higher, and an 85 or better course average in both science and math.

Areas of Study Include:

* **PHYSICS AND MEASUREMENT**

SI UNITS - [ LENGTH, MASS, TIME]; DIMENSIONAL ANALYSIS; SIGNIFICANT FIGURES; PROBLEM SOLVING; FERMI PROBLEMS, ORDERS OF MAGNITUDE, ESTIMATIONS, ERROR, AND ERROR ANALYSIS

* **MOTION IN ONE DIMENSION**

DISPLACEMENT, VELOCITY, SPEED; INSTANTANEOUS VELOCITY, SPEED; ACCELERATION; KINEMATIC GRAPHICS; FREE FALL

* **VECTORS**

COORDINATE SYSTEMS; VECTORS AND SCALARS; VECTOR ADDITION AND SUBTRACTION; VECTOR COMPONENTS; CONDITIONS FOR EQUILIBRIUM – STATIC AND DYNAMIC

* **MOTION IN TWO DIMENSIONS**

TWO DIMENSIONAL MOTION WITH CONSTANT ACCELERATION; MOTION IN A PLANE AND PROJECTILES; UNIFORM CIRCULAR MOTION; RELATIVE MOTION

* **THE LAWS OF MOTION**

CONCEPT OF FORCE; NEWTON'S FIRST LAW AND INERTIAL FRAMES; MASS, NEWTON'S SECOND LAW; APPLICATION OF NEWTON'S 2ND LAW TO SYSTEMS OF BODIES; FORCE AND GRAVITY, FRICTION

* **CIRCULAR MOTION AND APPLICATIONS OF NEWTON'S LAWS**

UNIFORM CIRCULAR MOTION; CENTRIPETAL FORCE; ROTATIONAL KINEMATICS; ROTATIONAL DYNAMICS; TORQUE; MOMENT OF INERTIA; ANGULAR MOMENTUM

* **THE LAW OF GRAVITY**

NEWTON'S UNIVERSAL LAW OF GRAVITATION; FREE FALL AND GRAVITATIONAL FORCE; KEPLER'S LAWS; GRAVITATIONAL POTENTIAL ENERGY; ENERGY CONSIDERATIONS IN PLANETARY AND SATELLITE MOTION

* **LINEAR MOMENTUM AND COLLISIONS**

LINEAR MOMENTUM AND ITS CONSERVATION; IMPULSE AND MOMENTUM; COLLISIONS IN ONE DIMENSION

* **WORK AND KINETIC ENERGY**

WORK DONE BY A CONSTANT FORCE; SCALAR PRODUCT; WORK DONE ON A SPRING; KINETIC ENERGY AND THE WORK- ENERGY THEOREM; POWER

* **POTENTIAL ENERGY AND CONSERVATION OF ENERGY**

POTENTIAL ENERGY; CONSERVATIVE AND NONCONSERVATIVE FORCES; CONSERVATIVE FORCES AND POTENTIAL ENERGY; CONSERVATION OF MECHANICAL ENERGY

* **OSCILLATORY MOTION**

SIMPLE HARMONIC MOTION; THE BLOCK AND SPRING SYSTEM; ENERGY OF A SIMPLE HARMONIC OSCILLATOR; THE PENDULUM; SIMPLE HARMONIC MOTION AND UNIFORM CIRCULAR MOTION

* **WAVE PROPERTIES**

WAVES AND ENERGY TRANSFER; TRANSVERSE AND LONGITUDINAL WAVES; WAVE PROPERTIES; LAW OF SUPERPOSITION

* **WAVE PHENOMENA**

SPEED OF A WAVE IN A UNIFORM MEDIUM; REFLECTION; REFRACTION; INTERFERENCE; DIFFRACTION [RIPPLE TANKS]

* **SOUND**

PROPERTIES OF SOUND; SPEED OF SOUND; RESONANCE; DOPPLER EFFECT

* **ELECTROSTATICS**

PROPERTIES OF CHARGES; INSULATORS AND CONDUCTORS; COULOMB'S LAW; CONSERVATION OF CHARGE

* **ELECTRIC FIELDS**

DIRECTION AND MAGNITUDE; FIELD LINES; MAPPING ELECTRIC FIELDS, FORCES ON CHARGED PARTICLES

* **ELECTRIC POTENTIAL & ELECTRIC POTENTIAL ENERGY**

ELECTRIC POTENTIAL ENERGY; WORK DONE ON CHARGED PARTICLES

* **CURRENT ELECTRICITY**

RESISITIVITY AND RESISTANCE; REQUIREMENTS FOR CURRENT FLOW; OHM'S LAW; ELECTRIC ENERGY AND POWER

* **SERIES AND PARALLEL CIRCUITS**

ELECTRIC POTENTIAL, CURRENT, AND RESISTANCE IN SERIES AND PARALLEL CIRCUITS; KIRCHHOFF’S RULES; GALVANOMETER, VOLTMETER, AND AMMETER; DC POWER SUPPLIES; POWER CONSUMPTION IN DC CIRCUITS; HOUSEHOLD CIRCUITS AND ELECTRICAL SAFETY

* **MAGNETIC FIELDS**

EARTH’S MAGNETIC FIELD; MAPPING MAGNETIC FIELDS; MOTION OF A CHARGED PARTICLE IN A UNIFORM MAGNETIC FIELD; MAGNETIC FIELD STRENGTH AND MAGNETIC FORCE; MAGNETIC FLUX; RIGHT-HAND RULES

* **MAGNETIC FORCE**

MAGNETIC FORCE ON CHARGED PARTICLES IN MOTION AND CURRENT CARRYING CONDUCTORS; MAGNETIC FORCE BETWEEN TWO PARALLEL CONDUCTORS; MAGNETIC FLUX; RIGHT-HAND RULES

* **ELECTROMAGNETIC INDUCTION**

ELECTROMAGNETIC INDUCTION; LENZ'S LAW; MOTORS AND GENERATORS; AC CURRENT; TRANSFORMERS

* **LIGHT**

ELECTROMAGNETIC NATURE OF LIGHT; LIGHT AS A WAVE; SPEED OF LIGHT; REFLECTION; REFRACTION; INTERFERENCE & DIFFRACTION; DISPERSION; PROPERTIES OF LIGHT; POLARIZATION; DOPPLER EFFECT

* **MIRRORS**

LAW OF REFLECTION; RAY TRACING

* **MODERN PHYSICS**

WAVE-PARTICLE DUALITY OF LIGHT; QUANTUM THEORY; BOHR & RUTHERFORD MODELS OF THE ATOM; ENERGY TRANSITIONS IN THE HYDROGEN AND MERCURY ATOMS; CONTINUOUS, EMMISION, AND ABSORPTION SPECTRA; COMPTOM EFFECT; PHOTOELECTRIC EFFECT

* **STANDARD MODEL**

INVESTIGATION OF SUB-ATOMIC PARTICLES; CLASSIFICATION OF MATTER AND THE STANDARD MODEL OF PARTICLE PHYSICS; QUARKS AND LEPTONS; BARYONS AND MESONS; FOUR FUNDAMENTAL FORCES OF NATURE

**Assessments:**

Final exam is the State-prepared Physical Setting - Physics Regents Exam

Classroom Rules

Welcome to Mr. Ropes’ physics class. My goal is to provide you with an intellectually challenging and positive learning experience. To facilitate your learning, I want to create a caring and considerate environment where you will feel safe both physically and psychologically. The following guidelines should make this possible.

# Preparedness:

* Be in your seat when the bell rings. If the bell rings and you are not in your seat, you are late. Please sign the designated notebook if you are late.
* Come to class with a notebook and pen or pencil and calculator.
* Come to class with a positive attitude, alert and ready to learn.

# Student Attitudes & Classroom Behavior:

* Raise your hand before speaking.
* Do not talk while I or another student is speaking.
* I do not believe in such a thing as a stupid question, nor should you.
* Be respectful of one another, their property and the school’s property.
* Do not use inappropriate language.
* Participate willingly in class discussion and activities. It will help you learn. I promise.
* Always give your best effort.

Seating, Lab Groups, Passes, etc.:

* The general seating assignments will be fixed. Changes will be made from time-to-time at my discretion.
* Students will work in lab groups that may or may not be defined by myself, and will depend on the particular activity.
* Bathroom pass is for one person at a time.
* Late passes will not be given out or accepted except for extenuating circumstances. Four lates constitute as an absence.
* Lunch conflict passes will not be permitted, nor is gum chewing, eating or drinking allowed in the classroom.
* Cell phone use is not permitted unless I request it to be used for the purpose of collecting data. Turn it off or put in on vibrate.

Grading:

* Quizzes and tests are graded as a ratio (# correct/total number of questions).
* Labs are graded on a 10 point scale (See rubric attached).
* Homework is graded as a ratio (# correct/total number of questions).

Homework & Laboratory Activities:

* Homework and laboratory work are a regular part of this course. Extensions will only be given under extenuating circumstances. Homework and lab work that is considered late will be marked down (at my discretion) 10% for each day that it is late up to a maximum of five days.

## Make-up Quizzes and Tests:

* Make-up quizzes and tests are offered to those students who have a legitimate reason for being absent from class. Those students that are permitted to take a make-up test will have to do so within three instructional days after their return to school. Students should note that the make-up test will not necessarily be the same as the one given to the rest of the class.

Supplemental Tests / Test Corrections:

* In the event that a student receives a grade less than 85%, a supplemental exam may be taken. However, the maximum value achieved on a supplemental exam cannot exceed 85%.
* Alternatively, I may offer students to make test corrections. Students can obtain ½ credit back for each question that they got wrong. In order to do test corrections, you must come to my class on your free time before, during or even after school. For math related questions, you must properly show how to solve it by showing all work. For conceptual based questions, you must demonstrate why the other choices are incorrect.

Student’s Name (print) Parent/Guardian Name (print)

Student’s Signature Parent/Guardian Signature Date

Student’s email address Parent/Guardian email address

Day Phone #:

Evening Phone#: