Dominican International School

AP PHYSICS 1

COURSE SYLLABUS

GRADE LEVEL: **11 & 12** SCHOOL YEAR: 2023-24

TEACHER: Victoria Santiago EMAIL: **vsantiago@dishs.tp.edu.tw**

COURSE DESCRIPTION:

AP Physics 1 is equivalent to a first-semester college course in algebra-based physics.

The course covers Newtonian Mechanics (including rotational dynamics and angular momentum); Work, Energy, and Power, Impulse and Momentum, and Simple Harmonic Motion.

This course provides students with opportunities to apply their knowledge of physics principles to real world questions or scenarios (including societal issues or technological innovations) to help them become scientifically literate citizens.

This also provides opportunity to the students to spend 25 percent of their class time engaging in hands-on laboratory work with an emphasis on inquiry-based investigations.

A good problem-solving technique does not begin with equations. It starts with a firm grasp of physics concepts and how they fit together to provide a coherent description of natural phenomena. The ability to reason in an organized manner is essential for problem solving. A strong reasoning ability combined with firm conceptual understanding helps students solve problems.

Course goals include developing each student's intuition, creativity and investigative skills to do the following.

- Read, understand, and interpret physical information.
- Use the scientific method to analyze a particular physical phenomenon or problem.
- Use basic mathematical reasoning in a physical situation or problem.
- Perform experiments, interpret the results of observations and communicate results.

COURSE OBJECTIVES:

The course is based on six big ideas, which encompass core scientific principles, theories, and processes that cut across traditional boundaries and provide a broad way of thinking about the physical world.

The following are the **big ideas**:

Big Idea 1: Objects and systems have properties such as mass and charge. Systems may have internal structure.

Big Idea 2: Fields existing in space can be used to explain interactions.

Big Idea 3: The interactions of an object with other objects can be described by forces.

Big Idea 4: Interactions between systems can result in changes in those systems.

Big Idea 5: Changes that occur as a result of interactions are constrained by conservation laws.

ASSESSMENT:

Students will be given chapter test after the completion of every chapter.

Quarter exam will be conducted at the end of each quarter.

Khan Academy practices will be assessed for each chapter.

Homework from AP Classroom will be assessed for each chapter.

Projects, Lab Activities, Seatwork and Homework will also be assessed.

This course will be assessed on the following four categories:

- Tests and Quizzes (30%)
- Seatwork, Homework and Participation (30%)
- Quarter Exam (30%)
- Deportment (10%)

PRIMARY TEXTBOOK & OTHER RESOURCES

Introduction to Physics, 11th Edition by Cutnell and Johnson (International Student Version)

https://www.khanacademy.org/science/physics

AP Classroom

ADDITIONAL INFORMATION

Please see Google Classroom for more information. Class code: **we5ko7y**

Academic Dishonesty means employing a method or technique or engaging in conduct in an academic endeavor that contravenes the standards of ethical integrity expected at DIS. Academic dishonesty includes but is not limited to, the following:

1. Purposely incorporating the ideas, words of sentences, paragraphs, or parts thereof without appropriate acknowledgment and representing the product as one's own work; and
1. Representing another's intellectual work such as photographs, paintings, drawings, sculpture, or research or the like as one's own, including failure to attribute content to an AI.
2. Employing a tutor, making use of Artificial Intelligence without acknowledgement, getting a parent to write a paper or do an assignment, paying for an essay to be written by someone else and presented as the student's own work.
3. Committing any act that a reasonable person would conclude, when informed of the evidence, to be a dishonest means of obtaining or attempting to obtain credit for academic work.

Any act of academic dishonesty will result in an automatic zero on the entire assignment

1st QUARTER – TENTATIVE COURSE CONTENT

(NB: Depending on time and interest, the teacher may delete and/or add other selections.)

Week / Date	Topic / Projects / Assessments
Week 1 **Aug 10th to 11th** **Only 2 School Days** *10 ~ First Day / Orientation Day*	General Discussion about AP Physics 1 Discussion of class rules, collecting text books from the library. **Significant Digits**
Week 2 **Aug 14th to 18th** *15 ~ Opening Mass*	**Chapter 2: Kinematics in One Dimension** Displacement Speed and Velocity Average Velocity Instantaneous Velocity Acceleration Equations of Kinematics for Constant Acceleration
Week 3 **Aug 21st to 25th**	Applications of the Equations of Kinematics Freely Falling Bodies Graphical Analysis of Velocity and Acceleration
Week 4 **Aug 28th to Sep 1st**	**Discussing answers for Check Your Understanding questions from Chapter 2** **Chapter 3: Kinematics in Two Dimensions** Vectors- Introduction Displacement, Velocity and Acceleration Equation of Kinematics in Two Dimensions Projectile Motion

Week 5 **Sep 4th to 8th** *8 ~ Holy Mass & VIP Induction*	**Discussing answers for Check Your Understanding questions from Chapter 3** **Chapter 4: Forces and Newton's Laws of Motion** The Concepts of Force and Mass Newton's First Law of Motion Inertia and Mass Newton's Second Law of Motion **One- Dimensional Motion- Khan Academy Assessment Completion**
Week 6 **Sep 11th to 15th** *12-14 ~ Pre-Exam Days*	The Vector Nature of Newton's Second Law of Motion Newton's Third Law of Motion Types of Forces- An Overview The Gravitational Force **Two- Dimensional Motion- Khan Academy Assessment Completion** **Chapter 2 Test**
Week 7 **Sep 18th to 22nd**	Relation Between Mass and Weight The Normal Force Apparent Weight Static and Kinetic Frictional Force The Tension Force Equilibrium Applications of Newton's Laws of Motion Non Equilibrium Applications of Newton's Laws of Motion **Forces and Newton's Laws of Motion- Khan Academy Assessment Completion**
Week 8 **Sep 25th to 29th** **No Classes** *25-28 ~Teacher's Conference* *29 – Moon Festival Holiday*	**No Classes**
Week 9 **Oct 2nd to 6th** **3 Days of Class** *5-6 ~Q1 Exams*	**Chapter 3 Test** Review for the Quarter Exam **First Quarter Examination**

2nd QUARTER – TENTATIVE COURSE CONTENT

(NB: Depending on time and interest, the teacher may delete and/or add other selections.)

Week / Date	Topic / Projects / Assessments
Week 1 (10)	**Give out First Quarter Exam papers and discuss the answers.**

Oct 9th to 13th **3 Days of Class** *9-10 – Double 10 Holiday*	**Chapter 5: Dynamics of Uniform Circular Motion** Uniform Circular Motion Centripetal Acceleration Centripetal Force Banked Curves
Week 2 (11) **Oct 16th to 20th**	Satellites in Circular Orbits Apparent Weightlessness and Artificial Gravity **Chapter 6: Work and Energy** Work done by a constant force The work- Energy Theorem and Kinetic Energy Gravitational Potential Energy
Week 3 (12) **Oct 23rd to 27th**	Conservative Versus Non conservative Forces The Conservation of Mechanical Energy Non conservative Forces and the work- Energy Theorem **Discussing answers for Check Your Understanding questions from Chapter 5** **Uniform Circular Motion and Gravitation- Khan Academy Assessment Completion** **Chapter 5 Test**
Week 4 (13) **Oct 30th to Nov 3rd** *1 - All Saint's Day Mass*	Power Other Forms of Energy and the Conservation of Energy Work done by a Variable Force **Chapter 7: Impulse and Momentum** The impulse- Momentum Theorem The principle of Conservation of Linear Momentum **Discussing answers for Check Your Understanding questions from Chapter 6**
Week 5 (14) **Nov 6th to 10th**	Collisions in One Dimension Collisions in Two Dimensions Center of Mass **Work and Energy- Khan Academy Assessment Completion** **Chapter 6 Test**
Week 6 (15) **Nov 13th to 17th**	**Discussing answers for Check Your Understanding questions from Chapter 7** **Chapter 8: Rotational Kinematics** Rotational Motion and Angular Displacement. Angular Velocity and Angular Acceleration The Equations of Rotational Kinematics. Angular Variables and Tangential Variables Centripetal Acceleration and Tangential Acceleration. Rolling Motion

	The Vector Nature of Angular Variables.
Week 7 (16) **Nov 20th to 24th**	Review for the Quarter Exam **Second Quarter Exam**
Week 8 (17) **Nov 27th to Dec 1st**	**Discussing answers for Check Your Understanding questions from Chapter 8** **Chapter 9: Rotational Dynamics** The Action of Forces and Torques on Rigid Objects Rigid Objects in Equilibrium Center of Gravity
Week 9 (18) **Dec 4th to 8th** 8 - Foundation Day Celebrations	Newton's Second law for Rotational Motion About a Fixed Axis Rotational Work and Energy Angular Momentum **Linear Momentum and Collisions- Khan Academy Assessment Completion** **Chapter 7 Test**
Week 10 (19) **Dec 11th to 15th** **3 Days of Class** *14-15 ~ Q2 Exams*	**Chapter 8 & 9 Test**
Dec 18th to Jan 1st	**Christmas Holiday**

3rd QUARTER – TENTATIVE COURSE CONTENT

(NB: Depending on time and interest, the teacher may delete and/or add other selections.)

Week / Date	Topic / Projects / Assessments
Week 1 (20) **Jan 3rd to 5th** **3 Days of Class** *4 ~ New Year Mass*	**Lab Activity**: Make measurements of objects using Vernier Calipers and Micrometer Screw Gauge.
Week 2 (21) **Jan 8th to 12th**	**Chapter 10: Simple Harmonic Motion and Elasticity** The Ideal Spring and Simple Harmonic Motion Simple Harmonic motion and the Reference Circle Displacement, Velocity, Acceleration and Frequency of Vibration
Week 3 (22) **Jan 15th to 19th**	Energy and simple Harmonic Motion The Pendulum Damped Harmonic Motion Driven Harmonic Motion and Resonance Elastic deformation Stress, Strain, and Hooke's Law
Week 4 (23) **Jan 22nd to 26th**	**Discussing answers for Check Your Understanding questions from Chapter 10** **Lab Activity:** Investigation of dependence of the period on the mass, length and angle and determination of acceleration due to gravity. **Lab Activity:** Verify Hooke's Law and find the Spring Constant of a spring
Week 5 (24) **Jan 29th to Feb 2nd**	**Simple Harmonic Motion- Khan Academy Assessment Completion** **Chapter 10 Test**
Week 6 (25) **Feb 5th to 9th** **3 Days of Class** *8-9 ~ CNY*	**Lab Activity:** Determine the unknown mass using translational and rotational equilibrium **Lab Activity:** Estimate the average friction force on a car as it negotiates one "trough" of a U- Rollercoaster
Feb 8th to 16th	**CNY Holiday**
Week 7 (26) **Feb 19th to 23rd** *19 ~ Lenten Mass* *21-23 ~ Pre-Exam Days*	**Lab Activity:** Verify Newton's 2nd Law using a modified Atwood setup Review for the Quarter Exam **Lab Activity**: Determine coefficients of Static and Kinetic friction. Review for the Final Exam
Week 8 (27) **Feb 26th to March 1st** **4 Days of Class** 28 ~ 228 Memorial Day Holiday	**Lab Activity**: Determine acceleration due to gravity *g* using a car on an incline. **Lab Activity**: Determine the velocity and acceleration of a uniformly accelerating object. Review for the Final Exam
Week 9 (28) **March 4th to 8th** **4 Days of Class** *8 ~ Q3 Exams*	**Third Quarter Exam**

4th QUARTER – TENTATIVE COURSE CONTENT

(NB: Depending on time and interest, the teacher may delete and/or add other selections.)

Week / Date	Topic / Projects / Assessments
Week 1 (29) **March 11th to 15th** **4 Days of Class** *11 ~ Q3 Exams* *12 ~ Q4 Begins*	**Do Practice Exam 1** **MCQ** -1hour 30 min Discuss the answers **Free Response**- 1hour 30 min Discuss the answers
Week 2 (30) **March 18th to 22nd** *18-21 ~ Fire Drill*	**Do Practice Exam 2** **MCQ** -1hour 30 min Discuss the answers **Free Response**- 1hour 30 min Discuss the answers
March 25th to Apr 5th	**Easter Holiday**
Week 3 (31) **Apr 8th to 12th** *10 ~ Easter Mass*	**Do Practice Exam 3** **MCQ** -1hour 30 min Discuss the answers **Free Response**- 1hour 30 min Discuss the answers
Week 4 (33) **Apr 15th to 19th**	**Do Practice Exam 4** **MCQ** -1hour 30 min Discuss the answers **Free Response**- 1hour 30 min Discuss the answers
Week 5 (34) **Apr 22th to 26th** 22-26 ~ AP Mock Exams	Review for the Final Exam
Week 6 (35) **Apr 29th to May 3rd** *1-2 ~ Pre-Exam* *1-10~ Final Exams (K, 5, 8, 12 only)* *4/29 – 5/10 ~ AP Exams*	Review for the Final Exam
Week 7 (36) **May 6th to 10th** *1-10~ Final Exams (K, 5, 8, 12 only)* *4/29 – 5/10 ~ AP Exams*	Review for the Final Exam
Week 8 (37) **May 13th to 17th** **2 Days of Class** *15-16 ~ Q4 Exams* *17 ~ Record Day*	**AP Physics 1 Exam (17th May 2024)**
Week 9 (38) **May 20th to 24th** **ACTIVITIES: *Double check the school calendar and emails from the administration.***	--- *20-24 ~ Student Clearance Days* *21 ~ Baccalaureate Mass for Graduating classes* *22 & 23 ~ Middle & High School Sports Day* *23 ~ Pre-Kindergarten & Gr. 1 - 4 Recognition/Kindergarten Graduation/Gr. 5 Promotion* *24 ~ Gr. 6 – 7 Recognition and Gr. 8 Graduation* *24 ~ Lower School Sports Day*

Week 10 (39) **May 27th to 31st** **ACTIVITIES: *Double check the school calendar and emails from the administration.***	---------- *27 ~ House Culminating Activity* *28 ~ Gr. 9-11 Recognition and Gr. 12 Graduation* *29 ~ Class Party* *30 ~ Last Day of School & Report Card Distribution (half day)* *31 ~ Teachers/Staff Meeting*