#### AMS 317 (3 credits, Fall 2023) Introduction to Linear Regression Analysis

Instructor	Changsoon(C.S.) Park			
	Research Professor, Department of Applied Mathematics & Statistics,			
	SUNY Korea			
Class	Mon,Wed 2:00PM-3:20PM			
Office	A611			
<b>Office Hour</b>	· Mon, Wed 09:00-10:30			
Phone	1916			
E-Mail	Changsoon.park@stonybrook.edu			
Text	Introduction to Linear Regression Analysis, 5th Edition, Wiley			
	Douglas C. Montgomery, Elizabeth A. Peck, G. Geoffrey Vining			
	ISBN: 978-0-470-54281-1			
Prerequisite	Basics of R language			
Grading	ABCDF grading			
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#### **Course Description**:

Classical least-squares theory for regression including the Gauss-Markov theorem and classical normal statistical theory. An introduction to stepwise regression, procedures, and exploratory data analysis techniques. Analysis of variance problems as a subject of regression. Data transformations. Diagnostics of leverage and influence. Nonlinear regression. Implementation of R.

#### **Learning Outcomes:**

- 1) Understand simple and multiple linear regression theories.
- 2) Understand model adequacy checking and data transformation
- 3) Understand the diagnostics of data points.
- 4) Understand the general type of regression models.
- 5) Learn the R functions for regression analysis and apply them to obtain the regression analysis results.

### Grades:

Class attendance – 10% Homework – 10% Midterm I, II – 20% each (Sep 27, Nov 1) Final – 40% (TBA)

Homework will be assigned at the end of two or three chapters, and is due one week from the day it is assigned on. Each student must turn in the homework at the beginning of the lecture on the due date. Late homework will not be accepted. Solutions will be posted on the webpage after the due date. All homeworks should be submitted via Blackboard. Final grade will be given according to the distribution of sum of five items.

## Lectures:

Lecture notes will be available to be downloaded from the course webpage. It would be a good idea to print the notes and bring them to the class.

No reference is needed, and examples and problems only in the textbook will be explained. Bring the textbook to the class.

The R language will be used to demonstrate the regression analysis.

## **Academic Integrity:**

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty are required to report any suspected instances of academic dishonesty to the Academic Judiciary. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at http://www.stonybrook.edu/uaa/academicjudiciary/

# **School Policy on Attendance:**

- 1. If a student has over 20% unexcused absences, the student's final course grade will be an F.
- 2. Students should report the reason of absence to the professor in advance, or immediately after the absence.
- 3. When a student excuses his/her absence, the student must provide documentation of the reason for the absence to the professor.
- 4. The professor of the course reserves the right to excuse absences.
- 5. The professor may excuse the absence if the submitted documentation fulfills the following conditions: extreme emergences, severe medical reasons with doctor's note, very important events.

Week	Dates	Chapter	Торіс
1	8/28,	Chapter1	Introduction
	8/30	Chapter 2	Simple Linear Regression
2	9/4, 9/6	Chapter 2	Simple Linear Regression
3	9/11, 13	Chapter 3	Multiple Linear Regression
4	9/18,9/20	Chapter 3	Multiple Linear Regression
5	9/25,	Chapter 3	R-practice
	9/27	Midterm #1	

### **Tentative Course Schedule**

6	10/2 10/4	Chapter 4	Model Adequacy Checking
	10/2,10/4		Model Adequacy Checking
7	10/9	No Class	
	10/11	Chapter 5	Data Transformation
8	10/16,10/18	Chapter 6	<b>Regression Diagnostics</b>
9	10/23,10/25	Chapter 7	Polynomial Regression
10	10/30	Review	
	11/1	Midterm #2	
11	11/6,11/8	Chapter 8	Indicator Variables
12	11/13,11/15	Chapter 9	Multicollinearity
13	11/20,11/22	Chapter 10	Variable Selection
14	11/27,11/29	Chapter 11	Regression Validation
15	12/4	Review	
	12/6	No Class	Correction Day

# **Classroom Mask Policy**

"Everyone participating in this class during in-person sessions must wear a mask or face covering at all times or have the appropriate documentation for medical exemption. Any student not in compliance with this policy will be asked to leave the classroom. If students need to drink or eat, they should step out of the classroom to do so."