**STA 2312 REGRESSION MODELLING I** (45 Contact Hours)

Pre-Requisites: None

### Course Purpose

To equip the students with necessary skills for investigating linear and non-linear relationships between variables using correlation analysis and regression analysis.

### Learning outcomes

By the end of this course the student should be able to;

* 1. Describe the basic concepts of regression.
  2. Describe simple linear and non-linear regression models. (3)Identify various designs of regression.

1. Determine the model assumptions.
2. Perform model diagnostics and remedial measures. (6)Select variables for a linear and non-linear regression. (7)Detect heteroscedasticity in regression models.

### Course Description

Simple linear regression and multiple linear regression models. Various designs: fixed and random effects model. Assumption on errors. Heteroscedasticity. Inference about model parameters and predictions, diagnostics, and remedial measures about the model. Independent variable selection, multicollinearity, autocorrelation, and non- linear regression. Use of computers in these topics.

### Teaching Methodology

Lectures, Assignments, Tutorials, Demonstrations, Case Studies, Class presentation, Group discussion, Practical.

### Instructional Material and Equipment

Marker boards, markers, dusters, computers and LCD projector.

### Course Assessment

Assignments (5%), Group work (10%), CATs (15%), End of Semester Examination (70%).

### Course Text Books

1. Chatterjee, S., Hadi, A., & Price, B., *Regression Analysis by Example*, New York: Wiley. ISBN 0-471-31946-5, 2000.
2. Freedman D.A., *Statistical Models: Theory and Practice*, Cambridge, University Press, ISBN 978-0-521-85483-2, 2005.
3. Sen, A., Srivastava, M., *Regression Analysis: Theory, Methods, and Applications*, 1st ed. 3rd corr. printing, XV, 347 p., ISBN: 978-0-387-97211-4, 1990.
4. Kingoriah G.K., *Fundamentals of Applied Statistics*, Jomo Kenyatta Foundation, ISBN: 9966225196, 2004.

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### Course Journals

1. Statistical Methodology, ISSN: 1572-3127.
2. Statistical Methods and Applications, ISSN:1618-2510; ISSN: 1613-981X. [3]Statistical Modelling, ISSN: 1471-082X.

### Reference Text Books

1. Goldberg M. A., Cho H. A. & Billerica, M. A., *Introduction to Regression Analysis*, WIT Press, , ISBN 1-85312-624-1, 2004.
2. Draper N.R. & Smith H., *Applied Regression Analysis*, New York: Wiley, ISBN 0-471-02995-5, 1998.
3. Abraham B. & Ledolter J., *Introduction To Regression Modeling*, Thomson Brooks/Cole, ISBN: 9780534420758, 2006.
4. Pardoe I., *Applied Regression Modeling*, 2nd edition, John Wiley & Sons, ISBN: 9781118345047, 2013.

### Reference Journals

[1]Statistical Methods in Medical Research, ISSN:0962-2802; 1477-0334 [2]Journal of Nonparametric Statistics, ISSN:1048-5252; 1029-0311 [3]Biometrical, ISSN:0006-3444; 1464-3510