INTRODUCTION TO STATISTICS AND EXPERIMENTAL DESIGN

Time: Place:  
T-TH 10:15-12:25 (lecture) SS134 (computer classroom)  
T-Th 12:25-1:15(help/tutorial/discussion)? SS134

Professor: Bruce Dudek    Office: SS 327    Phone: 442-4824  
510 students should feel free to see me at any time during the week that I am in my office and free. Office hrs are just the predictable time.  
Office hour adjustments would be posted on class web site.  
Help Sessions: Help, and review sessions are scheduled when there is demand. Early in the semester, suggested practice exercises will be made available and help sessions to review them can be extremely helpful. Finding a common time for everyone is usually challenging. I suggest thinking about early Friday afternoons for this.  
email: bruce dot dudek at albany dot edu (Much more reliable than phoning me)  
course home page-via personal web page (not blackboard):  
http://www.albany.edu/psychology/bcd/dudekclass.html  
The class web page is the official syllabus and will contain any updates to this doc.  

TA: Sydney Heiss SS318.    Email: sheiss AT albany DOT edu  
Hrs: TBA. 

This is a four credit hour course. We are scheduled into the classroom from 10:15-1:05 on Tuesdays and Thursdays. We will establish a workable schedule that results in four class hours per week during this time frame. The remainder of the time in the classroom can be devoted to additional computer tutorials or help sessions on lecture material as you wish. Please make certain to clear your schedules for this full 3 hour block of time each T-Th.  

A considerable amount of course material and communication will be distributed via the course web page, the shared department network drive, and via email. Students should make certain of their competence in accessing the course web page, the psych dept shared network drive, and UA email immediately (see computing document).  

Texts:  

Required - 1. Howell. D.  Statistical Methods for Psychology. 8th edition. Wadsworth/Cengage. 2012. will also be used for some sections of the 2nd semester course  
The Pearl text will be assigned as a year-long reading assignment, with sections only becoming relevant as we put foundation topics in place. It is an easier and gentler introduction to Pearl’s view of the data analytic world than some of his other writing.

**Recommended Statistical Software Guides** (also see section below):

The basic SPSS USER manuals can be useful, but much of the material is in the electronic syntax guide available with the help function in the program (some sections will be on the course web page).

I recommend the following (available at bookstore or Amazon):

There are many other recommended books on R. I list a few here and can make them available if you see me.


**Rationale for textbook choice and Recommended Usage**

The assigned textbooks were chosen with the following priorities in mind. First, texts should be good reference sources - books to be used for decades by the researcher. Second, the texts should cover most of the range of topics covered in lecture. Only third in the priority list is the “readability of the book” as an instructional textbook. The Howell text satisfies these requirements. However, students should familiarize themselves with other standard reference texts found in the “toolbox” bibliography. Some of them are listed below. The course will rely very heavily on materials prepared and distributed by the instructor. Texts will cover the range of topics presented in lecture, but not always in the same depth or with the same approach to development of the topic. They are to be used to expand and validate your understanding of lecture presentations. In this vein, any of the recommended alternative texts should be consulted at any point in time where you have difficulty with a topic.

The Diaz, et al., (2015) "OpenIntro Statistics" book is under continued development. It contains sections that approach subject matter in a manner very similar to the approach taken in
this course and can be a nice supplement to the Howell text. Diaz, et al., also cover a set of topics of interest to our 510 course that are not covered in Howell and can supplement BCD materials. More explicit guidance on usage of Diaz will be given as we move forward in the course.

Students are also urged to consult the “Statistics Toolkit” document found on the course web page. This is a constantly “in-progress” reading list of texts and articles which are viewed as the foundation literature for the appropriately trained data analyst in the Behavioral Sciences.

Recommended Supplemental Texts - first-choice alternative texts are indicated with an asterisk.

*Cohen, Cohen, West and Aiken Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences. 3rd Ed. Lawrence Erlbaum, 2003
Mendenhall, W., Beaver, R., & Beaver, B. (2012). Introduction to probability and statistics: Cengage Learning..
Exams and Grading:

This exam/grading outline is tentative at present, and will be finalized as we can assess our rate of progression through the material. Examination material is heavily based on lecture presentations.

- Midterm I - Earliest possible time is first week in Oct (probably after coverage of Sampling Distributions). **25%** of the course point total.
- Midterm II - Probably first week in Nov (after coverage of simple regression material). **25%** of the course point total.
- Final - Scheduled for Mon, Dec 19, 1:00-3:00 pm, **35%** of the course point total. Set by Univ regulations - **Make your Holiday Plans accordingly!**

Final exam will be cumulative, but with a progressive emphasis on more recent material.

Several ungraded (pass/fail) assignments (8-14) will contribute **5%** of the course point total and must all be completed for a passing course grade. Most of these be given out on a Thursday and due the following Tuesday, but shorter notice may also occur for a smaller number. Turning any of these in late will result in a diminution of the available course points from five to four. Two or more turned in late results in 0 of these 5 course points, but all must still be completed to pass the course.

Two graded assignments will probably focus on hand calculations of (1) a simple regression/correlation problem (due early Nov - **4%** course point total), and (2) a multiple regression problem (due near the end of the semester - **6%** course point total). Both must be completed on time for a passing grade in the course (B).

Several (probably at least five) computer assignments (to be specified later) are required, but do not count toward the course point total. Each will be graded on a +/- basis and all must be satisfactorily completed for a passing course grade (B). Unsatisfactory completion of computer assignments will result in redo’s. Some of these computer assignments may be combined with ungraded assignments.

**A strong expectation is that assignments will be due at the specified time/date.**

Final course grade is determined from the distribution of point totals summed from all exams and assignments. Typcially, cutpoints for grades are 90% of all possible points for an A-, and 75% for a B. The instructor prefers to not use the +/- grading option, but may use B+ and/or A- grades if the final point distribution does not have obvious break points.

**During lecture, the instructor will regularly ask questions which will reflect the assigned reading. Assignment of final grades in the case of "borderline" point totals can produce grades that are influenced by willingness and accuracy in answering these questions.**

Extra Lectures or Help Sessions may be scheduled upon demand (during the T-Th extra time period or at other times) in order to review material or work through exercises provided in the
texts. Individual tutoring/assistance is encouraged whenever a need arises. Do\'t be bashful about asking for help. The statistics material can only be well learned through active learning, and not simply passive attendance.

**Computer Usage**

The course will have a sizeable computing component. The goal of this component is the facilitation of rapid evaluation of data, rather than computing algorithms, per se. Some initial instruction in computing will occur in class and help sessions outside of class can be scheduled. Nonetheless, the onus is on the student to become proficient, not only in SPSS and R, but to be effective in the joint usage of these statistics packages with standard word processing, graphics, and spreadsheet software. Early in the semester, documents on the UA computing environment, on the R programming language, and on structure/creation of data sets will be assigned for mastery before we begin class work with computing. We will emphasize skills in SPSS, but R instruction will form an important component of the course since R is fast becoming the professional statistician\’s preferred tool.

Materials prepared by the professor will facilitate instruction of SPSS and much material is available online for this purpose as well. The Field text on SPSS usage is well-regarded for SPSS learning (not so much for its statistical concept development), but it is not required.

R is an expansive, open-source, programming environment. It is not a simple program to master, but we will use it in ways that facilitate our progression through the statistics material. The Kabakoff text very helpful and you can work through it as an elaboration of the treatment that we give R in class.

Early instruction in SPSS will be brief and the student is expected to elaborate on these basics by using materials provided. Additional help sessions can be scheduled to review/enhance SPSS skills.

**Academic Integrity, Academic Honesty, and Plagiarism**

*(Very Important - Read Carefully)*

All assignments for this course are given with the assumption that students will not collaborate with classmates or with any other colleagues on their completion. This includes computer assignments. For some assignments an exception to the collaboration rule may be instituted and will be explicitly stated (written) by the instructor.

Plagiarism can be defined as taking credit for someone else's work as one's own. This can be broadly construed, and students are not often aware of the nuances of expectations maintained by instructors. Education on this and other aspects of academic honesty are also viewed as an integral part of training in scientific disciplines. Therefore, as part of this course, you are required to read the University policy on Academic Standards/Integrity/Dishonesty/Plagiarism which can be found in the graduate bulletin/catalog. See:

http://www.albany.edu/graduatebulletin/requirements_degree.htm#standards_integrity
http://www.albany.edu/content_images/AcademicIntegrity.pdf

Plagiarism or academic dishonesty will result in automatic course failure.
# APSY 510 Textbook Reading Schedule

(Subject to some adjustment as we go along - additional articles will be assigned)

<table>
<thead>
<tr>
<th>Week of</th>
<th>Topic</th>
<th>Chapters in</th>
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<tbody>
<tr>
<td>Aug. 29</td>
<td>Introduction &amp; Design Issues</td>
<td>Howell 1</td>
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<tr>
<td>Sep. 5</td>
<td>Probability and Prob. Distributions</td>
<td>Howell 5</td>
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<tr>
<td>12</td>
<td>Probability and Prob. Distributions</td>
<td>Howell 6,3-4</td>
</tr>
<tr>
<td>19</td>
<td>Describing Data and Distributions</td>
<td>Howell 2</td>
</tr>
<tr>
<td>26</td>
<td>Sampling Distributions, Normal Distribution</td>
<td>Howell 4,3</td>
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<tr>
<td>Oct. 3</td>
<td>Estimation and Hypothesis Testing (No class Tues)</td>
<td>Howell 6,7</td>
</tr>
<tr>
<td>10</td>
<td>Estimation and Hypothesis Testing (No class Thurs)</td>
<td>Howell 8</td>
</tr>
<tr>
<td>17</td>
<td>Inferential Statistics, Chi-Squared and F distributions</td>
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<tr>
<td>24</td>
<td>Bivariate Linear Regression and Correlation</td>
<td>Howell 9</td>
</tr>
<tr>
<td>31</td>
<td>Bivariate Linear Regression and Correlation</td>
<td>Howell 10</td>
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<tr>
<td>Nov. 7</td>
<td>Partial and Semi-partial correlation</td>
<td>Howell 15</td>
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<tr>
<td>14</td>
<td>Multiple Regression</td>
<td>Howell 15</td>
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<tr>
<td>21</td>
<td>&quot; (no class 26th)</td>
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<tr>
<td>28</td>
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<tr>
<td>Dec. 5</td>
<td>&quot; Dec 8 is our last lecture.</td>
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Considerable supplemental reading will be assigned in the form of scanned chapters and articles. These will be provided as pdf’s on the class web site.

**NOTES:**

1. The reading schedule is constructed under the assumption that a first reading of assigned material will be done prior to the lecture on the respective topic. Note that the amount of reading increases dramatically in later weeks of the semester. The best strategy is to get as far ahead in your reading as possible. Lectures are most beneficial when a first reading of the material is completed prior to the lecture. Second and third readings would then be used to reinforce, clarify and crystallize your understanding of the material after its lecture.

2. There is no attendance requirement. However, since exams are largely conceptual/verbal in nature, adequate performance usually presupposes the conceptual framework generated in the lectures - and assignments will be due at class.

3. Textbooks serve as reference and supplemental sources. Lecture material is NOT designed simply to rehearse the textbook style or framework. The core of the course will be found in a great many, very detailed set of lecture notes, and handouts.

4. Since the course is the first of a two semester sequence, we have some flexibility in determination of the “stopping” point for the Fall semester. We may be able to proceed farther than the above reading schedule indicates and more material on MR might be covered.
Behavioral Objectives for the Student
These practices will ensure adequate mastery of the material

1. A good rule of thumb is that each hour spent in lecture should be matched by a minimum of 2-3 hours work outside of class. This means that the course will likely be the source of the heaviest demand on your time of all your classes and research.

2. Give the textbook a once through quick read BEFORE class lecture on that topic in order to identify terms and concepts. After lecture, do a thorough reread of the text and the lecture notes using one to illuminate and counterbalance the other.

3. The lecture notes contain a very large fraction of all of the core material that is essential to the course. Make sure that you understand EVERYTHING in them. Use the textbook to reinforce the lecture perspective.

4. Print out lecture notes before class so that you can take your own notes on them.

5. Work ALL exercises in each chapter. Attend help sessions to go over answers to the even numbered exercises.

6. Get Ahead. Stay Ahead. Statistics courses are a slow build of foundation principles and elaboration into specific research design applications. This means that early concepts are crucial for development of correct understanding of later concepts. Getting Behind compounds the difficulty of later concepts. We will go relatively slowly early, but very rapidly by mid semester. Early material is simpler/easier. So, develop good study habits and over learn the early material so that you are accustomed to putting in the time when we get to the more rapid pace and more challenging topics later in the course.

7. Study in groups. Don’t always keep the same group.

8. Attend Help Sessions. Ask for help sessions. Come for help from the Professor and/or TA at any time. Historically, we have found Friday afternoons a good time for help sessions. In addition to assignments, several "practice problem" sets will be recommended. Going over these in help sessions is tremendously helpful.