St. Maarten Academy

Course Outline for Physics
FORM 4
2020-2021

INSTRUCTOR: Mrs. Suja Pereppadan

RATIONALE

This course is designed to allow students to work individually and with others in practical, field and interactive activities that are related to theoretical concepts in the course. It is expected that the students will apply investigative and problem skills, effectively communicate scientific information and appreciate the contribution that a study of Physics makes to their understanding of the world.

AIMS

Major aims of this course are :

- Acquire technical and scientific vocabulary;
- Understand the concepts and generalizations necessary for the pursuit of Physics;
- Develop the ability to apply an understanding of the principles involved in Physics to situations which may not be familiar ;
- Develop an ability to detect problems and formulate generalizations;
- Search for patterns and to test hypothesis ;
- Design experiments and carry out other investigations;
- Gather information and present it in tabular, graphical and other acceptable forms;
- Report accurately and concisely;
- Develop an ability to appraise information critically, and evaluate ideas;
- Develop an awareness of the application of scientific knowledge and a concern about the consequences of such applications.

Rules

Every student should make an attempt to attend classes regularly and actively participate in the class activities. It is fully the responsibility of a student to make up for a class/test, if you are absent from a class/test. Every student should submit the SBA's within the time allotted for that SBA, failure to do so will result in awarding zero marks for the skills tested in that SBA. Students are expected to complete and submit all the assignments given to them on time. Failure to submit time will result in 10 % awarded for that assignment.

Resources

Physics for the Caribbean : A CXC course by Tom Duncan and Deniz Onac
Longman GCSE Physics by Brian Arnold and Steve Woolley
Complete Physics by Stephen Pople
Physics for CSEC examinations by Tom Duncan and Heather Kennett
Physics for CSEC by John Avison and David Henry
CXC Physics by Alec Farley and Clarence Trotz
Physics for CXC by John. H. Avison

TENTATIVE SCHEDULE FOR TERM 1

Week	Topic	Objectives	Activities	Assessment
1 Aug 17-21	Mechanics	Review of the Measurements and units		quiz
2 Aug 24-28	Mechanics	Information about SBA guidelines and skills assessed Allow students to plot graphs Draw a line of best fit for a set of plotted values Determine the gradient of a straight line graph including the derivation of the unit of the gradient of the graph	Drawing graphs and calculating gradients	Home-work assignment
3 Aug 31- Sep 4	Hydrostatics	Students should know about: • Pressure; definition • Unit of pressure • Pressure = force / area • Properties of fluid pressure • Use of $P = h \rho g$ • Different examples for properties of fluid pressure from day to day life	Class work	Quiz
4 Sept 7-11	Pressure	Atmospheric Pressure CXC Past paper questions		
5 Sept 14-18	Mechanics	Students should know about: • equations of motion; • problem solving involving equations of motion. Falling bodies under gravity	Problem solving	

6
Sept
21-25
	Mechanics	Students should know about:
		• distance-time graph;
		  ○ use distance-time graph to find unknowns
		  ○ find gradient of the graph to get speed
			graphs	Quiz

7
Sept28
-Oct 2
	Mechanics	• velocity-time graph;
		  ○ use velocity-time graph to find unknowns
		  ○ find gradient of the graph to get acceleration
			Analysis of graphs/ problem solving	SBA (measurements)

8 Oct 5-9		MID TERM BREAK		
9 Oct 13-16	Mechanics	Problems involving equations of motion	Use of distance-time graph & speed time graph to solve problems	
10 Oct 19-23	Mechanics	Students should know about: • Newton's laws of motion; • Problem solving based Newton's laws	Class work	Quiz
11&12 Oct 26- Nov 6	Mechanics	Students should know about: • definition of force; • views of Aristotle, Galileo and Newton about motion; • Momentum; • law of conservation of momentum; • problem involving momentum;	Problem solving;	Home-work assignment

13&14 Nov 9-20	Mechanics	Students should know about: • Energy; ○ Kinetic and potential energy; • conservation of energy; • problem solving; • different sources of energy; • energy changes; • work ; power; • problem solving	problem solving; practical activity.	SBA
15 Nov23 - Dec 4		END OF TERM 1 EXAM		

TENTATIVE SCHEDULE FOR TERM 2

Week	Topic	Objectives	Activities	Assessment

1 Dec 7-11	Hydrostatics	Students should know about:
		• Machines;
		• different type of machines;
		  ○ lever
		  ○ pulley
		  ○ wheel & axle
		• efficiency;
			Class work	quiz

2 Dec 14-16	Hydrostatics	Students should know about: • Industrial applications in which properties of fluid pressure is used. • Atmospheric pressure	Practical activity	SBA

		• Effects of atmospheric pressure in our day to day life (aviation & diving) • Instruments used for measuring atmospheric pressure & fluid pressure o U-tube manometer; o Barometer o Problem solving •		
3 Jan 4-8	Hydrostatics	Students should know about: • Archimedes' principle; • Floating & sinking; • Hydrometer; • problem solving;	Experiment to prove Archimedes principle	test
4 Jan 11-15	Thermal physics	Students should know about: • heat and temperature; • measurement of temperature • relate the use of thermometer to its design • define the fixed points on the Celsius scale • clinical thermometer and thermocouple	Class work	h.w. assignment
5 Jan 18-22	Thermal physics	Students should know about: • thermal expansion; o advantages o disadvantages o bimetallic strip and thermostat	Class work	Assignment SBA
6 Jan 25-29	Thermal physics	Students should know about: • heat capacity • specific heat capacity	Class work Practical activity	Quiz

7 Feb 1-5	Thermal physics	Students should know about: • specific latent heat; • application of the concept in problem solving; • perform/describe an experiment to find specific latent heat of fusion of ice; • perform/describe an experiment to find specific latent heat of vaporization of water	Problem solving; SBA	Home-work assignment
8 Feb 8-12	Thermal physics	Students should know about: importance of specific heat capacity and latent heat • application of latent heat in air-conditioning and refrigerator; • problem solving;	problem solving;	SBA
9&10 Feb 17-26	Thermal physics	Students should know about: • Experiments to investigate the relationships between the pressure, the volume and the temperature of a gas; • Problem solving using; o Boyle's law Charles law Pressurelaw General gas law	Class work problem solving	Test
11 Mar 1-5	Heat transfer	Students should know about: • Methods of heat transfer	Class work	SBA

12,13 Mar 8-19	Kinetic theory	Students should know about: • • Brownian motion • Kinetic theory • Use kinetic theory to explain differences in the microscopic properties of solids, liquids and gases ○ Explain gas pressure in terms of molecular motion	Practical activity	SBA
TERM 3 **Week**	**Topics**	**Objectives**	**Activity**	**Assessment**
1 Mar 22-31	Thermal physics	Discussion of CXC questions from thermal physics Revision of the whole unit		
2 Apr 6-9	Thermal Physics	Easter break Discussion of CXC questions continue	Unit test	Test
3 Apr 12-16		Planning and design SBA Students receive guidelines		SBA
4 Apr 19-23	Waves	• terms related to waves • properties of waves • Use wave equation to solve problems	Demonstration of properties of waves using ripple tank	
5 Apr26 -May 7		CARNIVAL BREAK		
6 May 10-14	Waves	• Sound waves • difference between longitudinal and transverse waves • Echoes and reverberations • Ultrasonic sound	Demonstration of bell jar experiment	Test

		Explain an experiment to find the speed of sound		
7 May 17-21	Waves	• musical notes • How pitch , loudness and quality affects the musical notes • the difference between noise and musical notes •	Exercise questions	
8 May 24-28	Waves	Discussion of CXC questions		Test
9 May 31- Jun4		Revision for final exam		