

CSCA Physics Examination Syllabus

(2025 Edition)

I. Examination Purpose

This examination aims to assess the core physics competencies required for international students to pursue undergraduate studies in science and engineering programs in China.

It assesses students' mastery of the fundamental physical knowledge system, understanding of scientific thinking, and ability to apply knowledge across disciplines. These core competencies form the foundation of university-level physics courses, provide essential support for disciplines such as mechanical engineering, electrical engineering, and materials science and engineering, and lay a solid groundwork for students' future research, innovation, and engineering practice.

II. Examination Format and Structure

1. Duration: 60 minutes
2. Total Score: 100 points
3. Language: Chinese or English
4. Question Type: Multiple Choice (Single Answer)
5. Number of Questions: 48
6. Content Modules:
 - Mechanics
 - Electromagnetism
 - Thermodynamics
 - Optics
 - Modern Physics

III. Examination Content and Scope

1. Mechanics
 - Kinematics: displacement, velocity, acceleration, uniform acceleration motion, free fall motion
 - Newton's laws of motion and their applications

- Momentum and impulse, law of conservation of momentum
- Work and energy, law of conservation of mechanical energy
- Circular motion and universal gravitation
- Simple harmonic motion and mechanical waves

2. Electromagnetism

- Electrostatics: Coulomb's law, electric field strength, electric potential
- Direct current circuits: Ohm's law, series and parallel circuits
- Magnetic field: magnetic induction, Ampere's force, Lorentz force
- Electromagnetic induction: Faraday's law, Lenz's law

3. Thermodynamics

- Kinetic theory of gases
- Ideal gas equation of state
- First law of thermodynamics

4. Optics

- Geometrical optics: laws of reflection and refraction
- Physical optics: interference and diffraction

5. Modern Physics

- Photoelectric effect
- Atomic structure
- Fundamentals of nuclear physics