LESSON PLAN

ESSON PLAN Ref:	Flipped Classroom	Course Ref:	EC 3322

Subject / Course:	**Intro to Economics Statistics**		
Topic:	**Regression Analysis I**		
Lesson Title:	**Regression Theory for Two Variables**		
Level:	**Undergraduate**	**Lesson Duration:**	**1 Week/ 1 Meeting**

Main Question to be Answered during this Week
How can we estimate the value of a (dependent) variable based on values given for other (independent) variables?

Before Class:

Learning Objectives for Class Preparation:

1) **Describe the difference between independent and dependent variables.**
2) **Apply the appropriate formula for the Pearson correlation coefficient and interpret the meaning of the Pearson Correlation Coefficient when a value is given.**
3) **For a 2-variable model estimate the regression parameters (slope and intercept) from data using the appropriate formula.**
4) **Use estimated parameters to build a regression equation and predict the dependent variable for given x-data.**
5) **Draw the regression line based on the estimated parameters in a diagram.**
6) **Remember the definition of prediction errors and calculate prediction errors based on provided data.**
7) **Learn how to import data from the clipboard into the R software**

Reading Activity for Learning Objectives 1) – 6):

Read Chapter 12 in: Warren, Denley, Achley Beginning Statistics, Hawkes Learning Systems, Charleston, SC 2014 (older editions are OK).

Multimedia Activity for Learning Objectives 1) – 7):

- **For Learning Objective 1)** Watch the following video and take notes: “Introduction to Simple Linear Regression” Click here
- **For Learning Objective 2) -6)** Watch the following video and take notes: “The Least Squares Regression Line” Click here
- **To review Learning Objectives 1) – 6)** Use the provided PowerPoints Click here
- **For Learning Objective 7)** Use this R-Script (Click here) .

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During Class:

Learning Objectives for in Class Session:

8) **Explain why correlation often does not coincide with causation.**
9) **Extend 2-variable model to multi variable model**
10) **Apply your knowledge to real world data by creating a model in R**
11) **Evaluate the quality of a regression model**
12) **Improve the model based on you evaluation.**

Activities During Class:

- **For Learning Objective 1) – 6)** Report the meaning of learning objectives 1) – 6) to the class and your instructor.
- **For Learning Objective 8) -9)** Instructor provides the Does and Don'ts in regression analysis.
- **For Learning Objective 10)** Analyze a regression problem of your choosing and phrase the research question.
- **For Learning Objective 10)** Find data to analyze your research question.
- **For Learning Objective 10)** Import your data into R Software
- **For Learning Objective 10)** Apply the Linear Model (lm() command) to regression data.
- **For Learning Objective 11)** Use the output of the lm() command to test and identify variables that significantly determine the dependent variable.
- **For Learning Objective 12)** Create a new model based on your test results.

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Assessments for Learning Objectives 1) – 6)

- Hawks Homework 12.1 -12.4 (due before class)
- Hawks Quiz 12 (at the beginning of class, however you can ask questions before the test is administered)

Assessments for Learning Objectives 7) – 12)

- R-Homework90 (see Blackboard menu point R Homework; due after class)

Comments:

- Hawks Homework are provided online by the textbook publisher. They can be repeated as often as a student wishes and are graded on pass/fail.
- Hawks Quizzes are provided online by the textbook publisher. They can only be taken once and are graded based on the proportion of correct answers.
- R Homework scripts are provided by your instructor. They familiarize you with the R-Software. Based on your analysis you have to answer 4-10 questions in the provided Google Form. R-Homework scripts are graded based on the proportion of correct answers.