

Department Name: Science department

Grade level: 12

Title of Course: CAPE Unit 1 Physics

Duration: September 2024 - May 2025

Description of the Course:

The CAPE Unit 1 Physics course offers a foundational exploration of the fundamental principles that govern the physical world. Designed with the Caribbean context in mind, this course integrates the theoretical and practical aspects of Physics to provide a comprehensive understanding of natural phenomena and technological applications. Students will engage with core concepts in Mechanics, Oscillation, Waves, Thermal Physics and Mechanical properties of Matter, while developing critical thinking, analytical, and inquiry skills essential for both academic and professional growth. The course emphasizes the relevance of Physics in everyday life, encourages ethical and responsible application of scientific knowledge, and prepares students for further studies or careers in scientific fields. Through this course, students will gain valuable insights into the role of Physics in addressing regional challenges and fostering sustainable development.

Course Prerequisites:

CSEC Physics (Grade 1) or equivalent

CSEC Mathematics (Grade 1) or equivalent

- Recommended: CSEC Additional Mathematics (Grade 1)

Course Objectives:

Upon completion of this course, students will:

- **Develop a Comprehensive Understanding of Physics Concepts:** Students will acquire a thorough understanding of fundamental Physics concepts and principles, particularly as they apply to technological and scientific contexts relevant to the Caribbean.
- **Apply Physics Knowledge to Regional Challenges:** Students will demonstrate an ability to apply their knowledge of Physics to analyze and address natural phenomena and environmental concerns specific to the Caribbean region.
- **Build Critical Thinking and Analytical Skills:** Students will develop critical thinking and analytical skills, including the ability to interpret data, analyze complex systems, and solve problems using Physics principles.
- **Prepare for Further Studies and Employment:** Students will gain appropriate scientific training that prepares them for higher education, employment in scientific fields, and personal growth through a solid foundation in Physics.
- **Develop Practical Experimental Skills:** Students will acquire and refine experimental skills, including accurate observation, precise measurement,

effective data recording and reporting, and the ability to design and conduct experiments with appropriate controls.

- **Communicate Scientific Findings Effectively:** Students will be able to present scientific data and findings clearly and logically, using appropriate scientific terminology and conventions to ensure precision and clarity in their reports.

Student Learning Outcomes:

Students will:

- solve problems of bodies at rest, in uniform motion, or uniformly accelerated motion under the influence of forces in one and two dimensions;
- appreciate the effects of forces acting on a body;
- understand the principle of conservation of energy;
- design and carry out experiments to test relationships between physical quantities;
- appreciate that the measurement of a physical quantity is subject to uncertainty.
- understand the different types of oscillatory motion;
- appreciate the properties common to all waves;
- recognize the unique properties of different types of waves;
- apply their knowledge of waves to the functioning of the eye and the ear.
- understand the principles involved in the design and use of thermometers;
- be aware of the thermal properties of materials and their practical importance in everyday life;
- understand the various modes of heat transfer;
- be familiar with the kinetic theory of gases and the equation of state of an ideal gas;
- display a working knowledge of the first law of thermodynamics;
- be aware of the mechanical properties of materials and their practical importance in everyday life.

Topical Outline of the Course Content:

Christmas Term

- ✓ **Uncertainty in measurement**
- ✓ **Accuracy and Precision**
- ✓ **Linearization**
- ✓ **SI Quantities and Units**
- ✓ **Homogeneity of Equations**
- ✓ **Vectors**
- ✓ **Linear Motion**
- ✓ **Projectile motion**
- ✓ **Linear Momentum**
- ✓ **Circular motion**
- ✓ **Gravitation**
- ✓ **Effects of Forces**
- ✓ **Kinetic & Potential Energy**

Easter Term

- ✓ **Simple Harmonic Motion ***
- ✓ **Waves ***
- ✓ **Refraction, Diffraction and Snell's Law**
- ✓ **Physics of the Ear**
- ✓ **Physics of the Eye**
- ✓ **The Design and use of Thermometers**
- ✓ **Heat Capacity and Specific Heat Capacity**
- ✓ **Latent Heat**
- ✓ **Heat Transfer**
- ✓ **Kinetic Theory of gasses**
- ✓ **First Law of Thermodynamics**
- ✓ **Mechanical properties of Matter**

** Topics are covered in external workshops (UWI), attendance is not mandatory but suggested*

Guidelines/Suggestions for Teaching Methods and Student Learning Activities:

- Lectures: Provide contextual background and detailed analysis of each topic.
- Group Discussions: Facilitate discussions on primary source documents and historical interpretations.
- Document Analysis: Students analyze historical documents, maps, and images related to the course topics.
- Research Projects: Assign research on specific revolts, economic systems, or figures in Caribbean history.
- Video presentations: Students watch historical videos relevant to the course topic
- Differentiated Instruction: Tailoring instruction to meet the needs, strengths, and interests of each student.
- Lecture-Demonstration: Combining lectures with demonstrations to enhance understanding through verbal and visual learning

Guidelines/Suggestions for Methods of Student Evaluation:

- Quizzes and Tests: Regular assessments to check understanding of key concepts.
- Classwork: Assignments completed during class that help monitor ongoing student progress and understanding.
- Homework Assignments: Tasks assigned for completion outside of class, reinforcing concepts taught and promoting independent study.
- Research Papers: In-depth analysis of a specific historical event or theme.
- Class Participation: Assessment based on engagement in discussions and activities.
- Presentations: Students present their research findings to the class.
- Final Exam: A comprehensive exam covering all course material.

- Group Projects: Team assignments that assess collaborative and interpersonal skills along with individual contributions.
- Peer Reviews: A process where students evaluate each other's work, providing feedback and gaining insights from peers.
- Online Quizzes and Exams: Digital tests that make use of technology to assess students' understanding in a more flexible or remote setting.
- Laboratory Experiments: Practical experiments to develop experimental skills. Some of these will form students' Internal Assessment to be submitted as a portion of their CAPE Grade.

Suggested Readings, Texts, Objects of Study:

Physics for CAPE Examinations,

CXC Study Guide – Physics Unit 1 for CAPE, Oxford University Press, *Terry David et al.*

Additional Readings:

A-Level Physics, Nelson Thomas, *Roger Muncaster.*

Bibliography of Supportive Texts and Other Materials:

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