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# Experimental Design and Regression Analysis

IE-34243, FALL 2019

Engineering Building #10, Room 10-301/10-609, Mon/Wed 13:30–14:45

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<b>Instructor</b>	Chanseok Park (e-mail: CP<AT>PUSAN<DOT>AC<DOT>KR)  OFFICE: Engineering Building 207–10527  OFFICE HOURS: 10:30–11:30am (M/W); 18:00–18:30pm (M/W); or by appointment. (No office hours on the first Monday of each month).
<b>Textbook</b>	<i>R을 이용한 통계적 실험설계와 분석</i> , 김재희 著, 자유아카데미 (ISBN-13: 978-89-7338-384-9)
<b>References</b>	<ol style="list-style-type: none"><li>1. <i>Applied Linear Regression Models</i>, McGraw-Hill/Irwin; 4th edition, by Michael H Kutner, Christopher J. Nachtsheim, and John Neter. (ISBN-10: 0073014664   ISBN-13: 978-0073014661)</li><li>2. <i>Design and Analysis of Experiments</i>, John Wiley &amp; Sons; 9th EMEA edition, by Douglas C. Montgomery. (ISBN-10: 1119589061   ISBN-13: 978-1119589068)</li></ol>
<b>Web Page</b>	<a href="https://AppliedStat.GitHub.io/teaching">https://AppliedStat.GitHub.io/teaching</a>
<b>Software</b>	<i>R Language</i> ( <a href="http://www.r-project.org">http://www.r-project.org</a> ). <i>Minitab</i> ( <a href="http://www.minitab.com">http://www.minitab.com</a> ).
<b>Prerequisite</b>	The expectation is that you have already been exposed to the basic probability and statistics.
<b>Policy</b>	<ul style="list-style-type: none"><li>• Attendance Policy: Class attendance is mandatory. If you miss a class for some reason, it is your responsibility to get notes, <i>etc.</i> from someone in the class. I will not repeat lectures during my office hours.</li><li>• Tardy Professor Policy: If the instructor has not arrived within 15 minutes of the scheduled class time, you may assume that class has been canceled.</li><li>• All drop/add procedures are your responsibility.</li></ul>

## Description and Learning Objectives

In this course, various statistical theories will be studied, including experimental design and regression analysis. In order to incorporate the theories into practical problems, the popular R statistical language or Rstudio will be handled in this class.

Upon successful completion of this course, a student will be able to:

- Understand the simple linear regression model.
- Estimate the parameters under the linear regression model.
- Perform basic statistical inference for the linear regression model.
- Know how to use matrix algebra in regression models.

- Analyze and infer the multiple linear regression model.
- Use categorical predictor variables in the regression model setup.
- Understand the connection between regression and experimental design.
- Understand basics on ANOVA (analysis of variance).
- Understand the randomized complete block design.
- Understand and design factorial experiments.
- Program statistical softwares (Minitab and R).

## Grading

The final grade will be curved and calculated as follows:

HOMEWORK:	5%
ATTENDANCE:	5%
MIDTERMS 1, 2:	60% (30+30)
FINAL:	30%

The lowest one of your mid-term exam grades will be replaced by the final exam after scaling to 30% if it is better. If a student misses a mid-term exam for any *legitimate* reason, then the final exam will count 60%.

ROUGH GRADING GUIDE:

- A+: 90 ~ 100      A: 80 ~ 90-
- B+: 70 ~ 80-      B: 60 ~ 70-
- C+: 50 ~ 60-      C: 40 ~ 50-
- F : below 40.

## Exams

MIDTERM 1:	T.B.A.	In class
MIDTERM 2:	T.B.A.	In class
FINAL:	T.B.A.	

- All the exams will be closed-book.
- For the **final exam**, you are allowed to bring in *one* A4-size formula sheet made up by yourself.
- The final exam will be comprehensive.
- During the exams, a basic calculator will be permitted but cannot be shared with others.
- Calculators in smart phones, tablet PC and laptops are prohibited.
- No early or late exams will be allowed without a written and legitimate excuse.