**Short course series: Fundamentals of linear mixed models for designed experiments**

**Instructors:**

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**Dates:** 09/13 9:00 am–4:30 pm & 09/14 9:00 am–12:00 pm | **Location:** 164 Justin Hall

**Overview:** Linear mixed models are widely used for analyzing data generated by designed experiments. However, figuring out how to model a given dataset requires a careful understanding of the data generating process and a basic intuition of how mixed models work. This workshop series aims to help practitioners gain understanding and develop the intuition for the most common assumptions in mixed models.

**Target audience:** K-State faculty, research scholars and graduate students interested in the applications of mixed models for modeling data generated by designed experiments.

**Software and computer requisites:** Since model applications will be demonstrated using R software, prior experience using R software will be convenient but not required. Likewise, attendees are encouraged to bring their laptops, but will be able to follow the content regardless.

**Tentative schedule:**

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| **Day** | **Topic** |
| **Saturday 09/13/2025** | **Fundamentals of linear mixed models for designed experiments**   * Introduction to the intuition behind mixed models. * How to build a statistical model. * Fitting a mixed model to experimental data. * Model diagnostics. |
| **Sunday**  **09/14/2025** | **Generalized linear mixed models**   * Modeling data with non-normal responses. * Model diagnostics for non-normal GLMMs. |

**Recommended textbooks:**

* Gelman, A. and Hill, J. (2006). Data Analysis Using Regression and Multilevel/Hierarchical Models (1st ed.). Cambridge University Press. [[link](https://www.amazon.com/Analysis-Regression-Multilevel-Hierarchical-Models/dp/052168689X/ref=pd_lpo_sccl_3/131-3172861-4727912?pd_rd_w=mjiqJ&content-id=amzn1.sym.4c8c52db-06f8-4e42-8e56-912796f2ea6c&pf_rd_p=4c8c52db-06f8-4e42-8e56-912796f2ea6c&pf_rd_r=G0DJKJDQA9GM5S2RABKA&pd_rd_wg=Apa9i&pd_rd_r=e8be25f9-32fa-442e-a7e6-e51f94e5d229&pd_rd_i=052168689X&psc=1)]
* Stroup, W.W., Ptukhina, M., & Garai, J. (2024). Generalized Linear Mixed Models: Modern Concepts, Methods and Applications (2nd ed.). Chapman and Hall/CRC. [[link](https://www.routledge.com/Generalized-Linear-Mixed-Models-Modern-Concepts-Methods-and-Applications/Stroup-Ptukhina-Garai/p/book/9781498755566?srsltid=AfmBOop80SBSwTFMCIzkiTtYe-5uir_Xnw2KVZxa1oXb4LJWrLRx0Wwq)]