



Spring 2016

I. COURSE INFORMATION

A. ELFN 6773 Introduction to Statistics & Research

B. Professor Dr. Steve Bounds, Assoc. Prof.  
Educational Leadership  
International Student Center, 203  
870-972-2123  
[sbounds@astate.edu](mailto:sbounds@astate.edu)

Virtual Office Hours: Wednesday, 7:00-9:00 p.m.

For use as Arkansas professional development hours, access the following website: <http://arkansased.org/pd/index.html>

II. TEXTBOOK(S) READINGS

A. Primary Text

Caldwell, Sally (2013). *Statistics Unplugged* (4th ed.) Thomson Wadsworth: Belmont, California. ISBN-10: 0840029438 or ebook, ISBN-13: 9780840029430. (Available locally, on the internet, or buy, rent, or buy eBook at <http://www.cengagebrain.com/shop/isbn/0495602183?cid=rdl>) (2<sup>nd</sup>, 3<sup>rd</sup>, or 4<sup>th</sup> ed. will work for the class. Content is the same.)

B. Supplemental Text:

APA Manual, 6<sup>th</sup> edition. Recommended.

C. Software:

Microsoft Office. Free to ASU students at <http://www.astate.edu/a/its/software-downloads/>

III. PURPOSE AND GOALS OF THE COURSE

- A. This course involves an examination of descriptive statistics and basic inferential statistical techniques. Hypothesis testing, confidence intervals, analysis of variance, correlation techniques and nonparametric statistical methods will be discussed.
- B. Upon completion of this course the student will be able to:
  - 1. Explain basic research terms, the process by which research design informs the choice of statistical procedure, and the way in which questions and hypotheses should reflect a chosen design and statistical procedure.
  - 2. Define basic statistical terms including normal and non-normal distributions of data, measures of central tendency (i.e. mean, median, and mode), variability (i.e. range, variances, standard deviations, and the standard error of the mean), levels of measurement, and probability.
  - 3. Use Excel or SPSS to calculate and interpret descriptive statistics, to explore data and solve statistical problems, and to communicate statistical results in accordance with current APA style.
  - 4. Describe statistical hypothesis testing, including rejecting and failing to reject the null hypothesis.
  - 5. Define Type I and Type II errors in statistical decision-making, the power of a statistical procedure, and the maximizing of power.
  - 6. Describe the factors that inform the choice of a statistical procedure, choosing appropriate statistical procedures to solve educational research problems.
  - 7. Describe the logic of selected statistical procedures.
  - 8. Write a research paper using APA format.

#### IV. STANDARDS LINKAGE

##### A. ELCC Standards (2011)

- 1.0: A building level education leader applies knowledge that promotes the success of every student by collaboratively facilitating the development, articulation, implementation, and stewardship of a shared school vision of learning through the collection and use of data to identify school goals, assess organizational effectiveness, and implement school plans to achieve school goals; promotion of continued and sustainable school improvement; and evaluation of school progress and revision of school plans supported by school-based stakeholders.
- 2.0: A building-level education leader applies knowledge that promotes the success of every student by sustaining a school culture and instructional program conducive to student learning through collaboration, trust, and a personalized learning environment with high expectations for students; creating and evaluating a comprehensive, rigorous and coherent

curricular and instructional school program; developing and supervising the instructional and leadership capacity of school staff; and promoting the most effective and appropriate technologies to support teaching and learning within a school environment.

3.0: A building-level education leader applies knowledge that promotes the success of every student by ensuring the management of the school organization, operation, and resources through monitoring and evaluating the school management and operational systems; efficiently using human, fiscal, and technological resources in a school environment; promoting and protecting the welfare and safety of school students and staff; developing school capacity for distributed leadership and ensuring that teacher and organizational time is focused to support high-quality instruction and student learning.

4.0: A building level education leader applies knowledge that promotes the success of every student by collaborating with faculty and community members, responding to diverse community interests and needs, and mobilizing community resources on behalf of the school by collecting and analyzing information pertinent to improvement of the school's educational environment; promoting an understanding, appreciation, and use of the diverse cultural, social, and intellectual resources within the school community; building and sustaining positive school relationships with families and caregivers; and cultivating productive school relationships with community partners.

6.0: A building level education leader applies knowledge that promotes the success of every student by understanding, responding to, and influencing the larger political, social, economic, legal, and cultural context through advocating for school students, families, and caregivers; acting to influence local, district, state, and national decisions affecting student learning in a school environment; and anticipating and assessing emerging trends and initiatives in order to adapt school-based leadership strategies.

B. Diversity Related ELCC Standards (2011)

5.0: A building-level education leader applies knowledge that promotes the success of every student by acting with integrity, fairness, and in an ethical manner to ensure a school system of accountability for every student's academic and social success by modeling school principles of self-awareness, reflective practice, transparency, and ethical behavior as related to their roles within the school; safeguarding the values of

democracy, equity, and diversity within the school; evaluating the potential moral and legal consequences of decision making in the school; and promoting social justice within the school to ensure that individual student needs inform all aspects of schooling.

C. Strengthening and Enriching Learning Conceptual Framework

- 1.2.a Demonstrates competence in applying knowledge of content and research in professional practice.
- 3.1.a Knows content and concepts of the discipline at an advanced level.
- 5.1.a Understands the relevance of research findings and performance data.
- 5.2.a Collects and analyzes student assessment data and makes data-driven decisions to improve student learning.
- 5.2.b Demonstrates ability to apply research methods and statistical techniques to improve professional practice.
- 5.2.c Demonstrates ability to interpret and apply research findings from professional literature.

V. COURSE ASSESSMENT AND PERFORMANCE MEASURES

*Note: Week is from Monday to Sunday (except Week 5)*

- A. Personal Introduction (due no later than 11:59 p.m. Sunday of Week 1)  
Microsoft Office is available free to ASU students at <http://www.astate.edu/a/its/software-downloads/>
- B. Exams  
Students will have exams to measure comprehension of the material. The exams will focus mostly on the use of statistical software, interpretation and application, not on manual statistical calculations. Students are permitted to have access to the text, class notes, and statistical software (Excel, SPSS, etc.) when taking exams. Statistical calculations should be performed using software. You will have at least two (2) hours in which to complete an exam once it is started.
- C. Case Projects

Students will use data provided in the class and write a response to a given situation. The analysis and reflection requires a written report to demonstrate mastery of the principles of research design and analysis. Detailed instructions and data are found in the course materials. [ELCC Standards 1, 2, 3, 4, 5, and 6]

D. Grading Method

Personal Introduction	0 points	
Survey	5 points	( 2.5%)
Cases	60 points	(30.0%)
Exams	<u>135 points</u>	<u>(67.5%)</u>
Total:	200	100%

- A: 180+ points \*
- B: 160 - 179 points
- C: 140 – 159 points
- F: 0 – 139 points

\* Grades are based on number of points attained in the class, not on the percentage. Therefore, percentages are not rounded for grade calculation purposes, so 179 points (89.5%) is still a B.

E. Late Submission Policy:

If the candidate is unable to complete an assignment on time due to a “serious extenuating circumstance (e.g. death in the family, personal health issues),” then he or she must contact the instructor immediately by email. Except in cases of serious extenuating circumstances, late work will not be accepted. The course professor will determine if the excuse for late work rises to the level of being a “serious extenuating circumstance” on a case-by-case basis.

Assignments that are submitted after the due date will receive the following deductions:

1. Late assignments receive a 5% deduction for each day after the due date.
2. Assignments submitted a week late or after the final date of the course will not be accepted.
4. Late Discussion Board threads or replies will not be accepted.

F. Email Policy

The course instructor will only email the candidate using the candidate's university email address; therefore, the candidate is responsible for regularly checking his/her university email. Additionally, the candidate must only e-mail the faculty from his/her A-State account.

VI. COURSE OUTLINE

Week	Quiz	Lesson	Topic(s) Covered
1	1	1	Introduction
1	2	2	Descriptive Statistics ( <i>Caldwell, ch 1-2</i> )
2		3	Distribution Shapes ( <i>Caldwell, ch 3</i> )
2	3	4	The Normal Curve & Z Scores ( <i>Caldwell, ch 4</i> )
2		5	Fundamental Concepts ( <i>Caldwell, ch 5</i> )
2	4	6	Confidence intervals ( <i>Caldwell, ch 6</i> )
3	5	7	Hypothesis testing & Single-sample t-test ( <i>Caldwell, ch 7</i> )
4		8	Hypothesis testing & Two-sample t-tests ( <i>Caldwell, ch 8</i> )
4	6	9	Alternative Hypothesis ( <i>Caldwell, ch 9</i> )
5	7	10	Analysis of variance ( <i>Caldwell, ch 10</i> )
6	8	11	Chi-Square tests ( <i>Caldwell, ch 11</i> )
7	9	12	Correlation and Regression ( <i>Caldwell, ch 12</i> )
7	10	13	Research Methods

## SCHEDULE

WEEK	LESSONS	ITEMS DUE*	DATES
Week 1	Lessons 1 - 2	Quizzes 1 & 2 Intro due Survey due	Jan 18-24
Week 2	Lessons 3 - 6	Quizzes 3 & 4 Case 1 due	Jan 25-31
Week 3	Lesson 7	Quiz 5 Case 2 due	Feb 1-7
Week 4	Lessons 8 - 9	Quiz 6 Case 3 due	Feb 8-14
Week 5	Lesson 10	Quiz 7 Case 4 due	Feb 15-21
Week 6	Lesson 11	Quiz 8 Case 5 due	Feb 22-28
Week 7	Lessons 12 - 13	Quizzes 9 & 10 Case 6 due	Feb 29-Mar 4

\*Items due by 11:59 pm on the last day of the week unless otherwise noted.

## VII. SPECIAL CONSIDERATIONS AND/OR FEATURES OF THIS COURSE

- A. Instructional methods will include cooperative learning, video lectures, class discussions/debates, journal reading, self-directed learning, and a data-based research or program evaluation project in order to increase learning and to accommodate a variety of learning styles.
- B. Students are required to access the LMS (Blackboard) to check for announcements, engage in focused discussions of research topics, and review the class lectures, and submit class assignments.
- C. Students are required to use word processing to prepare the project. **Word processing files must be saved as Microsoft Word files or as rtf files.** Microsoft Office, which includes Word and Excel, is available free for ASU students. (<http://www2.astate.edu/a/finance-admin/its/services/software.dot>)
- D. Students are required to use Statistical Package for the Social Sciences (SPSS) **or** Microsoft Excel Data Analysis to analyze data for the Research Paper.
- E. Students must submit original work (not from other sources and not from other coursework) in order to complete the requirements for this class. All work must be submitted in electronic format.
- F. Students are expected to be in "attendance". Class material will be available online through the LMS. Students are expected to complete all assignments during the specified time.
- G. Flexibility Clause: Circumstances may arise which will prevent us from fulfilling each and every component of this syllabus. Therefore, the syllabus is subject to

change. However, you will be notified of any changes that occur prior to any due date for assignments.

- H. **INTERNSHIP:** Students seeking the MSE in Educational Leadership (Building Level Administrator or C&I) or Special Education/Gifted should begin or continue completing the required internship activities. See the My Organizations section on the home page of Blackboard for more details about the portfolio and internship.

#### VIII. PROCEDURES TO ACCOMMODATE STUDENTS WITH DISABILITIES

If you need course adaptations or accommodations because of a disability, have emergency medical information to share, or need special arrangements, please notify the professor ASAP and/or the AState Officer of Disabilities  
<http://www2.astate.edu/disability/> 870-972-3964.

#### IX. REFERENCES

- Chase, C. (1984). *Elementary statistical procedures* (3<sup>rd</sup> edition). New York: McGraw-Hill.
- Enger, J. & Howerton, D. (1992). *User friendly guide to descriptive statistics* (3<sup>rd</sup> ed.). Needham Heights, MA: Ginn.
- Ferguson, F. & Takane, Y. (1989). *Statistical analysis in psychology and education*. New York: McGraw-Hill.
- Hopkins, C. & Antes, R. (1990). *Educational research: A structure of inquiry*. Columbus, Ohio: Charles E. Merrill.
- Neuman, W. (2004). *Basics of social research: Qualitative and quantitative approaches*. Boston, MA: Allyn & Bacon.
- O'Leary, Z. (2005). *Researching real-world problems: A guide to methods of inquiry*. Thousand Oaks, CA: Sage Publishers.
- Pyrzczak, F. (2009). *Success at statistics* (4<sup>th</sup> ed.). Glendale, CA: Pyrczak Publishing.
- Salkind, N. (2011). *Statistics for people who think they hate statistics* (4<sup>th</sup> ed.). Los Angeles, CA: Sage Publishers.
- Thompson, B. (2006). *Foundations of behavioral statistics: An insight-based approach*. New York, NY: The Guilford Press.



Welkowitz, J., Ewen, R. & Cohen, J. (2000). *Introductory statistics for the behavioral sciences* (5<sup>th</sup> ed.). Fort Worth, TX: Harcourt Brace College Publishers.

Witte, R. (2001). *Statistics* (6<sup>th</sup> ed.). Fort Worth, TX: Harcourt Brace College Publishers.