Academic INSIGHTS

immerse EDUCATION

Mathematics



AGES AND LOCATIONS

Ages 16-18: Cambridge, Oxford
Ages 15-18: London

Students are taught in separate age groups, with content and pace tailored to each.
Small classes, averaging 7 students.

COURSE INTRODUCTION

Applied mathematics, covering probability and statistics, calculus, medical imaging, linear algebra, machine learning, and scientific computing.

You'll learn how to build and test a quantitative model, analyse data in Python, and communicate the result to a non-specialist.

You'll leave with a completed personal project and a personalised tutor evaluation to draw on in university applications.



EXAMPLE TUTOR

Gaia C

PhD candidate, Department of Pure Mathematics and Mathematical Statistics and Trinity College, University of Cambridge; bachelor's and master's, École Normale Supérieure

Gaia's research sits at the intersection of discrete mathematics and theoretical computer science, focusing on extremal and probabilistic combinatorics. She has teaching experience in both mathematics and theoretical computer science at Cambridge.

Mathematics sample syllabus

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WEEK ONE

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
AM	**Foundations of probability** Study combinatorics, probability spaces, conditional probability, and independence.	**Statistical thinking** Explore averages, variability, distributions, and how scientific evidence is evaluated.	**Calculus as a modelling language** Revisit derivatives and integrals through interpretation rather than technique.	**Radioactive decay** Investigate how probability governs nuclear decay and how half-lives are calculated.	**Differential equations** Discover how remarkably simple rules can generate complex physical behaviour.
PM	**When intuition fails** Work through the birthday paradox and the Monty Hall problem.	**Bayesian inference** Update probabilities as new information arrives and apply this to medical testing.	**Exponential growth and decay** See why exponential functions recur across physics, biology, and finance.	**1:1 tutorial** Talk to your tutor about the areas of mathematics that interest you most, and get suggestions for reading and resources to take them further.	**Signal, noise, and inverse problems** Understand the mathematics hidden beneath a medical scan.
		Creativity masterclass Explore divergent, convergent, and lateral thinking, then use SCAMPER to generate and pitch original ideas.		**Personal project supervision** Choose a topic for your personal project, plan your research, and start shaping your presentation.	

WEEK TWO

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
AM	**PET and CT image reconstruction** Follow how physical measurements are converted into images of the human body.	**Classification and pattern recognition** Ask how a computer can distinguish healthy tissue from diseased tissue.	**Scientific computing in Python** Simulate probability experiments, model physical systems, and analyse datasets in Python.	**Mathematical communication** Prepare equations, figures, and reports in LaTeX and explain your reasoning clearly.	**Personal project presentations** Present your mathematics personal project to your tutor and peers.
PM	**Vectors and matrices** Represent images, datasets, and physical systems as mathematical structures.	**Introduction to neural networks** See how accessible mathematical ideas underpin modern AI systems.	**Analysing model assumptions** Test the limitations of a quantitative model and interpret its output honestly.	**1:1 tutorial** Get feedback on your progress, and talk through your academic ambitions and the university courses and careers mathematics can lead to.	**Personal project presentations (continued)** Respond to questions and discuss your peers' presentations.
	Critical thinking masterclass Examine the attention economy, echo chambers, logical fallacies, and cognitive bias, then debate a live issue.	**Guest speaker evening** Learn from an inspirational speaker from fields such as broadcasting, writing, philosophy, and sport, then question and debate.	**Personal project supervision** Finalise your research and slides and rehearse your presentation ready for Friday.		**Graduation ceremony** Certificates, speeches, and celebration.

Please note: this is an example syllabus and is subject to change.
Not shown: full evening and weekend social and cultural timetable.

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