

**LAMP L316: Analytic Approaches to Problem Solving**  
**Spring 2014: Section 18587**

**Lecture: T & H 9:30-10:45 Ballantine Hall 206**

**Lab: F 9:30-10:45 Ballantine Hall 222**

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<b>Office:</b>	TBA
<b>Office Hours:</b>	By appointment (and in lab sessions)
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This course will introduce you to statistical techniques, concepts and reasoning. We will begin by discussing descriptive statistics (techniques used to summarize data in a sample) before moving on to inferential statistics. Inferential statistics allow us to make inferences about social processes in a full population, based on the information obtained in a much smaller sample of people. Throughout the course, you will learn to conduct statistical analyses using a software named SPSS and to present your results both in written and oral form. Beyond acquiring a set of marketable skills, you will leave the course with a knowledge base that is increasingly necessary to consume and evaluate arguments presented in the media.

In the process of developing these skills, we will analyze survey data collected by our client (The Monroe County Community School Corporation ESL Office) who would like us to help answer a number of questions about student and parental satisfaction. Though our clients understand that this is a student project, representing work from only one of several courses being taken during the semester, they, and I, also have high expectations about the work you will produce and are really looking for help in solving some non-trivial problems. As in any real-world experience, your clients will assess you in terms of the value of the solutions you provide.

In addition to the traditional classroom activities like lab assignments and quizzes, it is expected that you will form a cohesive, effective team as you begin to solve your client’s problems. Because there are real world clients involved, effective project management and teamwork is critical to success.

The course does not assume any previous experience with statistics, and is not does involve particularly difficult mathematical calculations. However, it does require an understanding of basic algebra.

**Required Material**

*Readings:* We will not work directly from a textbook, however, for those of you who would feel more comfortable having a text to reference, I recommend purchasing the following basic statistics textbook for use as a reference during this class and in the future:

Miethe, Terance D. and Jane Florence Gauthier. *Simple Statistics: Applications in Social Research*. Oxford University Press.

This text usually sells for \$35-40. It is also possible to find good deals on other statistics texts if you search for used copies online.

You may also be interested in consulting the following online resource throughout this course: *Online Statistics: An Interactive Multimedia Course of Study*, by David Lane, Joan Lu, Camille Peres and Emily Zitek. <http://onlinestatbook.com/>

There will also be additional readings available on the class OnCourse site.

*Calculator:* You will need a basic scientific calculator. Anything that has the square root ( $\sqrt{\quad}$ ) and square ( $x^2$ ) functions should be fine. You do not need a graphing calculator.

*Software:* The labs in the course will make use of SPSS, a statistical software package commonly used for data analysis. This software is available in computer labs on campus, and you can use the software for free, remotely, at [iuanymware.iu.edu](http://iuanymware.iu.edu).

If you'd prefer to purchase a copy, it is available for \$40 from the IU Stat/Math Center.

## Course Requirements

*Problem Sets:* I will provide you with problem sets regularly throughout the semester. These are not graded, however, we may check to ensure that you have completed them. The problem sets are extremely important if you want to do well in this class. We have limited time to work through examples in class, and the problem sets are your opportunity to really prepare yourself for the quizzes and lab assignments.

*Quizzes:* We will have a total of six in class quizzes over the course of the semester. The quizzes will be worth 100 points each. Quizzes will be given every other Thursday beginning on January 23<sup>rd</sup>. They will test your understanding of the concepts and techniques learned in lecture. The tentative quiz dates for this semester are:

Jan. 23<sup>rd</sup>, Feb 6<sup>th</sup>, Feb 20<sup>th</sup>, March 6<sup>th</sup>, March 27<sup>th</sup>, and April 10<sup>th</sup>.

*Labs:* In addition to class lecture, we will have a scheduled lab period every Friday. These lab sessions will give you the opportunity to analyze real world data (and eventually the client data) and apply the techniques you learn in class. The labs should help you master the course material and give you hands on experience with statistical software. It is absolutely important that you show up to labs on time and prepared.

**We will not meet for lab on Fridays after exams unless explicitly noted in class.** On all other Friday's we will have a graded lab assignment. There will be a total of 6 lab assignments, and I will drop your lowest score. Most of these assignments will be due at the beginning of the following lecture. However, you should be able to complete, or nearly complete, most labs during the allotted lab time. You are permitted (and recommended) to work in groups on your lab assignment.

*Final Project:* We have three substantive questions that our client would like us to answer for them. You will split into three groups, and each group will answer one of these questions, create a written analysis of your findings, and present your findings to the client. I will provide a set of guidelines for conducting and writing up your analysis as we approach the end of the semester. Your final project will be worth 500 total points. You will be evaluated as a group; however, some portion of your grade will be based on an evaluation by your group members.

*Short Group Presentations:* Your final project group will also be responsible for a brief in class presentation. Each group will be assigned one section of Darrell Huff's *How to Lie With Statistics* or Joel Best's *Stat Spotting* (both texts will be available on the class OnCourse website). You will be responsible for briefly explaining your section to the class as well as providing and explaining an example from the media relevant to your section. Topics and presentation dates will be discussed and determined in class.

*Class Participation:* Participation will account for 100 points of your total grade. In a small class setting, engagement and participation are invaluable. Students who are actively engaged in the course, participate in class discussions, and attend class regularly will receive full credit for participation.

*Attendance:* Given the fast-paced nature of this course and its focus on lecture notes, attendance is of vital importance. While this class has no official attendance policy aside from the class participation points, if attendance becomes an issue I will institute an official attendance policy.

## Grading

Your grade will be based on the above requirements in the following manner:

<u>Requirement</u>	<u>Points Each</u>	<u>Total Points</u>
Quizzes (6)	100	600
Lab Assignments (5/6)	50	250
Final Project	500	500
Group Presentation	50	50
<u>Participation</u>	<u>100</u>	<u>100</u>
Total		1500

Letter grades will be assigned as follows:

A+	100-97%	(1500-1455)	C	76.9-73%	(1154-1095)
A	96.9-93%	(1444-1395)	C-	72.9-70%	(1094-1050)
A-	92.9-90%	(1394-1350)	D+	69.9-67%	(1049-1005)
B+	89.9-87%	(1349-1305)	D	66.9-63%	(1004-945)
B	86.9-83%	(1304-1245)	D-	62.9-60%	(944-900)
B-	82.9-80%	(1244-1200)	F	<60%	<900)
C+	79.9-77%	(1199-1155)			

## Additional Policies

*Makeup Policy:* In almost all instances, **there will be no makeup quizzes or labs**. Make up quizzes will only be granted under extraordinary circumstances. If you **absolutely have to** miss a quiz, **you need to notify me at least one week in advance** via email, and to provide proper documentation. If an emergency occurs on the day of an exam, you must email me before the exam and provide me with

documentation immediately. (In accordance with University policy, religious holiday accommodation forms must be turned in during the first week of class.) Questions on any makeup quizzes will reflect the fact that students had additional time to prepare. **There will be absolutely no make-up labs**, as you get to drop your lowest lab score and you will have time outside of the scheduled lab to complete the assignment.

*Special Accommodations:* In compliance with the Americans with Disabilities Act (ADA), IU seeks to provide “reasonable accommodation” for qualified individuals with documented disabilities. It is the student’s responsibility to inform the instructor and to contact the Disability Student Service Office (855-7578; <http://www.dsa.indiana.edu/dss.html>) about any special learning/study needs relating to a documented disability within the first two weeks of the semester.

*Academic Integrity:* I take academic misconduct seriously and will not tolerate it in this class. This includes cheating, plagiarism, etc. If misconduct is discovered, I will take the appropriate action according to University policy. Please see the *Code of Student Rights, Responsibilities, and Conduct* (<http://www.iu.edu/~code/code/responsibilities/index.shtml>) if you have any questions as to what constitutes academic misconduct.

*Incompletes:* In accordance with University policy, I will not grant incompletes for this course except under highly extraordinary and documented circumstances.

*Classroom Conduct:* Class participation is integral to your understanding of the material and to your performance in this class. You are expected to come into class prepared to engage in class discussion and to ask any clarifying questions that you may have had about that day’s or recent topics. Additionally, you are expected to be attentive during class. That means that you are not permitted to have cell phones, iPods, newspapers, etc. out during class time. Cell phones should be turned off before entering class (if you have circumstances that require that you keep your cell phone on, please notify me before class and turn your ringer to vibrate). **As a general rule, I do not allow laptops in class.**

If you do not abide by these rules, you will not receive credit for having attended class on that day and may be asked to leave.

*Communication:* The best way to contact me is through email (please include L316 in the subject line). I will check my email at least twice per day (once in the morning and once in the evening) and will respond to most emails within 24 hours. I will use email as the primary means of communication with you outside of the class room, and will do so with the assumption that you will check your email and oncourse at least once per day.

### Schedule of topics/readings

Topic	Associated Readings
<b>1. Introduction</b>	Pgs. 1-13, 37-41
<b>2. Univariate Descriptive Statistics</b>	
a. Frequency Distributions	Pgs. 47-58
b. Central tendency of a distribution	Pgs. 73-87
c. Dispersion/variability of a distribution	Pgs. 94-99
<b>3. Bivariate Descriptive Statistics</b>	

A. Two qualitative variables: Contingency tables and related measures of association	Pgs. 188-201 (don't worry about the discussion of degrees of freedom or significance; we will get to this later).
B. Comparing groups: A qualitative independent and quantitative dependent variable	
C. Two quantitative variables: Regression and correlation	Pgs. 235-248
D. Introduction to multivariate analysis	Pgs. 261-263
<b>4. Inferential Statistics</b>	
A. Probability and random variable distributions	pgs. 115-118
B. Sampling distributions	Pgs, 128-130
C. Normal and standard normal distributions	Pgs. 105-115
D. Estimation	Pgs. 127-143
(1) Confidence interval for a mean	Pgs. 133-136, 140-142
(2) Confidence interval for a proportion	Pgs. 137-138 , 142-143
E. Hypothesis testing	
(1) Logic of hypothesis testing	Pgs. 149-160
(2) Hypothesis test about a single mean	Pgs. 167-170
<b>5. Hypothesis testing in multivariate analysis</b>	
A. Comparing groups: Difference of means test and its extensions	Pgs. 173-175, 178-181
B. Contingency tables revisited	Pgs. 188-202
C. Regression and correlation revisited	
(1) Simple regression	Pgs. 248-251
(2) Multiple regression	Pgs. 266-271
D. Extensions and additional statistical tests, as needed for your projects (e.g., logistic regression, measures of association for ordinal variables, etc.)	