Dominican International School





SUBJECT: Physics

GRADE LEVEL: 11 TEACHER: Victoria Santiago SCHOOL YEAR: 2022-23 EMAIL: vsantiago@dishs.tp.edu.tw

COURSE DESCRIPTION:

Physics is the branch of knowledge that studies the physical world. This course is based on concepts-before- computation and provides comprehensive content which builds conceptual understanding and offers computational reinforcement. Examples make powerful connections to student's real lives. More hands-on activities are carried out to allow students to explore concepts and bring the concepts of physics to life. Throughout this course, the emphasis is on the teaching of concepts and the development of creative problem solving and higher order thinking skills.

Physics contributes to the development of chemistry, computing, engineering, environmental science, life sciences, material science, mathematics, medicine, physics education, and statistics.

The physics course is classified into three categories such as Forces and Interactions, Energy, Waves and Their Applications in Technologies for Information Transfer.

This course best prepares students for college level physics and nurtures a scientific outlook for everyday life.

COURSE OBJECTIVES:

Physics curriculum is aligned to Next Generation Science Standards (NGSS).

Forces and Interactions

HS-PS2-1: Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.

HS-PS2-2: Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system.

HS-PS2-3: Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.

HS-PS2-4: Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects.

HS-PS2-5: Plan and conduct an investigation to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current.

Energy

HS-PS3-1: Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and every flow in and out of the system are known.

HS-PS3-2: Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a either motions of particles or energy stored in fields.

HS-PS3-3: Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.

HS-PS3-4: Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).

HS-PS3-5: Develop and use a model of two objects interacting through electric or magnetic fields to illustrate the forces between objects and the changes in energy of the objects due to the interaction.

Waves and Electromagnetic Radiation

HS-PS4-1: Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.

HS-PS4-2: Evaluate questions about the advantages of using a digital transmission and storage of information.

HS-PS4-3: Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other.

HS-PS4-4: Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter.

HS-PS4-5: Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.

PRIMARY TEXTBOOK & OTHER RESOURCES:

PRIMARY TEXTBOOK

Pearson Physics by James S. Walker Copyright © 2014 Pearson Education, Inc., or its affiliates.

OTHER RESOURCES

http://www.physicsclassroom.com/mmedia/vectors/sat.cfm https://www.khanacademy.org https://www.pbslearningmedia.org/ https://quizizz.com/

ASSESSMENT:

Pop Quizzes will be conducted now and then.

They will be given a chapter test after the completion of every chapter.

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

Projects, Lab Activities, Homework, and Seatwork 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%)

ADDITIONAL INFORMATION: Please see Google Classroom for more information. Class code

Copying (plagiarism) is a serious offense and a form of theft. In certain cases, it is also a criminal offense. It is defined as taking words, phrasing, sentence structure, or any other element of the expression of another person's ideas, and using them as if they were your own. Plagiarism is a violation of another person's rights, whether the material stolen is great or small – it is not a matter of degree or intent. Plagiarism has serious consequences.

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

(NB: Depending on time and interest, the teacher may delete and/or add other selections.)	
Week / Date	Topic / Projects / Assessments
Week 1 Aug 10 th to 12 th <u>3 Days of Class</u> 10~ First Day / Orientation Day	Discussion of class rules, collecting text books from the library. <u>Chapter 2: Introduction to Motion</u> 2.1: Describing Motion
Week 2 Aug 15 th to 19 th Opening Mass	 2.2: Speed and Velocity 2.3: Position- Time Graphs Lab Activity: Position versus Time for a constant velocity car (TB, Page 64)
Week 3 Aug 22 nd to 26 th	Chapter 3: Acceleration and Accelerated Motion 3.1: Acceleration

	Chapter 5: Newton's Laws of Motion
	 Lab Activity: Determine the variation of the acceleration of a dynamics cart in two scenarios: (1) the total mass of the system is kept constant while the net force varies, and (2) the net force is kept constant while the total mass of the system varies Chapter 2 & 3 Test
Week 4 Aug 29 th to Sep 2 nd	5.2: Applying Newton's Laws5.3: FrictionLab Activity: Static and Kinetic friction (TB, Page 178)
Week 5 Sep 5 th to 9 th <u>4 Days of Class</u> 8~ Mass & Birthday Mother Mary 9 th – Moon Festival	Chapter 7: Linear Momentum and Collisions 7.2: Impulse Chapter 5 Test
Week 6 Sep 12 th to 16 th FYI – Pre-Exam Days	7.3: Conservation of momentum7.4: Collisions
Week 7 Sep 19 th to 23 rd	Chapter 8: Rotational Motion and Equilibrium 8.1: Describing Angular Motion 8.3: Torque
Week 8 Sep 26 th to 30 th <u>2 Days of Class</u> 28-30 ~Teacher's Conference	Chapter 7 Test
Week 9 Oct 3 rd to 7 th <u>3 Days of Class</u> 6-7 ~Q1 Exams	Review 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) Oct 10 th to 14 th <u>4 Days of Class</u> 10 – Double 10 Holiday	Give out First Quarter Exam papers and discuss the answers. <u>Chapter 9: Gravity and Circular Motion</u> 9.1: Newton's Law of Universal Gravity	
Week 2 (11) Oct 17 th to 21 st	9.2: Applications of Gravity	

	Chapter 19: Electric Charges and Forces
	19.1: Electric Charge
Week 3 (12)	19.2: Electric Force
Oct 24th to 28th 25-27 – Book Fair	19.3: Combining Electric Forces
28- Masquerade Night TBA-Holy Rosary Mass	Chapter 9 Test
	Chapter 21: Electric Current and Electric Circuits
Week 4 (13) Oct 31 st to Nov 4 th <i>I-All Saint's Day Mass</i>	21.1: Electric Current, Resistance, and Semiconductors
	Chapter 19 Test
	21.2: Electric Circuits
Week 5 (14) Nov 7 th to 11 th	Lab Activity: Ohm's Law (TB, Page 773)
	Quiz: 21.1
Week ((15)	21.3: Power and Energy in Electric Circuits
Week 6 (15) Nov 14 th to 18 th	Quiz: 21.2
NU 1 - (10)	Chapter 23: Electromagnetic Induction
Week 7 (16) Nov 21 st to 25 th	23.1: Electricity from Magnetism
25 - ISC Contest 25-Gr.12 Q2 Exam	Chapter 21 Test
Week 8 (17)	23.2: Electric Generators and Motors
Nov 28th to Dec 2th FYI – Pre-Exam Days 28-Gr.12 Q2 Exam	
Week 9 (18)	23.3: AC Circuits and Transformers
Dec 5th to 9th 8 - Foundation Day Celebrations	Lab Activity: Electromagnetic Induction (TB, Page 842)
Week 10 (19)	Review
<u>3 Days of Class</u> 15-16 ~ Q2 Exams	Second Quarter Examination
Dec 19 th to Jan 2 nd	Christmas Break

<u>3rd QUARTER – TENTATIVE COURSE CONTENT</u>

(NB: Depending on time and interest, the teacher may delete and/or add other selections.)		
Week / Date	Topic / Projects / Assessments	
Week 1 (20) Jan 5 to 6 th <u>2 Days of Class</u>	Give out Second Quarter Exam papers and discuss the answers. <u>Chapter 6: Work and Energy</u>	

	Introduction: 6.1: Work
Week 2 (21) Jan 9 th to 13 th	6.3: Conservation of Energy6.4: Power
	Lab Activity: Investigating Work on Inclined Planes (TB, Page 218).
Week 3 (22) Jan 16 th to 20 th	Chapter 10: Temperature and Heat
	10.1: Temperature, Energy and Heat10.3: Heat Capacity
	Lab Activity: Investigating Specific Heat Capacity (TB, Page 376)
Jan 23 rd to 27 th	Chinese New Year
Week 4 (23) Jan 30 th to Feb 3 rd	10.4: Phase Changes and Latent Heat
	Chapter 6 Test
Week 5 (24) Feb 6 th to 10 th	Chapter 11: Thermodynamics
	11.1: The First Law of Thermodynamics11.2: Thermal Processes
	11.3: The Second and Third Laws of Thermodynamics
	Chapter 10 Test
Week 6 (25) Feb 13 th to 17 th	Chapter 20: Electric Fields and Electric Energy
	20.1: The Electric Field
	Lab Activity: Mapping an Electric Field (TB, Page 736).
Week 7 (26) Feb 20 th to 24 th	20.2: Electric Potential Energy and Electric Potential
20-24 ~IOWA 22 ~ Ash Wednesday Mass 21-23 ~ Pre-Exam Days	Chapter 11 Test
Week 8 (27) Feb 27 th to March3 rd <u>3 Days of Class</u> 27-28 ~ 228 Memorial Day Holiday	20.3: Capacitance and Energy Storage
Week 9 (28) March (th to 10th	Review
$\frac{4 \text{ Days of Class}}{11 - Q3 \text{ Exams}}$	Second Quarter Examination

<u>4th QUARTER – TENTATIVE COURSE CONTENT</u>

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

Week / Date

Topic / Projects / Assessments

Week 1 (29) March 13 th to 17 th <u>4 Days of Class</u> 13 – Q3 Exams 14~ Q4 Begins	Give out Third Quarter Exam papers and discuss the answers.
	Chapter 13: Oscillations and Waves
	13.3: Waves and Wave Properties.
	Chapter 14: Sound
Week 2 (30) March 20th to 24 th 20 ~ Fire Drill	14.1: Sound Waves and Beats14.3: The Doppler Effect
Week 3 (31) March 27 th to 31 st	Chapter 15: The Properties of Light
	15.1: The Nature of Light15.2: Color and the Electromagnetic Spectrum
Apr 3 rd to 14 th	Easter Break
Week 4 (22)	15.3: Polarization and Scattering of Light
Week 4 (33) Apr 17 th to 21 st	Chapter 13 & 14 Test
	Chapter 17: Refraction and Lenses
Week 5 (34)	17.1: Refraction
Apr 24 th to 28 th 24-28 ~ AP Mock Exams	Lab Activity: Refraction through a glass slab
	Chapter 15 Test
Week 6 (35)	Chapter 17: Refraction and Lenses
May 1 st to 5 th	17.2: Applications of Refraction
2-4~ Fre-Exam 1-5~ Final Exams (K, 5, 8, 12 only) 1-5~ AP Exams	17.4: Applications of Lenses
Week 7 (36)	Lab Activity: Find the focal length of a given convex lens.
May 8 th to 12 th 8-12~ Final Exams(K, 5, 8, 12 only) 1-5 ~ AP Exams	Chapter 17 Test
Week 8 (37)	Review for the Quarter Exam
May 15 th to 19 th <u>3 Days of Class</u> 18-19~ Q4 Exams	Fourth Quarter Exam
Week 9 (38) May 22 nd to 26 th	Give out Fourth Quarter Exam papers and discuss the answers.
<u>4 Days of Class</u> 22~ Record Day	
23-26 ~ Student Clearance	
May 29 th to June 2 nd	
<u>4 Days of Class</u> 1 ~ Students Last Day 2~ Teachers/Staff Meeting	