**Physics 12 – Course Outline**

**Room:** 119 **Teacher Name:** Nicholas Westergaard

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**Course Description:**

The intent of this course is to build on and extend beyond the basic concepts of Physics 11 while preparing students for their transition into the field of sciences at a post-secondary institution. Many concepts have been covered in previous courses, however Physics 12 will demand more rigorous mathematical and conceptual approaches to these concepts. It is my goal as a teacher to facilitate the learning of the Physics 12course content while promoting work ethic, critical thinking, scientific communication, and problem solving.

**Course Expectations:**

**Absences and Lates:** All students are expected to arrive at class on time and prepared to learn. If a student is absent they are fully expected to make up any missed content and work on their own time.

*Note: If you do miss a class it is* ***your*** *responsibility to get any notes or assignments that you missed. You are expected to complete every assignment regardless if you were in attendance or not.*

**Homework:** Homework will be assigned regularly and is highly recommended for students to gain understanding, skill, and proficiency in their application of Physics. Daily homework will not be graded as a completion mark does not align with the assessment philosophy of this course.

*Note: Even if you struggle with a problem and feel that you are not able to complete it, the minimum you should do for each assigned problem is:*

***1)******Draw a picture***

***2) Write out the known and unknown variables***

***3) Write down all relevant equations***

***4) Explain in words (if possible) the steps you would take to solve the problem***

**Cheating**: Plagiarism and cheating are unacceptable. Students are expected to complete their own work on an individual basis unless otherwise stated by the teacher. Any student who plagiarizes the work of another (student or published work) - either in test situations or on major assignments will face disciplinary action.

**Extra Help:**  Any student requiring extra help can either: 1) See me for extra help in my room before school, lunch or after school, or 2) Should contact their study buddy. Following these suggestions will help prevent you from falling too far behind. **Remember**, if you are struggling the responsibility is yours to get on track.

**Enduring Understandings/Big Ideas:**

By the end of this course students will be expected to understand that:

* *Motion can occur in two dimensions and can be understood using vector analysis*
* *Forces act in two dimensions and determine an object’s motion*
* *In collisions, both the conservation of energy and momentum can be applied*
* *Circular motion and dynamics (equilibrium) can be used to predict the motion of objects on the Earth and in the universe*
* *Electric fields and forces act in similar ways to gravitational ones*
* *Current electricity depends on the relationship between current, voltage and resistance*
* *Electromagnetic induction is used to generate current electricity (and vice versa)*

**Course Content:**

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| **Unit Descriptions** |  |
| **Kinematics and Forces in 2-D** | Topics:   * Vectors * Kinematics in 2-D: Projectile Motion * Forces: Newton’s Laws in 2-D * Forces: Forces on Inclines and Tension |
| **Circular Motion** | Topics:   * Circular velocity, acceleration and angles * Circular motion in gravitational forces * Forces and circular motion: Banked roads and inclines |
| **Energy, Momentum, and Equilibrium** | Topics:   * Energy: Work and Energy in 2-D * Energy: Conservative and Non-conservative forces * Momentum: Collisions in 2-D * Equilibrium: Torques and Rotational Equilibrium |
| **Electrostatics** | Topics:   * Electric fields * Forces on electric charges through electric fields * Energy of electric fields |
| **Electric Circuits** | Topics:   * Electron flow through a conductor * Ohm’s Law of Resistance and Power * Series and parallel resistors * Capacitors and inductors |
| **Electromagnetism** | Topics:   * Effects of moving charges * Magnetic forces on conducting wires or moving charges |

**Evaluation:**

Evaluation will be fundamentally based on the student’s abilities as described:

**Understanding and Interpretation:** Students should be able to understand and interpret situations that they encounter. This includes understanding what variables and components are present, which are required to solve for the desired result and what these pieces fundamentally represent.

**Knowledge:** Students should be able to demonstrate that they understand the physical theory used in any situation and how it is applied. Correct problem solving methods and appropriate vocabulary are required.

**Critical Thinking and Lab Skills:** Students will have to come to conclusions that are not directly apparent through the use of logic and critical thinking skills. Students will also have to demonstrate their ability to perform labs and troubleshoot accordingly to obtain results. Students will also have to apply their skills to analyze both data and possible error.

**Communication:** Students will need to communicate all understanding and methodology clearly and tidily. Communication can take the form of drawings, sentences, paragraphs, and mathematical solutions. Communication will be assessed in EVERY assignment.

**Proficiency:** Students will have to show an ability to perform mathematical procedures as they pertain to the situation. Proficiency is also demonstrated through the ability to work at a minimum pace.

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| --- | --- |
| *Learning Activity* | *Percentage of final Mark* |
|  |  |
| *Unit Tests* | *30%* |
| *Formative Quizzes* | *0%* |
| *Summative Quizzes* | *10%* |
| *Labs (incl. Mini Projects & Assignments)* | *20%* |
| *Major Projects* | *20%* |
|  |  |
| *Final Exam* | *20%* |
| *Total* | *100%* |

**Supplies:**

The tools necessary for this course are Giancoli textbook, 3 ring binder with ample supply of notepaper and graph paper, two pens (one red and one blue or black), a pencil with an eraser, a ruler, and a scientific calculator.