Course Title: STA 471 Regression Analysis
Term: Winter 2023
Instructor: TBA
Course Credit: 3
Mode of Instruction: Online

Course Description:

This course covers simple linear, multiple linear, curvilinear, and multiple curvilinear regression models; simple, multiple, and partial correlation; variable selection techniques. Topics may also include correlation matrix, stepwise regression methods, nonlinear regression models and generalized linear model. The focus will be on the application of linear regression models in practice but will also cover basic theory of the linear model.

Course Prerequisites:

STA 275 Statistical Analysis; MAT 136 Calculus I

Learning Outcomes:

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

A. Know and apply linear and nonlinear regression analysis;

B. Understand the development of modern statistical models and relationships of these models

C. Interpret results from specific statistical model;

D. Build and validate regression models in a principled manner;

E. Apply various linear models to address research questions and fit into different data structure.

Course Material:

Douglas C. Montgomery, Elizabeth A. Peck and G. Geoffrey Vining, *Introduction to*

Linear Regression Analysis, 5th Edition, John Wiley & Sons, Inc. 2012.

Draper, Norman R(Contributor); Smith, Harry, *Applied Regression Analysis*, Wiley-Interscience, 1998.

Evaluation:

- 2 Assignments [20%]

- 2 Quizzes [20%]

- Mid-term Exam [25%]

- Final Exam [35%]

Description of the Evaluation tasks:

Assignment/ Essay/ ... : During the term, students will be required to finish several evaluation tasks within due date. All the tasks are linked with specific course topics/ outcomes and will adequately assess students' competence and learning outcomes. Students are encouraged to meet with instructor about these tasks at any point.

Mid- term/ Final Exams/ Quiz/. .. : There may be periodic quizzes given at the beginning of lecture sessions; the feedback from these quizzes will monitor the progress of the learners and help to set learning priorities. There will be mid- term exam/ final exam for the course. They are the basic criteria for the evaluation of students' learning outcomes and final grade.

Grading Policy:

Students are supposed to finish each online lecture. Prior to each class, students should finish the required readings. During the class time, students are encouraged to make use of all relevant online course resources and communicate with the instructor. Students' grades are accumulated based on the cumulative evaluations.

Students' letter grade will be assigned according to the following scale:

A+ 90- 100	A 85-89	A- 80-84
B+ 77-79	B 73-76	B- 70-72
C+ 67-69	C 63-66	C- 60-62
D+ 57-59	D 53-56	D- 50-52
F < 50		

Academic Integrity:

Students must strictly adhere to the university's academic integrity rule; and all essays, exams and any other form of academic assignments must adhere to these rules. Any form of plagiarism, cheating, or misappropriation of materials will be considered a violation of academic integrity and will be punishable by the university.

Withdrawal from the Course(s):

Students will be able to apply for a transfer or withdrawal within 3 days of the starting date of the course. If a withdrawal is applied for within 3 working days, the tuition fee will be fully refunded. After 3 days, the tuition fee will not be refunded. If a withdrawal is applied for in the first two weeks, it will be recorded as W (Withdraw) on the course transcript. After this initial two-week period, the class will be recorded as F (Fail).

Tentative Schedule:

Week 1

1	Simple Linear Regression
2	Interval Estimation in Simple Linear Regression
3	Multiple Linear Regression
4	Hypothesis Testing in Multiple Linear Regression
5	Model Adequacy Checking **Assignment 1**

Week 2

6	Transformations and Weighting to Correct Model Inadequacies
7	Polynomial Regression Models
8	Indicator Variables

		Multicollinearity
	9	Examination of the Correlation Matrix
	10	Variable Selection and Model Building **Quiz 1**

Week 3

11	Model-Building Problem Computational Techniques for Variable Selection
12	**Mid- term Exam**
13	Stepwise Regression Methods
14	Validation of Regression Models
15	All Possible Regressions **Assignment 2**

Week 4

16	Validation Techniques
17	Data from Planned Experiments
18	Linear Regression Models
19	Nonlinear Regression Models
20	Generalized Linear Model **Quiz 2**

Week 5

21	Logistic Regression Models
22	Regression Analysis of Time Series Data
23	Other Topics in the Use of Regression Analysis
24	Designed Experiments for Regression
25	**Final Exam**