Academic INSIGHTS

immerse EDUCATION

Biotechnology



AGES AND LOCATIONS

Ages 16-18: Cambridge

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

COURSE INTRODUCTION

How biological systems are engineered, covering biochemistry, genetics, CRISPR gene editing, microbial technology, and bioethics.

You'll learn to explain how gene editing works, evaluate its clinical and agricultural uses, and argue a position on its ethics.

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



EXAMPLE TUTOR

Dr Saroj V

PhD, University of Cambridge (Cambridge Nehru Scholar); undergraduate and postgraduate degrees, University of Madras

Saroj is a scientist, researcher, and entrepreneur who consults on R&D due diligence for biotech and pharma companies across Europe. He has authored 25 peer-reviewed publications, holds eight patents, and has taught extensively at Cambridge.

Biotechnology sample syllabus

Academic INSIGHTS

WEEK ONE

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
AM	**Foundations of biochemistry** Explore the proteins, fats, sugars, and DNA that build and power living cells.	**Genetics and inheritance** Follow how traits such as eye colour and inherited conditions pass between generations.	**Recombinant DNA technology** See how inserting a human gene into bacteria turned microbes into insulin factories.	**Designing a gene edit** Work through how scientists design a guide RNA for a real genetic target.	**Gene therapy in medicine** Examine in vivo and ex vivo editing, off-target effects, and treatments for sickle cell disease.
PM	**Energy and cell signalling** Examine how the body derives energy from food and how cells communicate with each other.	**The code of life** Trace how genetic information is stored, copied, and translated into working proteins.	**How CRISPR-Cas9 works** Learn how a guide RNA finds its target and Cas9 cuts DNA at exactly that point.	**1:1 tutorial** Talk to your tutor about the areas of biotechnology that interest you most, and get suggestions for reading and resources to take them further.	**Stem cells and regenerative medicine** Compare embryonic and adult stem cells and how damaged tissue can be repaired.
		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	**Cancer biology and biotechnology** Study how mutations disrupt the cell cycle and how immunotherapy turns the immune system on tumours.	**Bioinformatics** Use computational tools to analyse genetic data and spot errors in sequencing outputs.	**Microbiology and microbial technology** Investigate how microbes produce antibiotics, biofuels, and food, and help clean up pollution.	**Synthetic biology** Discover how engineered organisms and genetic circuits are designed to perform useful functions.	**Personal project presentations** Present your biotechnology personal project to your tutor and peers.
PM	**Reading the results** Learn how PCR, gel electrophoresis, and sequencing confirm whether a gene edit has worked.	**Precision medicine and genomics** Explore the Human Genome Project, biomarkers, and pharmacogenomics.	**Biotechnology in agriculture** Examine genetically modified crops, crop resilience, and the challenge of food security.	**1:1 tutorial** Get feedback on your progress, and talk through your academic ambitions and the university courses and careers biotechnology 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.