**Syllabus**

**Course Number:** ERMA 8320/8326

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

**Semester:** Fall 2020

**Credit Hours:** 3 credit hours

**Prerequisites:** ERMA 7300/7306, ERMA 7310/7316

**Meeting Time:** Thursdays 5:00~8:00

**Instructor:** Chih-hsuan Wang, PhD (wangchi@auburn.edu)

 334-844-7986; 4010 Haley Center

 wangchi@auburn.edu

**Alt. Instructor:** Margaret Ross, PhD (rossma1@auburn.edu)

**Office Hour:**  Tuesday 12:00~2:00

 **Or make an appointment**

**Date Syllabus Prepared:** Aug, 2020

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**Texts:**

Mertler, Craig A., & Vannatta, Rachel A. (2016). *Advanced and Multivariate Statistical Methods: Practical Application and Interpretation (6th ed.)*. Pyrczak Publishing, Los Angelas.

Meyers, L. S., Gamst, G., & Guarino, A. J. (2016). *Applied Multivariate Research: Design and Interpretation (3rd ed.)*. Thousand Oaks, CA: Sage Publications, Inc.

**Recommended:**

American Psychology Association (2019)*. Publication Manual of the American Psychological Association (7th ed.)*. Washington D.C., American Psychological Association.

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate Data Analysis (6th ed.).* Upper Saddle River, NJ: Person Education.

Tabachnick, B. G., & Fidell, L. S. (2007). *Using Multivariate Statistics (5th ed.).* Boston, MA: Pearson Education.

**Technology & Computer Software Requirements:**

1. Access to high speed internet through smart mobile device or computers.
2. SPSS version 22/23/24/25/26. If you have a university own desktop/laptop, you can request a copy of SPSS from OIT Help Desk at the LRC. If you are in campus, you will be able to access SPSS at computer labs in Haley Center. However, if you are not nearby the campus, **you need to purchase or rent a copy of SPSS. You can find additional information here:** [**https://www.ibm.com/us-en/marketplace/spss-statistics-gradpack/details**](https://www.ibm.com/us-en/marketplace/spss-statistics-gradpack/details). **Remember to get the Grad Standard Pack instead of Base Pack.** I will not accept the work completed by hand calculation unless it is the only way to do it. It is okay to use previous version of SPSS.
3. You can use other statistical software/package, such as SAS, R, STATA, or Python, to complete your work.
4. Microsoft Office Word.
5. PDF file creator (e.g. Adobe Acrobat).
6. Zoom application. You can install it in your computers, tablets or smartphones. This is for participating 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 the 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/> )

**IMPORTANT:**

All course materials (syllabus, PPTs, assignments, rubrics…etc.) will be available in Canvas. Check the Canvas site weekly for announcements, assignments, and information about the class.

**University COVID-19 Pandemic Policies**

**Zoom policy** - When we meet on Zoom, your attendance, attention, and participation are expected. Zoom participation requires you to keep your video on and your microphone muted when you are not speaking. Although you may be participating from your domicile, our Zoom meetings are professional interactions. You should dress and behave as you would in a normal F2F classroom. To the extent possible, please minimize distractions in the background. I reserve the right to dismiss anyone from a Zoom meeting whose environment or behavior is distracting or problematic. If you have any issues with sharing your video feed, adhering to this policy, or anything else related to your use of Zoom please notify me via email in the first week of class. I’m happy to consider and provide accommodations, but you will need to be in communication with me.

**Attendance** - Your health and safety, and the health and safety of your peers, are my top priorities. If you are experiencing any symptoms of COVID-19, or if you discover that you have been in close contact with others who have symptoms or who have tested positive, you should not attend any in-person classes. You will not be penalized for such an absence nor will you be asked to provide formal documentation from a healthcare provider. My hope is that if you are feeling ill or if you have been exposed to someone with the virus, you will stay home to protect others. I don’t want the need for documentation to discourage you from self-isolating when you are experiencing symptoms.

Please do the following in the event of an illness or COVID-related absence:

* Notify me in advance of your absence if possible
* Keep up with coursework as much as possible
* Participate in class activities and submit assignments electronically as much as possible
* Notify me if you require a modification to the deadline of an assignment or exam

Finally, if remaining in a class and fulfilling the necessary requirements becomes impossible due to illness or other COVID-related issues, please let me know as soon as possible so we can discuss your options

**Face Covering and Physical Distancing on campus** - In response to COVID-19, and in alignment with Auburn University's Presidential directives, and local, state, and national health official guidelines face coverings are required at all times while on campus, except when alone in a private office. "A “face covering” is defined as a “covering that fully covers a person’s nose and mouth, including without limitation, cloth face mask, surgical mask, towels, scarves, and bandanas. If a student has a medical exception to the face covering requirement, please contact the Office of Accessibility to obtain appropriate documentation.

Face coverings are not a substitute for physical distancing. Students shall observe physical distancing guidelines where possible in the classroom, laboratory, studio, creative space setting and in public spaces.

Students should avoid congregating around doorways before or after class sessions. If the instructional space has designated entrance and exit doors students are required to use them. Students should exit the instructional space immediately after the end of instruction to help ensure social distancing and allow for the persons attending the next scheduled class session to enter.

**If we go fully Remote** - In the event that the University is forced to move to fully online instruction, please be assured that the learning goals and outcomes of the course will not change; however, some aspects of the course will change in terms of the mode of delivery, participation, and testing methods. Those details will be shared via a Canvas Announcement within 24 hours of the announcement that we are going remote. Please be prepared for this contingency by ensure that you have access to a computer and Internet.

**Course Description:**

This course is designed to provide students the understanding of statistical methods pertaining to the design and analysis of educational research. Various Multivariate techniques will be presented, including logistic regression, Multivariate Analysis of Variance (MANOVA), Canonical correlation, Discriminate function analysis (DFA), Factor Analysis (EFA and CFA), and Path Analysis. 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 to analyze data and interpret outputs.

**Course Objectives:**

Students will:

* Gain an understanding of multivariate procedures.
* Apply knowledge of multivariate procedures by analyzing research problems and making decisions about the appropriate use of these procedures.
* Apply knowledge of multivariate analyses using SPSS. (Technology)
* Apply knowledge of multivariate procedures by interpreting results of statistical analyses.
* Interpret the results of the analyses in terms of the research hypothesis.

**Course Requirements:**

* Attend all class sessions and participate in class discussions and activities
* Complete all assignments
* Complete a final project.

**Grading and Evaluation Procedures:**

Assignment (100 pts \* 6) 600 pts

 Final Project 100 pts

Total Possible Points 700 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 in 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** | ***630+ points and excellent attendance and participation*** |
| **B** | ***560-629 points and at least good attendance and participation*** |
| **C** | **490~559 points** |
| **D** | **420~489 points** |
| **F** | **<420 points** |

**Course Requirements/Evaluation**

* Learning Methods

Lectures, discussions, readings, class/lab activities, and assignments.

* Student Assessment

 Assignments (6 assignments) 100 points each

 Final Project 100 points

* Class Activities

Class activity is designed to introduce you to the use of SPSS to complete analyses taught in class. 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 do are completing analyses on your own.

* Attendance

Points are not attached to attendance directly. However, excellent class attendance is expected. 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.

* Assignments (100 points each, 600 points in total)
1. Data Screening
2. Logistic Regression
3. Discriminant function analysis
4. MANOVA
5. Exploratory factor analysis and internal consistency reliability
6. Confirmatory factor analysis
* Working Together on Assignments

You may work together on assignments, and are encouraged to do so, unless otherwise instructed. However, you must write up your assignment independently using your own words.

* Final Project (100 points)

Pick **one** from these two options:

***Option #1:*** Select a research article in a journal from your field which uses one of the multivariate statistical methods we discussed in this class. Write short descriptions of the research purpose, list all research questions, and summarize data analysis methods and results for each research question. Provide your assessment of the scope and validity of conclusions. The report should be double spaced and not exceed 7 pages.

***Option #2:*** If you have a dataset, and the questions related to this dataset are in a multivariate setup, write short descriptions of your study related to this dataset and list your research question(s). Specify which multivariate data analysis method(s) you are going to use to answer your research question(s). Analyze the dataset and answer your research question(s). Provide your conclusion to the study. The report should be in APA format and not exceed 7 pages.

**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 in the Canvas at the beginning of each week. You are responsible to check the Canvas every week.
* All assignments need to be uploaded in the Canvas. I will grade your assignments in the Canvas. **You can check your grade and my feedback for each assignment in the Canvas as well.** However, I keep your official grades in my Excel file.
* If you need individual help, you can reach me during the 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***
* Due to the potential incompatibility of word processing programs and formats, and the potential for the transmission of viruses, absolutely no work for the course will be accepted as an E-mail and/or as an E-mail attachment, or on a disk etc. 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 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 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 accommodations, make an appointment with the Program for Students with Disabilities, 1228 Haley Center, 844 2096 (V/TT).

**Tentative Course Content and Schedule**

| **Week** | **Date** | **Topic** | **Reading**  | **Assignment Due** |
| --- | --- | --- | --- | --- |
| 1 | 8/17~8/23 | Syllabus & Introduction | Mertler: Ch 1 |  |
| 2 | 8/24~8/30 | Pre-Analysis Data Screening | Mertler: Ch 3Meyers: Ch 3  | Assignment #1 Data Screening |
| 3 | 8/31~9/6 | Review Correlation, RegressionCanonical Correlation | Mertler: Ch 7Meyers: Ch 4& 5 |  |
| 4 | 9/7~9/13 | Logistic Regression | Mertler: Ch 11Meyers: Ch 6 | Assignment #2 Logistic Regression |
| 5 | 9/13~9/20 | Discriminant Function Analysis | Mertler: Ch 10Meyers: Ch 7 |  |
| 6 | 9/21~9/27 | Discriminant Function Analysis | Mertler: Ch 10Meyers: Ch 7 | Assignment #3 DFA |
| 7 | 9/28~10/4 | Review ANOVAHotelling’s T2 | Mertler: Ch 6Meyers: Ch 8 & 9 |  |
| 8 | 10/5~10/11 | MANOVA/MANCOVA | Mertler: Ch 6Meyers: Ch 10 & 11 | Assignment #4 MANOVA |
| 9 | 10/12~10/18 | Exploratory Factor Analysis | Mertler: Ch 9Meyers: Ch 12 |  |
| 10 | 10/19~10/25 | Exploratory Factor Analysis | Mertler: Ch 9Meyers: Ch 12 | Assignment #5 EFA |
| 11 | 10/26~11/1 | Reliability AnalysisInstrument/measure issues |  |  |
| 12 | 11/2~11/8 | Confirmatory Factor Analysis | Meyers: Ch 13 | Assignment #6 CFA |
| 13 | 11/9~11/15 | Path Analysis | Mertler: Ch 8Meyers: Ch 14 |  |
| 14 | 11/16~11/22 | Final Project Due |
| 15 | 11/23~11/29 | **Happy Thanksgiving!** |  |  |

Mertler, Craig A., & Vannatta, Rachel A. (2016). *Advanced and Multivariate Statistical Methods: Practical Application and Interpretation (6th ed.)*. Pyrczak Publishing, Los Angelas.

Meyers, L. S., Gamst, G., & Guarino, A. J. (2016). *Applied Multivariate Research: Design and Interpretation (3rd ed.)*. Thousand Oaks, CA: Sage Publications, Inc.

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