

■ EDUQUEST EXCLUSIVE 8-PAGE MASTER GUIDE

ESAT Cambridge & Imperial STEM Admissions Guide

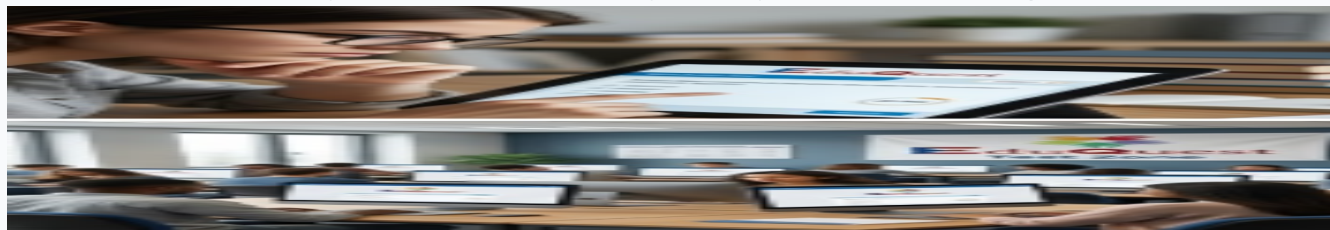
Engineering and Science Admissions Test: Mathematics, Physics, Chemistry & Biology Module Blueprint

1. ESAT Overview & Participating Universities

The Engineering and Science Admissions Test (ESAT) is the standardized computer-based admissions test for Cambridge Natural Sciences, Engineering, Veterinary Medicine, and Chemical Engineering, as well as Imperial College London engineering degrees.

- Modular Architecture: 3 Modular sections chosen based on your target degree (40 minutes each = 120 minutes total).
- Module 1: Mathematics 1 (Compulsory for ALL test takers) - 27 Questions in 40 minutes (~88 seconds per question).
- Modules 2 & 3: Selected from Biology, Chemistry, Physics, or Mathematics 2 (27 Questions in 40 minutes each).
- Calculator Policy: Strictly NO calculators or formula booklets allowed. Fast mental math is critical.

Figure 1: Pearson VUE ESAT Testing Laboratory & Modular Simulation Setup



■ High-Speed STEM Requirement

With only 88 seconds per question on advanced STEM problems, students must master multi-variable derivations and mental estimation.

Module 2: Degree-Wise Subject Module Mapping

1. Departmental Module Selection Requirements

University & Course	Compulsory Module 1	Module 2 Choice	Module 3 Choice
Cambridge Engineering	Mathematics 1	Physics	Mathematics 2
Cambridge Natural Sciences (Physical)	Mathematics 1	Physics or Chemistry	Mathematics 2 or Physics
Cambridge Natural Sciences (Biological)	Mathematics 1	Biology	Chemistry
Imperial Aeronautical / Mechanical	Mathematics 1	Physics	Mathematics 2
Imperial Chemical Engineering	Mathematics 1	Chemistry	Physics or Mathematics 2
Imperial Design Engineering	Mathematics 1	Physics	Mathematics 2 or Chemistry

Module 3: Mathematics 1 & 2 Core Content & Shortcuts

1. High-Yield Math 1 & 2 Topics

- Algebraic Derivatives & Integrals: Power rule, trigonometric derivatives, definite integrals under curves.
- Coordinate Geometry & Vectors: Scalar products (dot product), vector equations of lines, perpendicularity conditions.
- Logarithms & Indices: Rapid manipulation of log laws, solving exponential equations without calculator.
- Matrices & Transformations: Matrix multiplication, determinants, 2D geometric rotations and reflections.

Module 4: Physics Module: Derivations & Kinematics

1. Core Physics Formulations

- Kinematics & Projectiles: SUVAT equations, resolving velocity into horizontal (constant) and vertical (accelerating) components.
- Newtonian Dynamics & Energy: Momentum conservation, work done $W = F \cdot d \cdot \cos(\theta)$, kinetic energy and gravitational potential.
- Circuits & Electromagnetism: Kirchhoff's current and voltage laws, internal resistance, magnetic force $F = B \cdot I \cdot L \cdot \sin(\theta)$.
- Waves & Optics: Wave equation $v = f \cdot \lambda$, refraction index $n_1 \cdot \sin(\theta_1) = n_2 \cdot \sin(\theta_2)$, total internal reflection.

Module 5: Chemistry & Biology Modules Overview

1. High-Yield Chemistry & Biology Principles

- Chemical Equilibrium & Le Chatelier: Shifts in equilibrium position with temperature, pressure, and concentration.
- Organic Chemistry Mechanisms: Electrophilic addition, nucleophilic substitution, functional group testing.
- Cell Physiology & Genetics: Mitosis/Meiosis, DNA replication, enzyme kinetics (K_m and V_{max}), respiration pathways.
- Bioenergetics & Homeostasis: Photosynthesis light/dark reactions, kidney nephron filtration, hormone feedback loops.

Module 6: The 88-Second Pearson VUE Triage Protocol

1. Pacing & Screen-Reading Tactics

- With only 88 seconds per question, zero marks are awarded for incomplete solutions. If a multi-step calculation stalls after 45 seconds, flag, guess from remaining choices, and move.
- Use clean scratchpad quadrants: Divide your physical scratch paper into 6 numbered boxes per sheet to avoid misreading your own calculations.

Module 7: 10-Week ESAT Modular Study Plan

1. Study Milestones

Phase	Focus Area	Weekly Deliverables	Score Benchmark
Weeks 1–3	Mathematics 1 Mastery	40 Math 1 drills daily + formula memorization	Math 1 Accuracy > 80%
Weeks 4–7	Science Modules 2 & 3	Physics/Chem past paper sets + speed calculations	Module 2 & 3 > 75%
Weeks 8–10	Full Pearson VUE Mocks	2 Full 3-module timed simulations weekly	Target: Top Decile Band

Module 8: Candidate Self-Assessment & Mentorship Booking

1. Pre-Exam Verification Checklist

- Can you derive all standard SUVAT kinematics formulas without notes? (Yes / No)
- Can you calculate definite integrals mentally in under 60 seconds? (Yes / No)
- Have you completed at least 4 full-length 120-minute ESAT simulations? (Yes / No)

■ STEM Admissions Edge

EduQuest STEM students achieve interview shortlist rates exceeding 90% at Cambridge and Imperial.

■ Book Your 1-on-1 Strategy & Diagnostic Session

Book an ESAT Consultation with EduQuest Oxbridge STEM faculty.

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