# The Cambridge University Mathematics Experience Week

**18th-23rd March 2024**
**Noida, India**

## Programme Overview

Introducing "The Cambridge University Mathematics Experience Week," a Cambridge-accredited programme meticulously curated by SternaXP. Tailored for **9th, 10th, and 11th-grade** students, this immersive experience, under the guidance of Paul Fannon, Director of Studies in Mathematics at Jesus College, Cambridge, is crafted to immerse you in the essence of the University's renowned Mathematics Tripos.

This week-long programme serves as an intensive clinic on data analytics, problem-solving, and the inherent elegance of mathematical thinking. Through a blend of lectures, seminars, and Cambridge supervisions, the programme transcends traditional classrooms, providing a profound exploration of the intricacies of mathematics. Join us for a week of stimulating courses, led by top-notch academics, and connect and collaborate with a community that shares your passion for mathematics.

## Faculty

Meet Paul Fannon, the driving force behind this programme and the Director of Studies in Mathematics at Jesus College, University of Cambridge. A distinguished figure in his field, Paul embarked on his academic journey at Cambridge as an undergraduate in 1998, specializing in Natural Sciences.

Paul has researched, written, and taught various facets of mathematics, penning numerous A-level and IB textbooks. As the Chief Examiner for the International Baccalaureate, he has played a pivotal role in shaping their Applications and Interpretations Mathematics course.

With a wealth of teaching experience, he passionately delves into educational research, focusing on the development of critical thinking skills in mathematics and statistical modeling. Paul brings this dedication to teaching to the forefront as he, alongside a Cambridge University colleague, will personally lead participants through the "Cambridge University Mathematics Experience Week."

## Structure

The course will be run over 6 full working days by two faculty members from the University of Cambridge. The day will start with two or three lectures before lunch, then a seminar or examples class after lunch followed by some time to work on questions based on the lectures. Towards the end of the week, there will be opportunities to do some Cambridge-style supervisions where small groups meet with an academic to discuss the problems set.

## Course Content

**Lectures** will focus on Linear Algebra and Probability.

- **Linear algebra** will initially look at the notion of a vector as a geometric object before considering it more fundamentally as an element of a vector space which can then generalise to other interesting objects. It will then consider linear mappings of these vectors as an object called a matrix, which can be studied in its own right. Whilst linear algebra is a fundamental language of higher mathematics, the purpose of this course will be mainly about using logical, axiomatic arguments to develop critical thinking and communication skills.

- **Probability** will look at ways to apply rigorous arguments to uncertain events. It will start with considering the idea of a probability distribution and expected value. Developing the algebra of these ideas will lead us to some powerful general results.

The afternoon **Seminars** will provide insight into a variety of mathematical topics such as formal logic, information theory and machine learning.

**Cambridge Supervisions** are a system of small-group personal tuitions that are a strength of the University. Participants in this programme will have several Supervisions to deeply engage with the course content.

## Programme Requirements

To ensure a seamless learning experience, participants are expected to have a foundation in school-level algebra and statistics.

**Algebraic requirements:**

- Quadratic factorisation
- Quadratic formula
- Basic ideas of exponents and logarithms.

**Statistical Knowledge Requirements:**

- Basic rules and vocabulary of probability (e.g. independent, mutually exclusive, complement).
- Basic descriptive statistics: Mean, median, mode, range, standard deviation.

## Programme Specifics:

**Assessment:** Continuous assessment throughout lectures and supervisions ensures a thorough grasp of the material. There is no final examination.

**Participation Certificate:** Upon completion of the programme, participants will receive Cambridge accreditation as well as a certificate jointly issued by Cambridge and SternaXP.

**Venue:** HCL, A9, Block A, Sector 3, Noida, Uttar Pradesh 201307

**Dates:** 18th-23rd March 2024

## Register Now:

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