

**CEP 932: Quantitative Methods in Educational Research I**  
**Spring 2013**  
**M 4:10-7:00PM, 204 NS**

**Instructor: Dr. Kim Maier**

Email: kmaier@msu.edu

Phone: (517) 355-8538

Skype: kim.maier0323

Office: 451 Erickson

**Teaching Assistants: Dawn Chang, Tara Kilbride, Ting Shen**

**Course Content**

This course provides an introduction to data analysis and statistical inference. Students learn to describe data (quantitatively and graphically), to select and compute statistical estimates and hypothesis tests, to use software to accomplish these tasks, and to interpret and write about the results of the estimates and tests. General topics covered in class include: Descriptive Statistics, the Normal Distribution, Sampling Distributions, Statistical Inference, and Hypothesis Testing.

**Prerequisite Knowledge**

Knowledge of basic algebra is needed. Review of basic algebra topics will not be covered in this course so students not comfortable with their level of basic algebra skills should plan to acquire these skills via self-study by the end of the first week of class. Higher mathematics (e.g., trigonometry, calculus) is not used.

**Course Requirements:**

Due to the work involved with this course and the format of the offering, the following are required:

1. SPSS Software: Access and Proficiency. The course requires statistical analysis and you will be required to have access to the statistical software SPSS to complete the analyses (see the section on Statistical Software, below). Over the semester, you will develop your proficiency with SPSS. Course lectures and the textbook include material on running analyses in SPSS. Additional suggested resources for skill development are provided in the section on Statistical Software, below.
2. Angel Course Management System (CMS): Access & Proficiency. Angel will be the portal for all course materials. Not all internet browsers and versions are compatible with Angel, please check early in the first week of the course to verify that you can access all course content on Angel (see the Angel website, [angel.msu.edu](http://angel.msu.edu), for more information on compatible browsers). It is assumed that you know how to access content and operate within Angel. If you do not have these skills, you will need to develop them using resources such as those on Angel or at [dev.help.angel.msu.edu/students/guide](http://dev.help.angel.msu.edu/students/guide).
3. Skype (Optional). Some Office Hours will occur over Skype. In order to take advantage of these, you should have Skype installed on your computer and a Skype account. You will need to submit a contact request in order to communicate via Skype.
4. Capability to Print Electronic Documents. The *Assignments* and *Exercises* may require you to print SPSS data files (\*.SAV) or SPSS output files (\*.SPV or \*.SPO). You will need to be able to print these using a computer that has SPSS software installed.
5. Calculator. You will need to use a calculator to complete coursework. The calculator should have a square root function. Beyond that, the calculator can be fairly low-tech.

If you know that you cannot meet one or more of the above course requirements, or if you suspect meeting them may be a challenge, please contact the instructor immediately to determine if a work-around can be arranged (however, there is no guarantee that alternate arrangements are possible, this depends on the particular issue).

### **Required Textbook:**

Lomax, Richard G. and Hahs-Vaughn, Debbie L. (2012). *An Introduction to Statistical Concepts* (3<sup>rd</sup> ed). New York: Routledge.

### **Grading**

Grades are criterion-referenced. That is, grades will be assigned based on the percent of the total possible points that you receive on the coursework. The grading scale is: 93-100% = 4.0, 92-85% = 3.5, 84-77% = 3.0, 76-69% = 2.5, 68-61% = 2.0, 60-53% = 1.5. The scores for coursework are weighted as follows:

Assignments: 30%,  
Midterm Exam: 35%  
Final Exam: 35%

Individual grades will be posted on Angel. In order to see your grades, you will need to run a report in Angel. The overall percent shown in Angel may be inaccurate, please use the weighting as described above to compute your grade.

### **Course Schedule**

This course is not self-paced; content for topics is released as prior topics are completed. The course schedule is posted on the course Angel website. The dates listed in the schedule are tentative and subject to change. Instructor reserves the right to make changes to the syllabus and schedule as necessary. Students will be notified in advance of any change and the revised schedule will be posted on Angel. After notification of changes, students are responsible for adhering to the most current version of the schedule.

### **Coursework**

Coursework will consist of *Assignments* and *Exams*. *Assignments* can be completed individually or in groups (see section on Group Work, below).

*Assignments*. Generally, *Assignments* cover each of the major topics of the course. Tasks within an *Assignment* will ask you to. To complete an *Assignment*, you may be asked to perform statistical analyses using the statistical software SPSS (see the section below titled “Statistical Software”) with provided datasets, interpret statistical output results, respond to questions about the topics covered in class, and perform statistical analyses by hand. *Assignments* will be made available on Angel, and a corresponding answer key will be provided after the due date for the *Assignment*. Students should hand in a hard copy of *Assignments* at the beginning of the class when due, as specified in the most current version of the Course Schedule (see above section on Course Schedule above for details about schedule changes). Coursework submitted after the beginning of the class (**4:10pm**) will be considered late and subject to the late coursework policy. Due dates and the late policy will be strictly enforced. Student responses to *Assignments* can be handwritten (where applicable) or typed, but should be legible. Each page should be numbered and labeled with the student’s name (or all students’ names in the case of groups). Please staple multiple pages

together, DO NOT use paper clip.

*Exams.* *Exams* include a *Midterm Exam* and a *Final Exam*, both are required. These *Exams* are timed tests. *Exams* will contain short answer and computation problems, and may also include multiple choice and true/false items. Some of the problems will have multiple parts and you will be expected to not only compute statistics but also provide written substantive interpretations of the statistical test results. Both the *Midterm Exam* and the *Final Exam* are open-book and open-note. The content covered on *Exams* will be cumulative. You are encouraged to show your work on the exams. While this is optional, this is the only way that partial credit can be assigned for incorrect answers. The amount of partial credit assigned will depend on the content of the work shown; work that shows more of a connection with what the question asks will receive more partial credit.

### **Group Work Policy**

*Assignments* may be completed individually or as a group effort in groups of no more than three students. Groups should turn in one copy of the *Assignment* and all members will receive the same grade. Students are responsible for organizing and managing groups, and groups do not have to maintain a consistent membership roster. In other words, your decision to complete an *Assignment* individually or in a group can be changed back and forth over the course of the semester. You must submit a single document for all members of your group (do not submit a document for each individual group member) and the document must list the names of all group members. All those who worked together on a given *Assignment* will receive the same grade. Management of group dynamics is the responsibility of the group's members.

### **Late Coursework and Make-Up Policy**

Coursework is due at the beginning of the class, as described above. Given the cumulative nature of this course late submissions of *Assignments* are strongly discouraged. However, in the event that you decide submit a late *Assignment*, it will be penalized an additional 10% for each day it is late. This means that an *Assignment* handed in after class starts will be penalized 10%. The homework will be penalized an additional 10% for each subsequent day it is late (e.g., an *Assignment* that is handed in after 4:10pm the day after it was due will be penalized 20%).

Make-up *Exams* are only permitted in extreme circumstances (travel plans do not constitute a valid request). A request for a make-up *Exam* must be submitted with documentation such as a physician's letter and must be faxed to the instructor at (517) 353-6393. The student's request will be considered and the student will be informed via email of whether the request was approved. If approved, the student will be given an oral exam. If an exam is missed and the student's request is not approved, the student will receive a zero grade on the exam.

### **Statistical Software**

You will be required to use SPSS software to complete work for this course. SPSS is available on MSU Microlab computers (see <http://tech.msu.edu/computerlabs/floor-plans.php> for a list of available labs; check lab schedules for open times) if you are near the main MSU campus or at some MSU satellite locations. SPSS is a Windows package that is primarily menu-driven and is the software that will be used to illustrate analyses during the lectures. The current version of SPSS is IBM SPSS 20.0; versions of SPSS 15.0 or later would suffice, but when in doubt contact the instructor. SPSS software can be rented for a fee. The version to rent is the IBM® SPSS® Statistics Standard GradPack 20 for Windows or Mac. These packages can be found on sites such as [www.onthehub.com/spss](http://www.onthehub.com/spss) (a 6-month rental costs about \$55; the direct link to the order page for a

6 month rental from On the Hub is available on Angel).

It is not assumed that you are proficient in SPSS but that you will gain the necessary skills by studying the material in the textbook and in the lecture notes. If you need to learn more about SPSS, there are a number of resources that you may find helpful:

Field, Andy (2009). *Discovering Statistics Using SPSS* (3<sup>rd</sup> ed.). Thousand Oaks, CA. (Please note that this book is recommended on the basis of the statistical and technical content. However, this book and its accompanying website have non-statistical content that some may consider offensive. Recommendation of this content does not mean that the instructor necessarily endorses the non-statistical content).

Green, Samuel B. and Salkind, Neil J. (2010). *Using SPSS for Windows and Macintosh: analyzing and Understanding data* (6<sup>th</sup> ed.). Prentice Hall.

Pallant, Julie (2010). *SPSS Survival Manual: A step by step guide to data analysis using SPSS*. Open University Press.

UCLA Academic Technology services webpage: <http://www.ats.ucla.edu/stat/spss/>

### **Additional Statistical Resources:**

Students over the past semesters have recommended a number of books that they found helpful. Most of these books could be considered to be a more ‘big picture’ introduction to statistics. In general, these resources give a broad overview of the subject but do not go into any single topic deeply. While none of these resources would be a substitution for the course textbook, you may find them useful as additional sources. Many are available in the library, either the editions listed here or earlier editions.

Gonick, L. & Smith, W. (1994). *The Cartoon Guide to Statistics*. Harper Resource.

Kranzler, J.H. (2002). *Statistics for the Terrified* (3<sup>rd</sup> ed.). Prentice-Hall.

Levine, D.M. & Stephan D.F. (2004). *Even You Can Learn Statistics: A Guide for Everyone Who Has Ever Been Afraid of Statistics*. Prentice-Hall.

### **Angel Resources:**

For technical issues related to Angel, call the MSU Help Line at 1-800-500-1554 or (517) 355-2345 or consult the online resources available at [angel.msu.edu](http://angel.msu.edu) or at the MSU Library website. There are known issues with Angel and more recently, these have manifested in such things as inability to upload documents or to email within Angel. Please consult Angel help to confirm that your web browser is compatible with the current version, incompatibility can lead to a host of problems. The current version of Angel is also incompatible with Safari iOS (e.g., Ipad, Iphone) but you may be able to access some elements of the course. Alternate browsers may improve the iOS access experience, but Angel access may still be restricted. The access afforded by iOS browsers will not be sufficient to be the sole method of access.

### **Office Hours:**

The instructor and TA will hold weekly Office Hours in both face to face and Skype formats scheduled times (Schedule of Office Hours will be posted on Angel by Friday of the second week of classes). Office hours function on a first-come, first-served basis, regardless of format. To attend the office hours via Skype, you will initially need to send the instructor or TA a contact request. Once your request is approved, you will be able to ‘Call’ the instructor or TA in Skype; if there is a student attending ahead of you, you will either be *IMed* that you will get a call back, or

you will be added to a conference in Skype, depending on the nature of the current's student's questions.

### **Academic Integrity:**

Participation in this course assumes that you will adhere to the statements set out in the statement as well as the University Policy on academic integrity. MSU's policy is covered in the *Spartan Life* handbook, found on the *Spartan Life* web site at: <http://splife.studentlife.msu.edu>.

If the instructor suspects a student has violated the University policy on academic integrity, the instructor will proceed as guided by University policy. The student will be approached by the instructor. For advisory purposes, the instructor may also consult faculty members who serve on departmental, College or University committees that address academic integrity, the department chairperson, the academic dean, or the Ombudsman; in all of these interactions, the instructor will keep the student's identity confidential. The goal of these consultations is for the instructor to seek guidance to aid her in arriving at a decision about whether the suspicion merits an allegation of academic misconduct. The student may or may not be informed that the instructor is seeking advisement pertaining to a situation involving the student (the student's identity will not be disclosed). The student may be contacted by the instructor for the purpose of arranging a meeting to discuss the circumstances that prompted suspicion.

If the instructor makes an allegation that a student has committed academic misconduct, the student will be informed by the instructor. The University policy specifies that the initial action to be taken is at the discretion of the instructor and could include receiving a penalty grade for assignments or the entire course and recommendation for an academic disciplinary hearing (recommended to and initiated by the student's academic dean). If the instructor assigns the student a penalty grade, the instructor is required to report details of the allegation and penalty grade to the student's academic dean (for more details about this, as well as the right of students to an academic grievance hearing, see *Integrity of Scholarship and Grades* at Spartan Life Online – [www.splife.studentlife.msu.edu](http://www.splife.studentlife.msu.edu)).

If after consulting the University policy, there may still remain details that you may have questions about or need further clarification about how these principles and procedures apply specifically to the online format. You are encouraged to seek answers to your questions from an appropriate source. For more information on the University policy, first consult the online handbook. If you have any remaining questions and the instructor cannot adequately address them, the instructor will refer you to a knowledgeable source. The Office of the Ombudsman is a knowledgeable and neutral source (and students may post confidential inquiries with this office, see <https://www.msu.edu/~ombud/> for more details), and can also serve as a point of first contact.

Please note that the instructor will not penalize a student for asking for clarification on whether an action or behavior is considered to be in violation of policy, *if* that action or behavior has not been committed.

### **Accessibility:**

Michigan State University seeks to ensure that its programs are accessible to all persons. Students in need of special assistance or an accommodation regarding any of the course requirements as outlined in the syllabus and other course content are advised to notify the instructor immediately. We will meet privately to discuss a resolution of your matter, which may or may not include an appropriate referral. Confidentiality will be maintained regarding these discussions. For more information on University policy and accommodations, please consult the Resource Center for

Persons with Disabilities: [www.rcpd.msu.edu](http://www.rcpd.msu.edu).

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**SCHEDULE\***

<b>Dates</b>	<b>Topic</b>	<b>Chapter</b>	<b>Overheads</b>	<b>Due</b>
1/7	Overview of Class Introduction Data Summaries	1, p.110-111 2	c1.pdf c2.pdf	
1/14	NO CLASS MEETING LECTURE VIDEOS INSTEAD Data Summaries Descriptive Statistics	2 3	c2.pdf c3.pdf	
1/21	MARTIN LUTHER KING DAY NO CLASS			
1/28	Normal Distribution	4	c4.pdf	Assignment 1
2/4	Probability & Sampling Distributions Hypothesis Testing	5 6	c5.pdf	
2/11	Sampling Distributions Hypothesis Testing Inference for one mean (z-test & t-test)	5 6	c5.pdf c6.pdf	Assignment 2
2/18	Inference for one mean (z-test & t-test)	6	c6.pdf	
2/25	Midterm Exam			Assignment 3
3/4	SPRING BREAK NO CLASS			
3/11	Inference for two independent means Inference for two dependent means (t-tests)	7	c7.pdf	
3/18	Inference for one proportion Inference for two proportions Chi-square Goodness of Fit Test	8	c8.pdf	Assignment 4
3/25	Chi-square Goodness of Fit Test Chi-square Test of Association	8	c8.pdf	
4/1	Correlation	10	c10.pdf	Assignment 5
4/8	Simple Linear Regression (bivariate)	17	c17.pdf	
4/15	Simple Linear Regression (bivariate)	17	c17.pdf	Assignment 6
4/22	Simple Linear Regression (bivariate)	17	c17.pdf	
4/29	FINAL EXAM 5:45pm—7:45pm			Assignment 7

\* These are tentative dates, subject to change (except Final Exam date and time), Instructor reserves the right to make changes to the syllabus and schedule as necessary. Students will be notified in advance of any change.