

## ResEv 552 – Basic Educational Statistics (Fall 2009)

### Draft Syllabus

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Office hours: by appointment

Statistical analyses of social data are the basis of much public policy debate, from welfare reform to school vouchers to the use of standardized testing, and the tools for producing or analyzing statistics are increasingly needed in the workplace. This course will cover the basic statistics used in quantitative analysis. We will focus not only on statistical theory, but also on using statistical software to analyze and understand educational data.

By the end of this course you should be able to:

1. Understand basic descriptive and inferential statistics
2. Understand the logic of null hypothesis testing
3. Be able to conduct basic statistical analyses such as t-tests, chi-square analyses, and analysis of variance using Stata

Please note that I will be using your email address from the university system to contact you. If you do not use your university email address, please set up your university account so that it forwards email to the account you do use.

### Readings

We will use two main books for the course:

Gravetter, F.B, & Wallnau, L.B. (2008). *Statistics for the Behavioral Sciences*, 8<sup>th</sup> edition. Wadsworth Publishing.

Hamilton, L.C. (2009). *Statistics with Stata*, 10<sup>th</sup> edition. Cengage Publishing.

I also recommend the following text, which takes a more narrative approach to explain the course material. Many students have reported that the book has helped them to understand the material:

Urduan, T.C. (2005). *Statistics in Plain English*, 2<sup>nd</sup> edition. Lawrence Erlbaum.

In addition to the required texts listed above, you will read some research articles and other material. All additional readings will be available through WebCT and are noted with an \*.

## **Expectations**

### Attendance

Unlike many online classes, this class is synchronous. This means that you should be sitting in front of a computer each Monday evening from 5:00 PM to 8:00 PM to view my lecture. I will be recording each lecture in case you wish to review the lecture again or you miss a class.

Attending class is not mandatory, but I strongly urge you to attend all classes. Each class builds on previous classes, so **missing class is a recipe for failure**. In addition, waiting a couple of weeks until an assignment is due and then frantically viewing recorded class lectures is also an unwise strategy. Of particular importance are the lectures on hypothesis testing – the second half of the semester uses these lectures as the foundation, and they should not be missed. If you decide to miss a class, you will be responsible for getting copies of notes and assignments from another student. I am more than happy to answer any questions outside of class, but I will not be available to review the missed material with you – that is the purpose of my class lectures.

The best strategy for success is reading the assigned chapters before class, attending/viewing the lecture for that week, then rereading the assigned readings. Also, doing the assignment the day or two after it is handed out is generally better than waiting until the weekend before it is due. Not only will the material be fresh in your mind, but I am less available to answer questions on the weekend.

### Online issues

The class will be broadcast via Adobe Connect. All you need on your end is a web browser with the Adobe Flash Player plugin, already installed on most browsers. I will be writing on a whiteboard called a Sympodium that will show up on your computer screen. These slides will be posted on WebCT after each class. I recommend you take detailed notes as I lecture and use these as a backup. You will also be able to see how to use Stata as I use the software. If you attend class in real-time, with a headset you will be able to ask me questions during the lecture. **I strongly encourage you to interrupt my lecture at any time with any questions you might have** – this is the whole point of having you view my lecture live. My goal is to recreate online the atmosphere of my in-person statistics classes, where students ask questions and we engage in discussions throughout my lecture.

Information on hardware requirements can be found here:  
<http://www.hs.iastate.edu/odeet/resources/computer.php>

In sum, you will need a computer with Stata 11 installed and a browser with Adobe Flash, as well as a headset that will allow you to both speak and hear.

This is the first time I have taught this course online, and for some of you it may be your first online course, so we will have to be patient with one another.

### Software

We will be using Stata (version 11) for the course. Stata is similar to SPSS, but is much more powerful in terms of what it can do. In order to take this course, you must purchase a copy of Stata, unless you plan on attending my lectures in the MacKay computer lab on campus. (You will be using Stata during class time and for your assignments.)

If you wish to purchase Stata, you can get it at a substantial discount through this course: [http://www.stata.com/order/new/edu/gradplans/gp2-order\\_p1.html](http://www.stata.com/order/new/edu/gradplans/gp2-order_p1.html). The Course ID is SELPS. There are two options available to you:

- a) If ResEv 552 is the only class you will be taking in the ResEv quantitative sequence, then I recommend a one-year license of Small Stata for \$49. This will allow you to complete all the assignments for this class, but Small Stata is not really useful for most research projects outside this class.
- b) If you plan to take additional ResEv quantitative courses and will be doing a quantitative dissertation (as opposed to using qualitative techniques), I recommend purchasing a copy of Intercooled (IC) Stata, lifetime license, for \$179. We will use the IC version in ResEv 553 and ResEv 554.

You don't need to buy a set of Stata reference manuals for any ResEv course. The Hamilton Stata reference book will be sufficient for this course.

### **Evaluation**

You will be evaluated based on 5-6 short take-home exams that will be handed out throughout the semester. These are really more like homework assignments than short exams; I refer to them as exams to emphasize that you should not discuss the assignments with anyone other than me. (In previous semesters some students would work on the assignments with each other in the computer lab and assist one another with the software – just to be clear, this constitutes academic misconduct.)

The assignments will be a mix of problems done by hand and problems answered using Stata. We will be doing both types of problems during the class meetings, which is another reason to attend the live lectures as much as possible.

You may use your notes and assigned readings to do the assignments, but you may not consult with other people or sources (e.g., the Internet). You may not use assignments from previous sections of this class.

Course assignments will be due one week from when they are handed out. They must be scanned and emailed to me, or faxed (515-294-7635), by 12:00 noon on the day they are due. As a general rule, I do not accept late assignments and instead assign 0 points, unless there are extenuating circumstances such as hospitalization or a death in the family.

I will drop your lowest assignment grade when calculating your final grade. I may also curve the final grades up for the class depending on how the class performed.

### **Academic misconduct**

Academic misconduct in any form is in violation of Iowa State University Student Disciplinary Regulations and will not be tolerated. This includes, but is not limited to: copying or sharing answers on assignments, plagiarism, and having someone else do your academic work. Depending on the act, a student could receive an F grade on the test/assignment, F grade for the course, and could be suspended or expelled from the University. See the Conduct Code at [www.dso.iastate.edu/ja](http://www.dso.iastate.edu/ja) for more details and a full explanation of the Academic Misconduct policies.

Forms of academic dishonesty:

Obtaining unauthorized information. Information is obtained dishonestly, for example, by copying graded homework assignments from another student, by working with another student on a take-home test or homework when not specifically permitted to do so by the instructor, or by looking at your notes or other written work during an examination when not specifically permitted to do so.

Tendering of information. Students may not give or sell their work to another person who plans to submit it as his or her own. This includes giving their work to another student to be copied, giving someone answers to exam questions during the exam, taking an exam and discussing its contents with students who will be taking the same exam, or giving or selling a term paper to another student.

Misrepresentation. Students misrepresent their work by handing in the work of someone else. The following are examples: purchasing a paper from a term paper service; reproducing another person's paper (even with modifications) and submitting it as their own; having another student do their computer program or having someone else take their exam.

Plagiarism. "Unacknowledged use of the information, ideas, or phrasing of other writers is an offense comparable with theft and fraud, and it is so recognized by the copyright and patent laws. Literary offenses of this kind are known as plagiarism."

### **Disabilities**

Iowa State University complies with the American with Disabilities Act and Section 504 of the Rehabilitation Act. Any student who may require an accommodation under such provisions should contact me as soon as possible and no later than the end of the first week of class or as soon as you become aware. No retroactive accommodations will be provided in this class.

### **Course schedule**

While I attempted to provide an outline of the course, it is my experience that every class is unique. In addition, this is the first time I have taught this course online, so I am a little unsure about the pace. I may alter the schedule if I find that we need to spend more or less time on a particular topic. My philosophy is that I would rather cover 75% of the material thoroughly rather than rush through 100% of the material and have students leave the course scratching their heads and wondering if they learned anything.

As such, note that there are no dates for the class lectures. This is in case we get bogged down and I feel the need to repeat some material. This makes planning for you a bit more difficult, as we will not know the due dates of the assignments at the beginning of the semester. On the other hand, this means I won't hand out an assignment unless I'm confident a majority of the class understands the material. I've discovered that most students prefer this approach.

I also may bring in additional readings if I feel they are needed. Any changes to the course schedule or readings will be discussed in class. The open lectures for classes 11 and 12 will most likely be used if we get bogged down on a topic and we need to spend more time than I anticipated. If a miracle occurs and we actually follow the course schedule, I will add additional chapters from the book.

Important dates:

- September 7th – no class (university holiday)
- October 19th – no class (IES grant review panel)
- November 23rd – no class (university holiday)
- November 30th – last class
- December 7th – hold this date for makeup class, if needed (e.g., I am sick and cannot lecture one week)
- December 14th – date last take-home exam will be due

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### **Class 1 – Class overview, introduction to statistics, using Stata**

GW, chapters 1, 2 & 3 (review Appendix A if your math skills are rusty)

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### **Class 2 – Measures of central tendency**

GW, chapters 3 & 4

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### **Class 3 – Variability and z-scores**

GW, chapter 4 & 5

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### **Class 4 – Probability**

GW, chapter 6

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### **Class 5 – Sampling distributions and hypothesis testing**

GW, chapters 7 & 8

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### **Class 6 – Hypothesis testing, continued**

GW, chapter 9

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### **Class 7 – T-tests for two independent samples and CI's**

GW, chapters 10 & 12

Pope, R.L. & Mueller, J.A. (2005). Faculty and curriculum: Examining multicultural competence and inclusion. *Journal of College Student Development*, 46(6): 679-688.

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### **Class 8 – Chi-square and cross-tabulations**

GW, chapter 18

Janosik, S.M. (2004). Parents' views on the Clery Act and campus safety. *Journal of College Student Development*, 45(1): 43-56.

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### **Class 9 – Correlation**

GW, chapters 10 & 12

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### **Class 10 – Analysis of variance**

GW, chapter 13

Low, J.M. et al. (2004). Predictors of university student lawbreaking behaviors. *Journal of College Student Development*, 45(1): 535-548.

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### **Class 11 – To be determined**

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### **Class 12 – To be determined**