

Course 02429

Analysis of Correlated Data: Mixed Linear Models

Course introduction and evaluation

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Academic prerequisites

02429 Analysis of correlated data: Mixed linear models

<https://kurser.dtu.dk/course/2025-2026/02429>

- a) An introductory statistics course: 02402 Statistics (Polytechnical Foundation), 2403 Introduction to Mathematical Statistics, 02323 Introduction to Statistics. **Required**

- b) In addition to these, it is recommended to have at least two relevant statistics courses. The two most relevant courses are 02411 Statistical Design and Analysis of Experiments and 02418 Statistical modelling: Theory and practice. **Recommended**.

This course 02429 is recommended as a prerequisite to 02426 Non-linear random effect models: time-independent and dynamic models
(<https://kurser.dtu.dk/course/2025-2026/02426>)

Course evaluation

- One individual assignment: [pass/non-pass](#).
Feedback will be given.
- One group midterm assignment to be handed in: [20%](#).
Feedback will be given.
- One exam assignment: [20%](#).
Two or three full exercises to be handed in.
No feedback will be given. From these exercises, one will be randomly selected at the exam for presentation and examination.
- It is compulsory to pass each of the three assignments prior to presenting the final exam.
- Individual oral exam: [60%](#).

Course material at [dtulearn](#).

- eNote-1- eNote13 (.pdf, .R) PBB
- Lectures' slides (.pdf, .R)
- Exercises and solutions to some of these (.pdf or .R)

Software.

- R

Course Lectures

- L1 Linear models (LM). Some examples of Linear Mixed Models (LMM)
- L2 Linear mixed models (LMM).
- L3 Drying of beech wood - a case study, part I.
- L4 Linear mixed models theory, part I.
- L5 Hierarchical random effects (multilevel models).
- L6 Model diagnostics.
- L7 The analysis of split-unit data
- L8 Analysis of covariance.
- L9 Random coefficient models.
- L10 Linear mixed models theory, part II.
- L11 Repeated measures I.
- L12 Repeated measures II. Longitudinal/panel data.
- L13 Logistic regression with mixed effects and Generalized Estimating Equations.

Some references

eNotes 1-13 (.pdf, .R) P.B. Brockhoff. (experimental data, no observational data)

Madsen, H, and Thyregod, P. (2011). Introduction to General and Generalized Linear Models. CRC Press. Ch 5 Mixed effects models.

Meier, L. (2023). ANOVA and Mixed Models. A Short Introduction Using R. CRC Press. <https://stat.ethz.ch/~meier/teaching/book-anova/> Ch 6-7.

McCulloch, C., Searle, S.R and Neuhaus, J.M. (2008). Generalized, Linear, and Mixed Models. Wiley. Second edition. Collection of theoretical results and examples.

Pinheiro, J., and D. Bates. (2009). Mixed-Effects Models in S and S-PLUS. Statistics and Computing. New York, NY: Springer. Many illustrative examples in R.

Stroup, W.W. and Ptukhina, M. (2024). Generalized Linear Mixed Models, 2nd ed. CRC Press. Illustrative examples with interpretation, with SAS though the software is not relevant.

Jones, P., Harden, S. and Crawley, M.J. (2023). The R book, 3rd ed. Wiley. e.g. Ch 1 and 3, and 13 Mixed-effect models.
<https://findit.dtu.dk/en/catalog/643dedb4354e276889ad093b>

Software

Fitting LM and LMM, GLMM



- R
- Julia
- Python
- MATLAB
- SAS, JMP
- STATA
- SPSS

LM: Linear models

LMM: Linear Mixed Models

GLM: Generalized Linear Models.

GLMM: Generalized Linear Mixed Models.

R introduction? e.g. See eNote-1.pdf or Jones et al. The R book, Ch 1 and 3.