**Syllabus**

**Course Number:** ERMA 7310

**Course Title:** Design and Analysis in Education II

**Semester:** Fall 2024

**Credit Hours:** 3 credit hours

**Prerequisites:** ERMA 7300 Design and Analysis in Education I

**Meeting Time:** Tuesdays 5:00~7:50 pm

**Zoom ID:**
**Instructor:** Chih-hsuan Wang, Ph.D.

4010 Haley

wangchi@auburn.edu

**Office Hour:** Virtual, please make an appointment.

**TA:**  Jianwei Dong, MPS

 jzd0077@auburn.edu

**Office Hour:**  TBA.

**Date Syllabus Updated:** August 2024

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Texts:**

Ross, M. E., & Shannon, D. M. (2011). *Applied Quantitative methods in Education (2nd ed.)*. Dubuque, IA: Kendall/Hunt Publishing Company.

**Recommended Reading:**

American Psychology Association (2020)*. Publication Manual of the American Psychological Association (7th ed.)*. Washington D.C., American Psychological Association.

Gravetter, F. J. & Wallnau, L. B. (2017). *Statistics for the Behavioral Sciences* *(9th ed.).* Belmont, CA: Wadsworth.

Huck. (2012). *Reading research and Statistics (6th ed.).* Boston, MAS: Pearson Education.

Knapp, H. (2014). *Introductory Statistics Using SPSS*. Thousand Oaks, CA: Sage.

Shannon and Davenport (2001). *Using SPSS to Solve Statistical Problems*. Columbus, OH: Merrill/Prentice Hall.

**IMPORTANT:**

1. All course materials (syllabus, PPTs, lab assignments and data files, rubrics…etc.) will be available on Canvas. Check the Canvas site weekly for announcements, assignments, and information before each class. I am not going to provide hard copies.
2. Our class will be delivered in both Synchronous and Asynchronous format. You can access our class Zoom room through Canvas class page or just join the Zoom room type in Zoom ID # (TBA).
3. If you enroll in the F2F class, you are expected to Zoom in synchronously. If you enroll in the Distance class, you are encouraged to join us synchronously, but you can also complete your coursework asynchronously.
4. I will not accept the work completed by hand unless it is the only way to do it.

**Required Computer Software and Skills:**

1. Access to high-speed internet through smart mobile devices or computers.
2. SPSS version 27/28/29 (at least **Grad Pack** **Standard**).
	1. You can purchase/rent the SPSS Standard Grad Pack from these distributors listed on the IBM website:

<https://www.ibm.com/us-en/marketplace/spss-statistics-gradpack/details>

* 1. There are several vendors on the SPSS website. Their prices are varied. You can try to find the best deal among those vendors.
	2. Or you can access the SPSS virtually through the Internet. You need to use VPN to be able to access the virtual lab. Remember that when you are in the virtual lab, you are NOT using your own computer. Do NOT save anything on the computer or on the desktop. Instead, you need to email the files or save them on thumb drives.
1. You can use other statistical software/packages, such as SAS, R, STATA, or Python, to complete your work. However, I will only introduce SPSS in our class.
2. Microsoft Office Word.
3. PDF file creator (e.g. Adobe Acrobat).
4. Online Learning Platform (Canvas) basic skills: open, download, and upload documents, review documents and video clips online, and **review instructor feedback on the Canvas. (More student resources for Canvas can be found here:** [**http://wp.auburn.edu/biggio/canvas/student-help/**](http://wp.auburn.edu/biggio/canvas/student-help/) **)**
5. Zoom application. You can install it on your computers, tablets, or smartphones. This is for participating in virtual office hours.

**Other Prerequisite Skills:**

 Students taking this class are expected to be able to perform the following basic skills **at the beginning** of the class:

1. **Computer basic skills**: open, save, copy-paste, use track changes, make tables, and create Word and PDF documents.
2. **Online learning platform basic skills**: open, download, and upload documents, review documents and video clips online, and **review instructor feedback on the Canvas. (More student resources for Canvas can be found here:** <http://wp.auburn.edu/biggio/canvas/student-help/> )

**Course Description:**

This course is designed to provide students with the understanding of statistical methods pertaining to the design and analysis educational research. Descriptive statistics will be reviewed and analyses that assess the strength of relationships between or among variables as well as analyses to predict will be studied. This course emphasizes the conceptual application of statistics with some emphasis placed on the mathematical derivation of the formulas to facilitate understanding of the statistics. A part of the course will be learning SPSS as it pertains to correlation and regression and learning to interpret output.

**Course Objectives**:

Upon completion of this course, the student will be able to:

* gain an understanding of correlation and regression procedures.
* apply knowledge of correlation and regression procedures by analyzing research problems and making decisions about the appropriate use of these procedures.
* use SPSS to analyze data by correlation and regression statistical procedures.
* interpret the results of correlation and regression statistical procedures in terms of the research hypothesis.
* review published research literature to examine the application of measurement, design, and analysis procedures.
* prepare a written summary of data analysis results in APA format.

**Course Requirements:**

* Attend all class sessions and participate in class discussions and activities.
* Complete all examinations.
* Complete all computer exercises.
* Complete a final project.

**Grading and Evaluation Procedures:**

Midterm Examination 100 pts

 Final Exam 50 pts

Lab Assignments (20 pts \* 5) 100 pts

Final Project 50 pts

Total Possible Points 300 pts

* Any assignment presented or turned in late will be penalized 5% for each day past the assignment deadline. Assignments more than 2 weeks overdue will not be accepted.
* You can check your grade for each assignment you submitted on the Canvas. However, I keep the official grades in an Excel file and will calculate your final grade using Excel or SPSS.

**Grading Scale:**

|  |  |
| --- | --- |
| **Grade** | **Points** |
| **A** | ***270+ points and excellent attendance and participation*** |
| **B** | ***240 ~ 269 points and at least good attendance and participation*** |
| **C** | **210 ~ 239 points** |
| **D** | **180 ~ 209 points** |
| **F** | **< 180 points** |

* Class Attendance (weekly Canvas login record)

Points are not attached to attendance directly. However, in order to explore topics effectively, attendance and class participation are essential. Excellent class attendance is required to earn an A and to earn lab or other PPT activities points. If you need to be absent for school or work related requirements, illness, or an emergency, you are allowed to make up points for no more than two classes. Students are responsible for initiating arrangements for missed work.

* Examinations (Midterm: 100 pts; Final: 50 pts)

There will be two examinations. These exams will be taken home. You can use all resources you can find to complete the exams. However, the work needs to be your own work.

**The final exam is optional.** If you already have an A (at least 180 points) before the final exam, you can choose whether or not to complete the final. If you choose NOT to take the final exam, your final exam grade will be recorded as 50.

* Lab Assignments (20 pts \* 5 + maybe Bonus Lab 20 pts)

Lab assignments are designed to introduce you to the use of SPSS to complete analyses taught in classes. Due to time restraints, it is NOT intended to provide you with enough practice to memorize procedures. You should have reference books to help you complete analyses via SPSS when you are completing analyses on your own.

* Final Project (50 pts)

The following is the outline that will be used for this assignment. You will turn in your paper (4 to 6 pages double spaced excluding cover page and references) at the end of the semester. You must use a **correlation / regression design / ANCOVA** taught in this class to analyze data and report results to answer your research questions. If you do not use a correlation / regression design, I will not accept the paper. The paper is to be written in APA style. **Keep in mind that this paper is NOT an article critique**.

**Class Policy Statements**

* ***Email and Communication***
* All communication through emails needs to be via Auburn Tiger Email system. In other words, you need to use your university email address to send me emails, and I will do the same. Emails will be responded **within 48 hours** **excludes weekends and holidays.**
* All PPTs and announcements will be posted on the Canvas at the beginning of each week. You are responsible to check the Canvas every week.
* All assignments need to be uploaded on the Canvas. I will grade your assignments on the Canvas. **You can check your grade and my feedback for each assignment on the Canvas as well.** However, I keep your official grades in my Excel file.
* If you need individual help, you can reach me during office hours, email, or make an appointment (request Zoom meeting).
* ***Class Attendance*** (weekly Canvas login record)

Points are not attached to attendance directly. However, in order to explore topics effectively, attendance and class participation are essential. Excellent class attendance is required to earn an A and to earn lab or other PPT activities points. If you need to be absent for school or work-related requirements, illness, or an emergency, you are allowed to make up points for no more than two classes. Students are responsible for initiating arrangements for missed work.

* ***Assignment Policy***
* All graded work must be submitted through Canvas.
* All work submitted for the course must be typed.
* ***Late Assignments Policy***
* Assignments turned in late will receive a 5% reduction in earned points per day. The only exception will be in the case of emergency.
* Assignments more than 2 weeks overdue will not be accepted.
* Except for work requiring calculations, all work must be typed, or it will **not** be graded. Late penalty will be applied to work completed in writing and then turned in late in typed format for a grade.
* ***Incompletes and Withdrawals***
* Grades associated with incomplete course work or withdrawal from class will be assigned in strict conformity to the University policy (see Auburn University Bulletin). If you wish to drop this course you may do so by the 10th class day with no grade assignment. From the 10th class day to mid-quarter a W (withdrawn-passing) grade will be recorded in your transcripts. After this period withdrawal from the course will only be granted under unusual circumstances and must be approved by the Dean of the College of Education.
* Note that the incomplete grade (IN) policy is in effect. The new policy requires that students complete a form requesting that an IN grade be assigned. If this form in not completed and given to the instructor of the class, a grade will be assigned with a score of zero (0) for work that has not been completed and turned in by the time the instructor reports grades. To be eligible for a grade of IN, the student must have completed and have passed more than half of all class assignments/exams for semester.
* ***Academic Misconduct***

**Academic Honesty**

The Department of EFLT recognizes university policy regarding academic misconduct. Violations include, but are not limited to: plagiarism, unauthorized assistance during examinations, submitting another’s work product as your own, using another’s words as your own without appropriate citation, sharing unauthorized materials with another that contain questions or answers to examinations, altering or attempting to alter assigned grades. **In accordance with the University policy regarding academic misconduct, students may be subject to several sanctions upon violations of the Student Academic Honesty Code.** See the Tiger Cub publication for the current year for specifics regarding academic misconduct as well as student’s rights and responsibilities associated with the Code.

**Plagiarism**

For more information, see:

<http://www.collegeboard.com/student/plan/college-success/10314.html>

<http://owl.english.purdue.edu/owl/resource/589/01/>

<http://www.indiana.edu/~wts/pamphlets/plagiarism.shtml>

* ***Disability Accommodations***

Students who need special accommodations in class, as provided for by the American Disabilities Act, should arrange a confidential meeting with the instructor during office hours the first week of classes — or as soon as possible if accommodations are needed immediately. If you have a conflict with my office hours, an alternate time can be arranged. To set up this meeting, please contact me by e-mail. You must bring a copy of your Accommodation Memo and an Instructor Verification Form to the meeting. If you do not have these forms but need accommodation, make an appointment with the Program for Students with Disabilities, 1228 Haley Center, 844 2096 (V/TT).

**Tentative Course Content and Schedule**

| Week | Date | Reading & Class activities | Assignment (20 pts) Due on Sundays |
| --- | --- | --- | --- |
| 1 | 8/20 | SyllabusIntroductionReview of Hypothesis Testing |  |
| 2 | 8/27 | Repeated Measure ANOVA |  |
| 3 | 9/03 | Mixed-Design ANOVA | Bonus Lab Due on 9/08 |
| 4 | 9/10 | No meeting  |  |
| 5 | 9/17 | Correlation* Review of Least Squares
* Variance and Covariance
* Calculation of Correlation

Coefficient of Determination (r2) | Lab #1 Due 9/22 |
| 6 | 9/24 | Simple Linear RegressionPart and Partial Correlation | Lab #2 Due 9/29 |
| 7 | 10/01 | Multiple Linear Regression |  |
| 8 | 10/08 | Multiple Linear Regression  |  |
| 9 | 10/15 | Method of Entering Data Checking Assumptions | Lab #3 Due 10/20 |
| 10 | 10/22 | Midterm Exam Due on Sunday, 10/27 |
| 11 | 10/29 | Analysis of Covariance (ANCOVA) |  |
| 12 | 11/05 | Analysis of Covariance (ANCOVA) | Lab #4 Due 11/10 |
| 13 | 11/12 | Curvilinear Regression | Lab #5 Due 11/17 |
| 14 | 11/19 | Final Exam Due on Sunday, 11/24 (Optional if you have earned 180+ points before the final) |
| 15 | 11/26 | Happy Thanksgiving |
| 16 | 12/03 | Final Paper Due on Tuesday, 12/03 |

NOTE: This is a tentative syllabus. Any changes will be announced in class. Students are responsible for being aware of the changes made.

Final Paper Rubric

Your final paper should adhere to the following guidelines:

* The paper should be 4-6 pages in length, double-spaced, using Times New Roman 12 point font.
* Maintain 1-inch margins on all sides (top, bottom, left, and right).
* The title page and references do not count as part of the page limit requirements.
* After the text, include a list of references formatted according to APA format 7th edition guideline.
* A minimum of **five (5) references** is required for this assignment.
* If you are unsure about the APA formatting, please consult the Publication Manual of the American Psychological Association. Copies are available in the library, and it is recommended that all doctoral students in social sciences (education, psychology, etc.) have their own copy.
* You are required to utilize a correlation/regression design/ANCOVA (Analysis of Covariance) as taught in this class to analyze data and report results that address your research question. Failure to use one of these specified methods will result in the paper not being accepted.
* This assignment is not an article critique; instead, you are expected to independently find a dataset and conduct your own data analysis.
* This assignment could be completed either individually or as a group.

**Format of your final paper:**

1. **Cover Page**

Your final paper title is NOT “Final Paper” or “Final Project”. Your final paper should have a meaningful title that reflects the content of your work. Please provide a specific and descriptive title for your paper.

1. **Abstract**
2. **Introduction**
* Problem
	+ What is the problem? Provide a statement of the problem. Be explicit!
	+ Provide some background info (with a couple of references) on the problem.
	+ Indicate the variables of interest and their hypothesized relations.
* Research Questions
	+ List at least one research question.
	+ Re-state the variables of interest and their hypothesized relations according to your research question(s).
1. **Method (Must use one of the quantitative methods covered in the lectures)**
* Participants
* Describe the sample.
* Describe the demographics statistics of the sample if available.
* Instruments
	+ Describe the instruments/measures/surveys.
* Procedure
	+ How were data collected if such information is available.
1. **Results**
* Present the appropriate statistics.
* See example APA write-ups.
1. **Discussion**
* Conclusion and Recommendations.
* Discuss each result in relation to your research questions.
* Discuss potential problems with the study and how the study might be improved in the future.
* Recommendations for future research.
1. **References Page**
* A minimum of **five (5) references** is required.
1. **Appendix**
* SPSS output.

**Performance Rubric: ERMA 7310 Final Project (50 points)**

| **Criteria** | **Novice/Not Mentioned** | **Competent/Not Clearly Defined** | **Proficient/Clearly Defined** |
| --- | --- | --- | --- |
| APA Formatting(5 pts) | 0%.  References or citations not given; Single spaced; Headings/subheadings not used; | 50%.  Some style errors, but not enough to detract from the presentation.  Tables might be cut and pasted; A few reference errors or failure to italicize all symbols. | 100%.  Double spaced; tables/figures in APA format (not cut and pasted SPSS output); appropriate # decimal places; Headings/subheadings appropriate; Citations correctly given in text and matched to references.  Symbols italicized. |
| Introduction & Research Questions(5 pts) | 0%.  No linkage of introduction to RQ(s); RQs omit IV(s) and/or DV, or are not testable. | 50%.  RQs are testable and include variables, but maybe awkwardly worded.  The introduction may be weak but linked to RQ(s). | 100%.  The introduction makes case for the present study; research question(s) are clearly stated, include appropriate IV(s), DV, and are testable. |
| Participants, Instruments, & Procedure(5 pts) | 0%.  One or none of the sections are suitably addressed. | 50%.  Two of the three sections are suitably addressed. | 100%.  All three elements are suitably addressed; clearly explained. |
| Design & Analysis Used(7.5 pts)  | 0%.Design and/or analysis absent or incorrect. | 50%.Partial or incomplete description of statistical design, and analysis. | 100%.Be specific about what analysis you are using (e.g., multiple linear regression, ANCOVA, curvilinear regression, logistic regression) |
| Variables(5 pts)  | 0%. IV(s) and/or DVs not indicated or reversed. | 50%.  DV indicated; IV(s) may be poorly indicated (e.g., conflating levels of an IV with the number of IVs) | 100%.For ANOVA: clearly define all your factors (with all levels of each factor) and DV; For regression: clearly define all predictor(s) and the outcome variable. |
| Results(15 pts)  | 0%.Lacks summary statistics; Omits key statistical test results; Fails to include and explain ES estimates;  Mis-interprets test results. | 60%.Possible omission of some summary statistics and/or parameter estimates/test results, but otherwise correct;  Too many statistics given in text when a table is preferred. | 100%.Descriptive statistics (*M*s and *SD*s) for all variables included in the analysis, and appropriate *R*2, adjusted *R*2, change statistics if applicable, ANOVA results, and regression parameters (*B*, beta, and associated *p* values), etc. |
| Conclusions & Recommendations(7.5 pts)  | 0%.  Conclusions and/or recommendations absent; important conclusions missing or incorrectly drawn. | 50%. Not all conclusions are supported by data; Recommendations absent or “boilerplate.” | 100%.  Conclusions supported by analyses are linked back to research questions/hypotheses; recommendations tied to results; Clear explanations. |