

St. Maarten Academy

Course Outline for Physics

FORM 5

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
Macmillan Physics
Physics for CXC
Complete Physics
CXCPhysics

TENTATIVE SCHEDULE FOR TERM 1

Week	Topic	Objectives	Activity	Assessment
1 Aug 17-21	Ray Optics	How images are formed in a mirror How to draw ray diagram to show the image position in a mirror problem solving.	Question/answer sessions	
2 Aug 24-28	Ray optics	<ul style="list-style-type: none"> • • refraction of light • problems involving, ray diagrams and prisms to find refractive index • Real and apparent depth 	Problem solving	Home work assignment
3 Aug 31- Sept 4	Ray Optics	<ul style="list-style-type: none"> • total internal reflection • dispersion and color • problem solving 	problem solving;	SBA
4 Sept 7-11	Ray Optics	<ul style="list-style-type: none"> • terms related to a lens • to draw accurate ray diagrams for different image positions for convex lens. • the type of image in convex and concave lenses 	Discussion of CXC questions	Test

week	Topic	Objectives	Activity	Assessment
5 Sept 14-18	Ray Optics	<ul style="list-style-type: none"> • Simple optical instruments such as camera and projector. • functioning of the Human eye 	Home work assignment	SBA
6 Sept 21-25	Review		Discussion of CXC questions	Test

week	Topic	Objectives	Activity	Assessment
7 Sept 28- Oct 2	Waves	<ul style="list-style-type: none"> • • Different types of waves (transverse and longitudinal waves) • Terms related to a wave motion <ul style="list-style-type: none"> ○ Speed, Frequency , amplitude, period, phase ○ Use of $v = f\lambda$ • Displacement-time graphs of longitudinal and transverse waves <p style="color: red;">MID TERM BREAK</p>	Class work	
8 Oct 12-16	Waves	<p>:</p> <ul style="list-style-type: none"> • Wave phenomena <ul style="list-style-type: none"> ○ Reflection, Refraction, Diffraction , Interference • Reflection of plane and circular wave fronts • Refraction of plane wave fronts at plane boundaries • Diffraction of plane wave fronts at edges and at single slits of different widths • Relate refraction of plane wave fronts at a plane boundary to change in speed across the boundary 	Problem solving	Quiz
9 Oct 19-23	Waves	<ul style="list-style-type: none"> • Interference : constructive interference or destructive interference • Young's double slit experiment • Recall that frequency remains same after refraction 	Problem solving	
10 Oct 26-30		<ul style="list-style-type: none"> • Discussion of CXC questions 		SBA
11 Nov 2-6	Waves	<ul style="list-style-type: none"> • Use the relationship • $\frac{\sin \theta_1}{\sin \theta_2} = \frac{v_1}{v_2} = \frac{\lambda_1}{\lambda_2}$ 	Problem solving	Home work Assignment

Week	Topic	Objectives	Activity	Assessment
12 Nov 9-13	Waves	<ul style="list-style-type: none"> • Sound waves as longitudinal ; <ul style="list-style-type: none"> ○ properties of sound waves ○ factors related to sound waves <ul style="list-style-type: none"> ▪ pitch ▪ loudness ○ speed of sound and apply it to practical situations ○ range of frequencies detectable by humans ○ musical instruments 	Question/answer sessions	SBA Test
13 Nov 16-20	Waves/Static electricity	<ul style="list-style-type: none"> • electromagnetic waves; their properties and use. • Electric charge; <ul style="list-style-type: none"> ○ forces that electric charge exert; • Electric fields <ul style="list-style-type: none"> ○ hazards of electric charge • Conductors and insulators; 	Home work assignment	
14 Nov 23 - Dec 4		END OF TERM EXAM		

week	Topic	Objectives	Activity	Assessment
1 Dec 7-11	Current Electricity	<ul style="list-style-type: none"> • electron flow and conventional current; • relationship between current and charge; • problem solving • Circuits and components: <ul style="list-style-type: none"> ○ symbols used in circuits; • Resistors connected in series and parallel; <ul style="list-style-type: none"> ○ $R = R_1 + R_2$ ○ $R = nr$ ○ $R = \frac{R_1 \cdot R_2}{R_1 + R_2}$ ○ $R = n / r$ 	Problem solving	<p>Quiz</p> <p>Problem solving assignment</p>
2 Dec 14-18	Current Electricity	<ul style="list-style-type: none"> • Series and parallel circuits; • different situations involving series and parallel circuits; 	problem solving.	SBA Ohm's law
3 Jan 4-8	Current Electricity	<ul style="list-style-type: none"> • problems involving Ohm's law; • problems involving series , parallel circuits and ohm's law • Different points to remember with respect to series and parallel circuits; 	Problem solving	Home work assignment

TENTATIVE SCHEDULE FOR TERM 2

week	Topic	Objectives	Activity	Assessment
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4 Jan 11-15	Current Electricity	<ul style="list-style-type: none"> • problems involving Ohm's law; • problems involving series , parallel circuits and ohm's law • Different points to remember with respect to series and parallel circuits; 	Problem solving	Home work assignment
5 Jan 18-22	Current Electricity	<p>:</p> <ul style="list-style-type: none"> • V-I graphs in different situations; • Electrical power ; • different formulas for power and its unit; • calculation of electrical power cost for it; • 	problem solving;	SBA
6 Jan 25-29	Current Electricity	<ul style="list-style-type: none"> • • Use of Fuse, Breakers, ground wire in electrical circuits and its purpose • Select a fuse or breaker of suitable current rating for a given appliance • electrical connections and use of colour coding for the wires used, problem solving; 	Discussion of CXC questions	Test
7 Feb 1-5	Current Electricity	<ul style="list-style-type: none"> • • Cite examples of conversion of electrical energy to other forms • Ways of reducing wastage of electrical energy and means of doing so • Carbon resistors and the colour code used to find the value of carbon Resistors • Problem solving <p>Objectives</p>	Home work assignment	SBA
8 Feb 8-12	Current Electricity	<ul style="list-style-type: none"> • • • Problems solving involving combination of series and parallel circuits; • Discuss the reasons for using parallel connections in house and head lights of cars 	Discussion of CXC questions	SBA Assignment

5 Jan 27-31	Electronics	<ul style="list-style-type: none"> • Semi conductor diodes • Direct and alternating current 	Class work	
6 Feb 3-7	Logic Gates	<ul style="list-style-type: none"> • symbols for and, nand, or, nor and not gates • Truth tables • Circuits involving combinations of not more than 3 gates 	Class work	test
7 Feb 10-14	Magnetism	<ul style="list-style-type: none"> • types of magnets • magnetic forces, field • Electromagnetism 	Class work	
8 Feb 17-19	Electromagnetism	<ul style="list-style-type: none"> • magnetic field around a current carrying wire • Flemings left hand rule • motors- d,c /a.c motors 		
9 Feb 22-26	Electromagnetism	<ul style="list-style-type: none"> • Induced e.m.f • Action of A.C Generator 	Class work	
10 Mar 1-5	Transformers	<ul style="list-style-type: none"> • Principle of a transformer • Advantage of using A.C. current • Transformer formula 	Class work	Test
11 Mar 8-12	Nuclear Physics	<ul style="list-style-type: none"> • Models of atom • structure of atom • unstable atom • Isotopes • 	Class work	
12 Mar 15-19	Nuclear Physics	<ul style="list-style-type: none"> • Radioactivity • Alpha, beta, gamma emissions 		
13 Mar 22-26	Nuclear Physics	<ul style="list-style-type: none"> • Radioactive decay • Half life • Nuclear Energy 	Class work	Test

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