

# Syllabus for TBCS Physics (2024-2025 Academic Year)

---

## **TBCS AP Physics Course Description:**

Welcome to the AP Physics course for the TBCS 2024-2025 academic year! This course is designed to provide high school and advanced middle school students with a comprehensive understanding of the fundamental principles of physics. Our curriculum is structured to cover the key topics in American AP Physics 1, AP Physics 2, and AP Physics C, including Mechanics and Electricity & Magnetism.

Throughout the academic year, students will explore a wide range of concepts such as kinematics, dynamics, work, energy, power, momentum, rotational motion, electrostatics, electric circuits, magnetism, waves, optics, thermal physics, fluid mechanics, quantum mechanics, and relativity. Each topic will be approached with an emphasis on problem-solving and critical thinking skills, preparing students for the AP Physics exams and fostering a deeper appreciation for the subject.

The first semester will focus on providing a solid foundation in the basics of physics, starting with an overall review of the entire AP Physics curriculum. Subsequent weeks will delve into specific areas, ensuring a thorough understanding of each concept. The second semester will build on this foundation, introducing more advanced topics and applications, with a continued focus on preparation for the AP exams.

This course aims not only to improve students' academic performance but also to ignite a passion for physics by demonstrating its real-world applications and relevance. Join us for a challenging and rewarding journey through the fascinating world of physics!

## **TBCS AP 物理课程简介:**

欢迎参加 TBCS 2024-2025 学年的 AP 物理课程！本课程旨在为高中生和高年级初中生提供全面理解物理基本原理的机会。我们的课程结构涵盖了美国 AP 物理 1、AP 物理 2 以及 AP 物理 C 中的关键主题，包括力学和电磁学。

在整个学年中，学生将探索一系列广泛的概念，如运动学、动力学、功、能量、功率、动量、旋转运动、电静力学、电路学、磁学、波、光学、热物理学、流体力学、量子力学和相对论。每个主题都会强调问题解决和批判性思维技能，帮助学生为 AP 物理考试做准备，并培养对该学科更深的欣赏。

第一学期将重点打下物理基础，从整体回顾 AP 物理课程开始。接下来的几周将深入探讨具体领域，确保对每个概念有深入理解。第二学期将在此基础上进一步发展，引入更高级的主题和应用，同时继续为 AP 考试做准备。

本课程不仅旨在提高学生的学业成绩，还希望通过展示物理在现实世界中的应用和相关性，激发他们对物理的热情。加入我们，一起踏上充满挑战和收获的物理探索之旅吧！

## **Resources:**

1, PhET Interactive Simulations: <https://phet.colorado.edu/>

2, oPhysics: Interactive Physics Simulations: <https://ophysics.com/>

3, Khan Academy High School Physics: <https://www.khanacademy.org/science/high-school-physics>

## **Fall 2024**

Week	Topic	Objectives	AP Physics Sections
Week 01: 08/18/2024	Systematic Overall Review of AP Physics Curriculum	Provide a broad overview of all the major topics covered in AP Physics to set the stage for detailed study in subsequent weeks.	AP Physics 1, AP Physics 2, AP Physics C: Mechanics, AP Physics C: Electricity and Magnetism
Week 02: 08/25/2024	Kinematics	Understand the concepts of displacement, velocity, acceleration, and equations of motion.	AP Physics 1, AP Physics C: Mechanics
Week 03: 09/01/2024 (No Class)	No Class (Holiday)	No Class	No Class
Week 04: 09/08/2024	Dynamics	Learn about Newton's laws of motion and their applications.	AP Physics 1, AP Physics C: Mechanics
Week 05: 09/15/2024	Work, Energy, and Power	Understand work-energy theorem, kinetic and potential energy, and power.	AP Physics 1, AP Physics C: Mechanics
Week 06: 09/22/2024	Momentum and Collisions	Grasp the concepts of momentum, impulse, and conservation of momentum.	AP Physics 1, AP Physics C: Mechanics
Week 07: 09/29/2024	Circular Motion and Gravitation	Study the laws of circular motion and universal gravitation.	AP Physics 1, AP Physics 2, AP Physics C: Mechanics

Week 08: 10/06/2024	Rotational Motion	Learn about rotational kinematics, dynamics, and energy.	AP Physics C: Mechanics
Week 09: 10/13/2024	Electrostatics	Understand electric charge, electric force, and electric fields.	AP Physics 2, AP Physics C: Electricity and Magnetism
Week 10: 10/20/2024	Electric Circuits	Learn about current, voltage, resistance, and Ohm's law.	AP Physics 1, AP Physics 2, AP Physics C: Electricity and Magnetism
Week 11: 10/27/2024	Magnetism and Electromagnetic Induction	Understand magnetic fields, forces on charges, and Faraday's law.	AP Physics 2, AP Physics C: Electricity and Magnetism
Week 12: 11/03/2024	Waves and Sound	Study wave properties, sound waves, and Doppler effect.	AP Physics 1
Week 13: 11/10/2024	Light and Optics	Learn about reflection, refraction, and optical instruments.	AP Physics 2
Week 14: 11/17/2024	Modern Physics	Understand concepts of quantum mechanics, atomic, and nuclear physics.	AP Physics 2
Week 15: 11/24/2024 (No Class)	No Class (Holiday)	No Class	No Class
Week 16: 12/01/2024 (Final Exam)	Final Exam Week	Final Exam	Final Exam

## Spring 2025 (Date TBD)

Week	Topic	Objectives	AP Physics Sections
Week 01:	Review of Fall Semester Topics	Reinforce understanding of previously covered topics.	AP Physics 1, AP Physics 2, AP Physics C: Mechanics, AP Physics C: Electricity and Magnetism
Week 02	Thermal Physics	Understand the laws of thermodynamics and heat transfer.	AP Physics 2
Week 03	Fluid Mechanics	Study properties of fluids, buoyancy, and Bernoulli's principle.	AP Physics 2
Week 04	Electrostatics (Advanced)	Dive deeper into electric fields, potential, and capacitance.	AP Physics 2, AP Physics C: Electricity and Magnetism
Week 05	Electric Circuits (Advanced)	Analyze complex circuits including RC, RL, and RLC circuits.	AP Physics 2, AP Physics C: Electricity and Magnetism
Week 06	Magnetism (Advanced)	Explore magnetic fields in more detail, including Ampere's law.	AP Physics 2, AP Physics C: Electricity and Magnetism
Week 07	Electromagnetic Waves	Understand the nature of electromagnetic waves and their properties.	AP Physics 2
Week 08	Quantum Mechanics (Advanced)	Study advanced topics in quantum mechanics and their applications.	AP Physics 2

Week 09	Atomic and Nuclear Physics (Advanced)	Learn about nuclear reactions, decay, and applications.	AP Physics 2
Week 10	Relativity	Understand the principles of special relativity.	AP Physics 2
Week 11	AP Exam Preparation	Review key concepts and practice exam questions.	AP Physics 1, AP Physics 2, AP Physics C: Mechanics, AP Physics C: Electricity and Magnetism
Week 12	Capstone Project Presentations	Allow students to present their projects on a chosen physics topic.	AP Physics 1, AP Physics 2, AP Physics C: Mechanics, AP Physics C: Electricity and Magnetism
Week 13	Course Review and Q&A	Provide a final review of the course content and address any remaining questions.	AP Physics 1, AP Physics 2, AP Physics C: Mechanics, AP Physics C: Electricity and Magnetism
Week 14 (Final Exam)	Final Exam Week	Final Exam	Final Exam