STAT-803 Generalized Linear Models (3 Credit Hours)

1. Objectives

This course aims to introduce students to the linear models, their estimation, fitting, prediction and interpretation.

2. Course Contents

Linear models and their assumptions. The generalized linear model (GLM) for binary and counts data. Its estimation, fitting and inference. Logit models with categorical predictors, multiple logistic regression, logit models for multinomial, nominal and ordinal responses. Loglinear model fitting. Dependent proportions and conditional logistic regression for binary matched-pairs comparing marginal distributions with multiple responses. Marginal modeling. Random effects modeling of clustered categorical, binary, and multinomial responses. Multivariate random-effects models for binary data, fitting, inference, and prediction. Nonparametric random-effects models and beta-binomial models. Related applications/computations with R.

3. Recommended Books

i. Agresti, A. Categorical Data Analysis, 2nd Edition. Wiley (2002).
ii. McCullough P. and Nadler J.A., Generalized Linear Models, 2nd Edition. Chapman and Hall, New York (1999).
iii. Hoffmann, J.P., Generalized Linear Models: An Applied Approach, (2004).
iv. Homer, D.W. and Lemeshow, S., Applied Logistic Regression, 2nd Edition. Wiley (2000).
v. Takezawa, K., Introduction to Nonparametric Regression, Wiley (2005).
vi. Hastier, T.J. and Tibshirani, R.J., Generalized Additive Models. Second edition. Chapman and Hall, New York (1999).

4. Outcomes

On successful completion of this course, students will be able to first identify the appropriate linear model for their data sets, they will be able to estimate the model parameters and will be able to predict the response. This will also help the students to study the properties of the fitted linear model.