

ERMA-7300-001 Design and Analysis in Education I

Auburn University, College of Education,

Department of Educational Foundations, Leadership, and Technology

*ERMA-7300-001 Design and Analysis in Education I*

Summer 2025

# Part I: Instructor Information

## Instructor: Ya Mo

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Virtual Office Hours: By appointment; please email to arrange a time.

Office Location: College of Education Building #3340

Contact Instructions: For quickest response, I prefer that you contact me through email. I will respond to email within 24 hours, except on weekends and holidays. Emails received after 5 p.m. on Friday will be replied to on the following Monday.

*For assistance with technical problems in Canvas, please contact Biggio Tech, Bighelp@auburn.edu, or consult* [*Canvas Student Guide*](https://community.canvaslms.com/t5/Student-Guide/tkb-p/student)*.* For other technology-related questions or problems, please contact *IT Service Desk*, [*itservicedesk@auburn.edu*](mailto:itservicedesk@auburn.edu), or *334-844-4944*.

# Part 2: Course Information

## Course Format

This course will be conducted in-person. Assignments will be submitted through the Auburn University [Canvas](https://auburn.instructure.com/courses/1659250) course site. This course consists of weekly readings, practice tasks, performance tasks, and research projects. Each student must complete assignments and all other course requirements by scheduled deadlines. Due dates occur on **Wednesday** and **Sunday** each week at 11:00 p.m. **Central Time**.

## Course Description

## In this course, we will review basic statistical theory and then move on to the analysis of variance, including t-tests, between and within subjects ANOVA, and mixed ANOVAs. We will emphasize conceptual understanding in this course, not computations. We will use SPSS for all analyses and work with this software in class.

## Course Learning Objectives

Upon successful completion of this course you will be able to:

1. Describe different models associated with different statistical procedures.
2. Evaluate the assumptions made in order to use a particular statistical model.
3. State research hypotheses.
4. Create the data structure for the various statistical procedures.
5. Select the appropriate statistical procedure for a given research design.
6. Draw conclusions based on the results of statistical tests.

# Part 3. Instructional Materials

## Required Course Texts, Materials, and Resources

The material listed here is required by the first week of class unless stated otherwise.

Strunk, K. K. & Mwavita, M. (2020). *Design and Analysis in Educational Research: ANOVA Designs in SPSS*. Routledge.

ISBN 9781138361164

## Recommended Materials and Resources

Students are encouraged to use/explore the following materials. These materials are suggested but not required.

1. Library LibGuide (https://libguides.auburn.edu/)
2. Electronic databases
3. Professional Association membership
4. Miller Writing Center (https://auburn.edu/academic/provost/university-writing/miller-writing-center/)
5. eTutoring

# Part 4. Course Requirements

## Class Participation

## The amount of learning you get out of this course will depend to a large extent on your preparation and participation. I hope you actively participate in this course because it is the best way to engage you in learning.

## Time Required

Please be aware that time estimates for each lesson, assignment, and week are estimates only. The actual time you spend to complete the course activities will vary depending on how quickly you read and your statistical knowledge background. Organize your time in a way that allows you to thoughtfully and thoroughly complete readings and assignments. According to [University Credit Hour Policy](https://auburnpub.cfmnetwork.com/B.aspx?BookId=12563&PageId=462074&Search=credit%20hour%20policy), this 3-credit course will require you to spend, on average, 9-10.5 hours of coursework each class session. A suggested weekly schedule to divide your time is provided in each class on Canvas.

## Course Modules and Activities

When you initially log in to your Canvas course, read any new announcements from the instructor. To begin work on each week’s classes, select the **Modules** link from the course’s main menu and use the numbered items to guide you through the learning activities.

This is a 6-week course. Each class will provide a variety of instructional activities. These have been designed to help you meet the course learning objectives, as well as develop the foundational knowledge, critical thinking, and communication skills associated with this subject. If you do not understand the instructions or due dates for an assignment, please email your instructor. Time estimates are provided to help you gauge the effort involved and manage your schedule more effectively.

Classes will contain a variety of weekly activities for you to complete, including:

**Individual Study**

* ***Readings***

Listed within each module along with instructional guidance. All readings are from the required text listed above. Reading time estimates do not include time to take notes or reread challenging material. You may wish to adjust your study plan accordingly.

## Major Assignments and Projects

Detailed instructions, resources, rubrics or other grading criteria, and time allocations to complete these assignments and projects are provided in their respective learning activity folders on the Canvas course site.

* **Performance Tasks worksheet due on Wednesday at 11:00 p.m. CT on Canvas except for the first week**

Performance Tasks will be graded on accuracy.

* **Research Projects due on Sunday at 11:00 p.m. CT on Canvas**

**Each project is worth 8 points. Criteria for evaluating projects:**

Briefly introduced research question and stated the hypotheses to be evaluated. 2 points

Provided the sample data (the actual numbers you worked with). 2 points

Statistically evaluated the hypotheses (provided the computer output) 2 points

Stated conclusions based on statistical analysis 2 points

For each of these, the scoring system is as follows:

2 points = excellent work, 1 point = something is not quite right, 0 points = something is missing

Project 1: Independent Samples T-Test

Design an experiment to test some treatment (you should include two groups in your experiment). State your hypotheses. Provide (make up) data for the groups in your experiment. THESE DATA SHOULD LEAD TO A REJECTION OF THE NULL HYPOTHESIS. Statistically test your hypotheses. Draw conclusion(s) based on your statistical tests.

Project 2: One-way Analysis of Variance

Design an experiment to test some treatment (you should include three or more groups in your experiment). State your hypotheses. Provide (make up) data for the groups in your experiment. THESE DATA SHOULD LEAD TO A REJECTION OF THE NULL HYPOTHESIS. Statistically test your hypotheses. Draw conclusion(s) based on your statistical tests. Conduct planned contrasts to identify which groups are significantly different based on your hypotheses. Draw conclusion(s) based on your statistical tests. What was the effect size of the ANOVA and the effect sizes of the contrasts?

Project 3: Factorial Analysis of Variance—Fixed-Effects Model

Design an experiment that uses a factorial design. Provide (make up) data for the groups in your experiment. THESE DATA SHOULD LEAD TO A SIGNIFICANT INTERACTION. Statistically test your hypotheses. Conduct simple effects analysis for the significant interaction. Draw conclusion(s) based on your statistical tests and effect size calculations.

Project 4: Paired Samples T-Test

Design an experiment to test some treatment (you should include only one group in your experiment). State your hypotheses. Provide (make up) data for the group in your experiment. THESE DATA SHOULD LEAD TO A REJECTION OF THE NULL HYPOTHESIS. Statistically test your hypotheses. Draw conclusion(s) based on your statistical tests.

Project 5: Within-Subjects Analysis of Variance

Design an experiment that uses a within-subjects design (a repeated-measures factor). Provide (make up) data for the groups in your experiment. THESE DATA SHOULD LEAD TO A REJECTION OF THE NULL HYPOTHESIS. Statistically test your hypotheses. Conduct all appropriate follow-up analyses. Draw conclusion(s) based on your statistical tests.

## Grading Information

I will do my best to provide clear expectations and grading criteria for your assignments. I encourage you to view grading rubrics before assignment submission, confirm an assignment has been submitted, and view all of your scores and accompanying comments on graded tests and assignments by accessing **Grades** in the main course menu. Learn more about **Grades** from [Canvas Help Page](https://community.canvaslms.com/t5/Student-Guide/tkb-p/student#Grades).

Grades in this course will be based on a weighted grading system.

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| --- | --- |
| **Graded Activity or Deliverable** | **Weight %** |
| Performance Tasks | 50% |
| Research Projects | 50% |

Final letter grades will be based on the following scale:

|  |  |
| --- | --- |
| **Percentage** | **Letter Grade** |
| 90-100% | A |
| 80-89% | B |
| 70-79% | C |
| 60-69% | D |
| 0-59% | F |

# Part 5. Course Schedule

***Note:*** *The instructor reserves the right to change the syllabus and schedule if warranted and/or if unexpected situations arise.*

The schedule below contains major events only. Detailed content can be found in each module on Canvas.

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| --- | --- | --- | --- |
| **Date** | **Class** | **Theme/Topic/LO** | **Assigned Readings and Due Dates of Major Components** |
| PRE-CLASS MODULE | 01 | Course Overview, and Basic Issues in Quantitative Educational Research and Research Design | * Chapter 1 and Chapter 2 of our textbook   **IMPORTANT: PLEASE COMPLETE THIS MODULE BEFORE PROCEEDING TO CLASS 02** |
| 05/19  -  05/21 | 02 | Basic Educational Statistics & Null Hypothesis Significance Testing | * Chapter 3 and Chapter 4 of our textbook * Class 02 Performance Tasks due on **May 21** |
| 05/22  -  05/25 | 03 | Comparing a Single Sample to the Population Using the One-Sample Z-Test and One-Sample T-Test | * Chapter 5 of our textbook * Class 03 Performance Tasks due on **May 25** |

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| --- | --- |
| **05/26** | **Memorial Day (No Class)** |

|  |  |  |  |
| --- | --- | --- | --- |
| 05/27  -  05/28 | 04 | Comparing Two Sample Means—The Independent Samples T-Test | * Chapter 6 of our textbook * Class 04 Performance Tasks due on **May 28** |
| 05/29  -  06/01 | 05 | Independent Samples T-Test Case studies | * Chapter 7 of our textbook * Research Project #1 due on **June 1** |
| 06/02  -  06/04 | 06 | Comparing More Than Two Sample Means—  The one-way ANOVA | * Chapter 8 of our textbook * Class 06 Performance Tasks due on **June 4** |
| 06/05  -  06/08 | 07 | One-Way ANOVA Case Studies | * Chapter 9 of our textbook * Research Project #2 due on **June 8** |
| 06/09  -  06/11 | 08 | Comparing Means across Two Independent Variables—The Factorial ANOVA | * Chapter 10 of our textbook * Class 08 Performance Tasks due on **June 11** |
| 06/12  -  06/15 | 09 | Factorial ANOVA Case Studies | * Chapter 11 of our textbook * Research Project #3 due on **June 15** |
| 06/16  -  06/18 | 10 | Comparing Two Within-Subjects Scores Using the Paired Samples T-Test | * Chapter 12 of our textbook * Class 10 Performance Tasks due on **June 18** |

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| --- | --- |
| **06/19** | **Juneteenth Holiday (No Class)** |

|  |  |  |  |
| --- | --- | --- | --- |
| 06/20  -  06/22 | 11 | Paired Samples T-Test Case Studies  **(This class session will be conducted asynchronously online)** | * Chapter 13 of our textbook * Research Project #4 due on **June 22** |
| 06/23  -  06/25 | 12 | Comparing More Than Two Points from within the Same Sample—The Within-Subjects ANOVA **(This class session will be conducted asynchronously online)** | * Chapter 14 of our textbook * Class 12 Performance Tasks due on **June 25** |
| 06/26  -  06/29 | 13 | Within-Subjects ANOVA Case Studies **(This class session will be conducted asynchronously online)** | * Chapter 15 of our textbook * Research Project #5 due on **June 29** |
| ADVANCED MODULE 1 | 14 | Mixed Between- and Within-Subjects Designs Using the Mixed ANOVA | * Chapter 16 of our textbook   **NOTE:** This module will not be covered in class; it is intended for your independent study. |
| ADVANCED MODULE 2 | 15 | Mixed ANOVA Case Studies | * Chapter 17 of our textbook   **NOTE:** This module will not be covered in class; it is intended for your independent study. |

# Part 6. Student Expectations/Responsibilities

#### Academic Integrity

Upholding academic integrity in all work provides you with the opportunity to fully engage with the material being investigated and assert your evidence-based findings. Behaving with integrity and honesty is a hallmark of an Auburn University graduate, demonstrating the commitment to learning and preparation necessary for a successful future. When you receive your degree, the University will indicate that you have engaged with academic work that is representative of your own efforts and completed your work with integrity and honesty.

All work you submit must represent your own ideas and efforts or be cited, including any material you wrote for another course; when your work does not, it is academic dishonesty. All portions of the Auburn University Student Academic Honesty code (Title XII) found in the [Student Policy eHandbook](https://nam11.safelinks.protection.outlook.com/?url=https%3A%2F%2Fauburnpub.cfmnetwork.com%2FB.aspx%3FBookId%3D12839&data=05%7C02%7Cyzm0043%40auburn.edu%7C0dfe2044e77c4f72e8df08dcbe2d41aa%7Cccb6deedbd294b388979d72780f62d3b%7C0%7C0%7C638594348790457457%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C0%7C%7C%7C&sdata=FQEYEPTU0kdC%2BRkWSDvK%2B%2Fcb%2B86q7Ebq4WZQmOZspNM%3D&reserved=0) will apply to this class. All academic honesty violations or alleged violations of the SGA Code of Laws will be reported to the Office of the Provost, which will then refer the case to the Academic Honesty Committee.

## Communicating with Your Instructor

If you have a conflict and/or will be unavailable to participate in a timely manner during a particular week, please let me know by sending an email in advance. Contact me by email to ask questions, give status reports, or request 1:1 assistance if needed. You are encouraged to ask questions immediately.

The turnaround time for grading assignments will generally be three days. I will use rubrics and other Canvas tools to comment on your assignments and provide feedback. If you notice any problems in the course or seek clarification on an assignment, send me an email. If you need technical assistance, please contact Biggio Tech or IT Service Desk. Office Hours are most successful when we find a mutually agreeable meeting time. If you need help with the course, please do not hesitate to set up appointments with me.

# Part 7. Course Expectations and Policies

## Late Work Policy

Your work is late when it is submitted anytime after the published deadline. It is always best to submit work on time, but I understand that sometimes extenuating circumstances make this difficult. If you have a conflict and cannot submit your work in a timely manner during a particular week, please send me an email in advance to make arrangements. **My policy on late work is 12 hours**. After 12 hours, there are penalties for turning in homework after the due dates:

12+ hours—1 day late: 10% off

2 days late: 25% off

3+ days late: 50% off

# Part 8. Additional Syllabus Policies and Procedures

The Auburn University Classroom Behavior Policy is strictly followed in the course; please refer to the [Student Policy eHandbook](https://nam11.safelinks.protection.outlook.com/?url=https%3A%2F%2Fauburnpub.cfmnetwork.com%2FB.aspx%3FBookId%3D12839&data=05%7C02%7Cyzm0043%40auburn.edu%7C0dfe2044e77c4f72e8df08dcbe2d41aa%7Cccb6deedbd294b388979d72780f62d3b%7C0%7C0%7C638594348790466976%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C0%7C%7C%7C&sdata=0Lk0lUIEgW9ySLg31dxiJj4CHFwuNAWU2sOa8I5NID4%3D&reserved=0) for details of this policy.

Students who need accommodations should submit their approved accommodations through the AIM Student Portal on AU Access and follow-up with the instructor about an appointment. It is important for the student to complete these steps as soon as possible; accommodations are not retroactive. Students who have not established accommodations through the Office of Accessibility, but need accommodations, should contact the Office of Accessibility at: [ACCESSIBILITY@auburn.edu](mailto:ACCESSIBILITY@auburn.edu) or (334) 844-2096 (V/TT). The Office of Accessibility is located in Haley Center 1228.