Academic INSIGHTS

immerse EDUCATION

Engineering

AGES AND LOCATIONS

Ages 13-15: Cambridge, Oxford
Ages 16-18: Cambridge, Oxford, Singapore
Ages 15-18: London, Toronto, Sydney

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



COURSE INTRODUCTION

Engineering problem-solving, covering robotics and path planning, numerical simulation, fluid mechanics, control systems, and machine learning.

You'll learn how to build a mathematical model, simulate a physical system, and explain your reasoning to a technical audience.

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



EXAMPLE TUTOR

Dr Muhammad Z

PhD and MRes, University of Cambridge (EPSRC-funded); master's, Durham University

Muhammad's doctoral research is on advanced remote epitaxy for growing ultrathin single-crystal semiconductor layers for next-generation photovoltaics. He teaches physics and engineering at Cambridge throughout the year, through college supervisions and small-group tutorials.

Engineering sample syllabus

Academic INSIGHTS

WEEK ONE

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
AM	**Introduction to engineering** Survey the mathematical and engineering foundations the course will build on.	**Robotics and sensing** Understand how robots perceive their environment and translate that into movement.	**Interview-style problem solving** Tackle an open interview question as a class and design a model to answer it.	**Equations of motion** Describe how position, velocity, and acceleration change under applied forces.	**Numerical methods** Learn why some equations cannot be solved analytically and how to approximate solutions.
PM	**Linear algebra and calculus for engineers** Revisit vectors, matrices, and calculus as tools for modelling real systems.	**Path planning algorithms** Generate a trajectory for a robot and use graph search to find the optimal path.	**Mathematical modelling** Justify the assumptions in your model and test it against real-world data.	**1:1 tutorial** Talk to your tutor about the areas of engineering that interest you most, and get suggestions for reading and resources to take them further.	**Rocket simulation in MATLAB** Model thrust, drag, and gravity to simulate a rocket's flight trajectory.
		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	**Refining your simulation** Improve your model for varying air resistance, fuel consumption, and accuracy.	**Dimensional analysis** Simplify engineering problems by examining the units of the variables involved.	**Electronic engineering and microchip design** Learn how computers are built and how engineers approach chip design.	**Sustainable design** Examine sustainable design principles and the minimum viable product approach.	**Personal project presentations** Present your engineering personal project to your tutor and peers.
PM	**Introduction to fluid mechanics** Meet lift, boundary layers, the Reynolds number, and what makes a wing work.	**Control systems** Explore how sensors, controllers, and actuators keep a system on target.	**Machine learning for engineers** Explore how algorithms learn patterns and make predictions from data.	**1:1 tutorial** Get feedback on your progress, and talk through your academic ambitions and the university courses and careers engineering 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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