

Course number		U-LAS11 10010 LE55									
Course title (and course title in English)		Mathematical Statistics-E2 Mathematical Statistics-E2		Instructor's name, job title, and department of affiliation		Research Institute for Mathematical Sciences Associate Professor,Croydon, David Alexander					
Group		Natural Sciences		Field(Classification)		Data Science(Foundations)					
Language of instruction		English		Old group		Group B		Number of credits		2	
Number of weekly time blocks		1		Class style		Lecture (Face-to-face course)		Year/semesters		2024 • First semester	
Days and periods		Thu.3		Target year		Mainly 2nd year students		Eligible students		For science students	
[Overview and purpose of the course]											
<p>This course will develop the theory of statistical inference, which has applications across the natural and social sciences, and beyond. It will focus on the key topics of parameter estimation and hypothesis testing. As well as presenting the theoretical justification for various techniques covered, it will also be a goal to show how these can be applied in examples.</p>											
[Course objectives]											
<p>- To understand the basic concepts of, and mathematical justification for, point estimation and hypothesis testing</p> <p>- To be able to apply key techniques of statistical inference in applications</p>											
[Course schedule and contents)]											
<p>The following indicates possible topics that will be covered and approximate schedule, though the precise details may vary depending on the student's proficiency level and background.</p> <p>(1) Review of probability theory [3 weeks] Distribution and expectation, multivariate distributions, conditional distributions, notions of convergence, common families of distributions, random samples</p> <p>(2) Point estimates [5 weeks] Estimators, sampling distribution, parameterized statistical models, maximum likelihood estimates, sampling distributions, confidence intervals, point estimation for linear models</p> <p>(3) Hypothesis testing [4 weeks] Likelihood ratio tests, methods of evaluating tests, goodness of fit tests, tests for comparing mean and variance of two samples, tests for independence</p> <p>(4) Applications [2 weeks] Extended example applications of the main techniques covered earlier in the course</p> <p>Total: 14 classes and 1 week for feedback</p>											
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## Mathematical Statistics-E2(2)

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### [Course requirements]

None

### [Evaluation methods and policy]

There will be 3 exercise sheets throughout the course, for which students will be expected to return work and present some of their answers in class. This will account for 30% of the final mark. The remaining 70% will be based on a final exam.

### [Textbooks]

There will be no set textbook for the course, as the lectures will contain all the material needed for the homework and exam. However, students might find the following useful as additional reading:

Statistical Inference, Casella and Berger, Duxbury, 2002

### [Study outside of class (preparation and review)]

Details will depend on the number of students enrolling on the course, and will be discussed in the first class.

### [Other information (office hours, etc.)]