科目ナンバリング	U-LAS11 20002 LE55						
授業科目名<英訳>	Second Course in Statistics-E2 Second Course in Statistics-E2			担当者所属職名・氏名	数理解析研究所 准教授 Croydon, David Alexander		
群	自然科学科目群			分野(分類)	データ科学(発展)	使用言語	英語
旧群	B群	単位数	2単位	週コマ数	1コマ	授業形態	講義（対面授業科目）
開講年度・開講期	2026・後期	曜時限	木2	配当学年	主として2回生	対象学生	全学向

[授業の概要・目的]

This second course in statistics provides an in-depth introduction to regression, which is the area of statistics in which a dependent variable is modelled as a linear function of one or more predictor variables, together with a random error. Regression has applications across scientific research, engineering, and various other fields, and it will be an additional goal of the course to explore some of these. Whilst some knowledge of introductory statistical theory might be helpful, the course is intended to be self-contained.

[到達目標]

- To gain a mathematical foundation in regression analysis
- To understand how to interpret and evaluate a linear model
- To develop skills in using statistical software (R)
- To be able to apply simple linear regression, multiple linear regression, and generalized linear models in examples

[授業計画と内容]

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. Moreover, in addition to the mathematical content, applications will be considered throughout the course.

(1) Simple linear regression [7 weeks]
Definition of the model, parameter estimation, model interpretation and evaluation

(2) Multiple linear regression [4 weeks]
Estimators for such models, tests for significance of regression, tests on individual regression coefficients and subsets of coefficients, confidence intervals on regression coefficients, polynomial regression

(3) Generalized linear models [3 weeks]
Link functions and linear predictors, parameter estimation, model analysis, specific examples of generalized linear models including logistic regression and Poisson regression

Total: 14 classes and 1 week for feedback

[履修要件]

Whilst not essential, it will benefit students if they have previously taken an introductory statistics course. In order to complete the assignments, students will be asked to download and use the free statistical software R (and RStudio). No previous knowledge of statistical computing/programming will be assumed.

[成績評価の方法・観点]

There will be regular (approximately fortnightly) 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 70% of the final mark. The remaining 30% will be based on a final exam.

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Second Course in Statistics-E2(2)

[教科書]

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 books listed in the reference section useful as additional reading. (All of these references contain much more than will be covered in the course.)

[参考書等]

（参考書）

Bingham and Fry 『Regression: Linear Models in Statistics』（Springer, 2010）
Montgomery, Peck and Vining 『Introduction to Linear Regression Analysis』（Wiley, 2012）
Moore, McCabe and Craig 『Introduction to the Practice of Statistics』（Macmillan, 2021）

[授業外学修（予習・復習）等]

The lecturer will present the basic concepts in class, upon which assignments will be set. The time for these might vary from assignment to assignment, and student to student, but the lecturer estimates these to take 2-3 hours each.

[その他（オフィスアワー等）]

[主要授業科目（学部・学科名）]

理学部