STA 2476: Statistical Model Building

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Department of Pure and Applied Sciences

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General Information

Instructor: Dr. Mutua Kilai	**Time**: 7-10am
Day: Monday	**Place**: LH 32

- **Class Policy**: Regular attendance is essential and expected.
- **Academic Honesty**: Lack of knowledge of the academic honesty policy is not a reasonable explanation for a violation.
- **Software**: R Software will be used all through.
- **Assignment Template**: To be provided as per the assignment schedule.

Course Purpose

To enable the learner to construct a mathematical description of some real-world phenomena that accounts for the uncertainty and/or randomness involved in that system.

Learning Outcomes

By the end of the course, the learner should be able to:

- Describe a non-linear regression model
- Discuss the asymptotic properties of non-linear least squares estimators
- Describe the concept of mixed models
- Estimate functions in non-parametric regression models
- Explain the concept of non-parametric regression models

Course Content

- Analysis of the general linear model: model building, model selection and validation, variable selection; stepwise and best subset regression.
- Introduction to response surface methodology.
- Modeling under prior and additional information, ridge regression.
- Modeling of non-normal data.
- Treatment of outliers in regression models.
- Generalised linear models, measurement of association in two-way Tables; log-linear and other models for contingency tables; logits; probits; categorical data, score tests

R packages to install

- `fpp3`
- `tidyverse`
- `broom`
- `performance`
- `GGally`

Course Assessment

- Written CATs: 20%
- Assignment: 10%
- Final Examination: 70%

Course Textbooks

- George K. King'oriah (2004). Fundamentals of Applied Statistics. Jomo Kenyatta Foundation. ISBN: 9966223908
- N. H. Bingham, John M. Fry (2010), Regression: Linear Models in Statistics. ISBN 978-1-84882-969-5
- Thomas Kneib, Gerhard Tutz (2010) Statistical Modelling and Regression Structures: Festschrift in Honour of Ludwig Fahrmeir. ISBN 978-3-7908-2413-1
- Edward W. Frees (2009), Regression Modelling with Actuarial and Financial Applications, Cambridge University Press. ISBN-13: 978-0521135962
- N R Draper, H Smith. (1998) Applied Regression Analysis. New York: Wiley. ISBN 0-471-02995-5.

Thank You!