MATH 484: Applied Regression Analysis and Experimental Design, Fall 2022 MWF 9-9:50 Engineering A 0420, Instructor: Dr. David Olive

Text: Olive, D.J. (2017), *Linear Regression*, Springer, New York, NY. (paperback is $25) or Olive, D.J. (2010), *Multiple Linear and 1D Regression*, online at (http://parker.ad.siu.edu/Olive/regbk.htm).

Course Webpage: http://parker.ad.siu.edu/Olive/M484.html

Prerequisites: Math 483 (a calculus based introductory statistics course that covered hypothesis testing is essential), Math 221 (Linear algebra)

Office: (J.W.) Neckers 261 (wing A), *Phone:* (618)-453-6566

email: dolive@siu.edu *Office hours:* MWThF 1:00-2:30

I am also available by appointment and on a walkin basis, especially before and after class.

This course will cover multiple linear regression and experimental design with much more emphasis on regression, including prediction, regression diagnostics, one and two way ANOVA. Heavy use of computer output will be made. This course is the **most important applied course in statistics**, and is important for **actuarial math**.

Several classes will meet in the **computer lab: Neckers 258**.

R website: https://cran.r-project.org/

Arc website: www.stat.umn.edu/arc/

(Cumulative) Final: Friday, Dec. 16, 10:15-12:15.

Last day to drop: office on Friday Oct. 28, by internet Sunday Oct. 30

Students receive a WF if they stop attending class and fail. An INC is given if for reasons beyond their control, students engaged in *passing* work are unable to complete all class assignments. Two HWs may be turned in one class period late with no penalty and a 3rd with 25% penalty except for the last week of classes. I sometimes give a $A-$, $B+$, $B-$, and a $C+$.

Grading:

HW	300	drop 1 HW	Quizzes	100	
exam1	100	exam 2	100	exam 3	100
final	300			total	1000
min. grade	points	min. grade	points	min. grade	points
A	900-1000	B	800-899	C	700-799
D	550-699				

Week of	MON	WED	FRI
Aug 22	ch. 1, 2.1	2.1	2.2
Aug 29	lab?	2.2	2.2, 2.4, HW1, Q1
Sept 5	no class	2.4	2.7,Q2, HW2
Sept 12	2.6	2.6, Q3	2.6, HW3
Sept 19	2.3	Exam 1	2.3, 2.5, 2.8
Sept 26	2.8, 2.9	2.9, Q4	2.10, HW4
Oct 3	lab?	3.1, Q5	3.1, 3.2, HW5
Oct 10	3.2	3.2, Q6	3.3,HW6
Oct 17	lab?	3.3, 3.4, Q7	3.3,3.4, HW7
Oct 24	3.4	Exam 2	3.5
Oct 31	4.1	4.2, Q8	4.2, 4.3, 5.1, HW8
Nov 7	5.2	5.1,5.2, HW9	no class
Nov 14	lab?	5.3,5.4, Q9	5.2, 5.3,6.1, HW10
Nov 21	no class	no class	no class
Nov 28	6.1,6.2	Exam 3	7.1
Dec 5	7.1, HW11	7.1, Q10	8.1

References: **Regression and Experimental Design:**

Kutner, M.H., Nachtsheim, C.J., Neter, J. and Li, W. (2005), *Applied Linear Statistical Models,* 5th ed., McGraw-Hill/Irwin, Boston, MA.

Regression:

Bowerman, B.L., and O'Connell, R.T. (2000), *Linear Statistical Models an Applied Approach,* 2nd ed., Duxbury, Belmont, CA. (easy)

Cook, R.D., and Weisberg, S. (1999), *Applied Regression Including Computing and Graphics,* Wiley, New York, NY. **Arc**

Ryan, T. (2009), *Modern Regression Methods*, 2nd ed., Wiley, Hoboken, NJ.

Sheather, S.J. (2009), *A Modern Approach to Regression with R,* Springer, New York, NY.

Weisberg, S., (2014), *Applied Linear Regression*, 4th ed., Wiley, New York, NY.

Experimental Design: Box, G.E.P, Hunter, J.S., and Hunter, W.G. (2005), *Statistics for Experimenters*, 2nd ed., Wiley, New York, NY.

Kuehl, R.O. (1994), *Statistical Principles of Research Design and Analysis*, Duxbury Press, Belmont, CA.

Ledolter, J., and Swersey, A.J. (2007), *Testing 1-2-3 Experimental Design with Applications in Marketing and Service Operations,* Stanford University Press, Stanford, CA.

Maxwell, S.E., and Delaney, H.D. (2003), *Designing Experiments and Analyzing Data*, 2nd ed., Lawrence Erlbaum, Mahwah, NJ.

Montgomery, D.C. (2012), *Design and Analysis of Experiments,* 8th ed., Wiley, NY.

R/Splus: Becker, R.A., Chambers, J.M., and Wilks, A.R. (1988), *The New S Language A Programming Environment for Data Analysis and Graphics,* Wadsworth and Brooks/Cole, Pacific Grove, CA.

Crawley, M.J. (2013), *The R Book,* 2nd ed., Wiley, Hoboken, NJ.

SAS: Cody, R.P,, and Smith, J.K. (2006), "Applied Statistics and the SAS Programming Language," 5th Ed., Pearson Prentice Hall, Upper Saddle River, NJ.