COURSE SYLLABUS

Course Prefix/Number: STA 6246

Course Title: DESIGN AND ANALYSIS OF EXPERIMENTS

Course Credit Hours: 3

Instructor Name and Contact Information: Dr. Raid Amin

Email: ramin@uwf.edu

Office: Bldg. 4, Room 336

Tel: Ext. 3014

Prerequisites or Co-Requisites: Each student must have successfully completed at least one of the following courses within the past five years: STA5206, STA5166, STA4207, STA5176 or equivalent statistics course(s)

Course Description:

This course provides a first coverage of the main concepts of experimental design and the associated analysis of variance models. It introduces different types of experimental designs to students from all types of disciplines. Statistical methods useful in design and analysis of experiments in physical, biological, and social sciences. The course furthers concepts in design and analysis of planned experiments with emphasis on confounding and fractional replications of factorial experiments.

Student Learning Outcomes:

Upon completion of the course the student will:

- Demonstrate the ability to understand different types of experimental design.
- Demonstrate the ability to understand the analysis of variance for the different types of designs.
• Demonstrate the ability to draw statistical conclusions based on computer output.
• Demonstrate the ability to design experiments and analyze the data for real problems.
• Demonstrate the ability to use the statistical software SAS to solve statistical problems.
• Demonstrate the ability to collaborate with other researchers to solve real problems.

**Topics Covered:**

Completely randomized design (CRD), Randomized complete block design (RCBD), Latin square designs, Factorial designs, Fractional factorial designs, Split plot designs, and Nested designs (compared to Cross-over designs), Repeated Measures designs.

**Text book:**

Title: Design and Analysis of Experiments, 7\textsuperscript{th} Edition, by Douglas C. Montgomery, John Wiley and Sons ISBN 0-47-012-8666

**Grading / Evaluation:**

Exam 1 ........................................ (20%)  
Exam 2 ........................................ (20%)  
Final Exam ................................. (30%)  
Homework .................................. (20%)  
Project ..................................... (10%)  

Grading scale: A (92-100%), A- (90-92%), B+(87-90%), B (82-87%), B- (80-82%), C+(77–80%), C (72-77%), C- (70-72%), D+ (67-70%), D (62-67%), D- (60-62%), F (below 60).

**Distance Students:** The course will be taught via Elluminate Live!,

• Attendance is **highly recommended** for each lecture. Students should be logged on and they must participate in as many lectures as possible.
• **Exams.** The exams are emailed to your proctors at given times of the semester, and you will be given a specific time to complete your exam which your proctor will email me back when completed. You will take your exams at a teaching center (or high school principal office or at a military base to proctor the comprehensive final exam. The final exam will be an in-class, closed book exam in which a simple one-page formula sheet is allowed. No examples or solutions are allowed on the formula sheet. The final exam is comprehensive and is designed to reflect any improvements in the students’ performances. Distance students take all exams proctored, or if they want to, take the exams at UWF.

Exam 1: proctored (there may exist a fee (around $40))

Exam 2: proctored (there may exist a fee (around $40))

Final Exam: proctored. (there may exist a fee (around $40))

• **Online discussions.** Students are highly encouraged to participate in any online discussions. You are welcome also to discuss the lessons amongst yourselves by using the threaded discussions, chat rooms, or email.

**Honor Policy :**

Students are encouraged to discuss the course material with each other, but no help should be given or received for any graded assignments or exams.

**Special Technology Utilized by Students:**

1) All homework and the project are to be completed with the Statistical Analysis System (SAS).
I will port on e-learning handouts and program(s) that you may need for your homework, and I will use a computer in class to demonstrate how to use SAS, and how to read outputs from
SAS. Then you are required at least to be able to submit similar SAS programs on your own in order to finish your homework. Get as much practice as possible with SAS. SAS can be accessed via e-desktop.

2) The use of a scientific calculator with no graphic tools or internal programs for analysis of variance is allowed during exams and the final.

**Expectations for Academic Conduct/Plagiarism Policy:**

As members of the University of West Florida, we commit ourselves to honesty. As we strive for excellence in performance, integrity-personal and institutional-is our most precious asset. Honesty in our academic work is vital, and we will not knowingly act in ways which erode that integrity. Accordingly, we pledge not to cheat, nor to tolerate cheating, nor to plagiarize the work of others. We pledge to share community resources in ways that are responsible and that comply with established policies of fairness. Cooperation and competition are means to high achievement and are encouraged. Indeed, cooperation is expected unless our directive is to individual performance. We will compete constructively and professionally for the purpose of stimulating high performance standards. Finally, we accept adherence to this set of expectations for academic conduct as a condition of membership in the UWF academic community.

**Assistance:**

Students with special needs who require specific examination-related or other course-related accommodations should contact Barbara Fitzpatrick, Director of Disabled Student Services (DSS), dss@uwf.edu, (850) 474-2387. DSS will provide the student with a letter for the instructor that will specify any recommended accommodations.

**Meeting time and office hours**

**Meeting Time:** MW 5:30pm-6:45pm

**Meeting Place:** The new SSE Building (4), Room 305

**Office Hours:** will be announced
**Material:**

1. Concepts (Chapter 1)

2. Completely randomized design (Chapter 3)

3. Randomized complete block designs (RCBD) (Chapter 4.1)

4. Balanced incomplete block design (Chapter 4.4)

5. Latin square design (Chapter 4.2)

6. Graeco-Latin square design (Chapter 4.3)

7. Factorial design (Chapter 5, Chapter 6)

8. Introduction to fractional factorial design (Chapter 8)

9. Introduction to regression models (Chapter 10)

10. Introduction to random effect models: nested and split-plot designs (Chapters 13 and 14).

**Homework:**

There will be assignments given through the semester. Each assignment will be posted on the course web page, which contains the assigned problems and the due dates. You must turn in your homework on time.

**Project:**

You will work on a project in groups. Each group is composed of two students. I will later on explain how to go about doing the project. At the end of the semester, each project is presented in class. Every group member needs take part in the presentation. Each group turns in a project report. It can be in slides, or a detailed report. Either way, you need to describe the design of the experiment, the model you fit, the analysis of the
data, and your conclusion and discussion. The slides or report needs to be neatly typed and well organized.

**Attendance:** Attendance is strongly encouraged.

**Withdrawal:** Deadline for automatic withdrawal with a “W” grade is given in the university catalog. No late W’s are assigned.

**Make-up exams:** There will be no make-up exams given for this course. Discuss with me any scheduling problems very early in the semester and definitely before exam days. If a student is excused from a term exam, then the final exam will have more weight for this student. For example, each term exam counts for 20% of the final grade. If a student is excused from this exam, then the final exam for this student would count for 20%+30%=50% of the final grade, i.e. the weight of the term exam is added toward the weight of the final.

**WEATHER EMERGENCY INFORMATION**

In the case of severe weather or other emergency, the campus might be closed and classes cancelled. Official closures and delays are announced on the UWF website and broadcast on WUWF-FM.

**Weather Emergency Information**

- WUWF-FM (88.1MHz) is the official information source for the university. Any pertinent information regarding closings, cancellations, and the re-opening of campus will be broadcast.
- In the event that hurricane preparation procedures are initiated, the UWF Home Web Page and Argus will both provide current information regarding hurricane preparation procedures, the status of classes and the closing of the university.

Emergency plans for the University of West Florida related to inclement weather are available on the following UWF web pages:
Information about hurricane preparedness plans is available on the UWF web site:

http://uwfemergency.org/hurricaneprep.cfm

Information about other emergency procedures is available on the UWF web site:

http://uwfemergency.org/

- All exams will be taken proctored. I will explain to you in detail what this means.
  
  (a) You choose an educational unit (college, university, military educational unit, high school principal’s office) to proctor your exams.
  (b) The proctor will fill out a UWF Proctor Form, and you will submit to me the signed form in a timely fashion. There will be a drop box in e-learning for such filled proctor form.
  (c) I will email your proctors the exam a day before it is given.
  (d) The exam dates will be fixed for one day on which all students will take the exam.
  (e) The proctor will scan your completed exam, and then email me the scanned exam.

Frequently Asked Questions

- What does a “proctored exam” mean? ➔ The exam will be taken at an approved educational center that you choose, and you will be proctored (overlooked) as you take the exam. There may be a fee included, depending on the center doing the proctoring. You must submit to the appropriate drop box on e-learning the proctor information. UWF has a special form for proctor information with guidelines.
- May I use my relative or spouse as my proctor for exams? ➔ No, this would be unacceptable. Always start by looking for a junior college close to where you live.
- I am an officer in the US military. How would I take proctored exams? ➔ A higher ranked officer may be used as your proctor. Many military bases have educational centers that can be used for proctoring.
- I am stationed in Japan at a U.S. military base. The time difference is considerable. How will I be able to attend lecture live and when will I take my proctored exams? ➔ I am flexible in such situations, and we will work out how you will go through this online course. Exams can be taken at times that are manageable for you at your local time.
• How will I submit my exams to you? ➔ I will send your proctor the exam in a timely fashion, and she/he will email me back your completed exam after scanning it at the educational center where you will be taking the exam.

• Do I have multiple options when to take the proctored exam? ➔ All exams will be taken on specific days that I will announce in class and on e-learning. There is flexibility at what time on a given day you can take the exam, as long as the proctor will be able to email me back your scanned completed exam on the same day.

• I travel a lot, and I need to take my exams on weekends. Is this possible? ➔ No, this is not possible since all students must take the exams on the same day.

• How do I send you my assignments when I complete them? ➔ You will be able to write up each assignment with pencil and paper, followed by scanning it to a single PDF file with maximum file size 2MB. Then you will submit that (single PDF) file to the appropriate drop box on e-learning.

• Can you give me some tips on how to scan the assignments? ➔ There will be a file posted on e-learning on how to scan assignments.

• Must I participate in e-learning discussions? ➔ Your active participation on e-learning with questions and answers and tips for assignments is extremely valuable to all students and to your better student learning of the course material.

• May I send you emails on the course material throughout the semester? ➔ I have many students enrolled in my classes each semester, and it is most efficient to limit emails to personal issues that you do not want to post on e-learning. Whatever I address on e-learning will stay posted for an entire semester, and all students will benefit from my input there.

• May I drop the course any time during the semester? ➔ Always check with the announced UWF deadlines for dropping courses without penalties. There is no “late W” assigned by me. It is your responsibility to keep track of deadlines.

• No automatic late withdrawal from this course with a 'W' is possible after the deadline. Refer to the UWF Catalog for details.

**EXPECTATIONS FOR ACADEMIC CONDUCT/PLAGIARISM POLICY:**

Due to the distance learning nature of this course, all requirements must be completed within the time scheduled, unless prior arrangements are made with the instructor. Participation in online forum discussions will be graded using this Discussion Forum Grading Rubric. Your final grade will be determined by the points you accumulate within each category, divided by the total points available within that category. These scores will then be weighted based upon the percentages indicated above to determine your final grade. Online facilities will be provided so students can monitor their own progress.

It is the philosophy of The University of West Florida that academic dishonesty is a completely unacceptable mode of conduct and will not be tolerated in any form. All persons involved in academic dishonesty will be disciplined in accordance with University regulations.
and procedures. Discipline may include suspension or expulsion from the University. Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, and the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts.

In addition, any behavior that interferes with the conduct of a class is classified as disruptive behavior and will not be tolerated. Although not exhaustive, examples of disruptive behavior would include: inappropriate or threatening online postings or e-mails, etc.