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, STA4206, 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; estimation of variance components.

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:**


**Grading / Evaluation:**

Exam 1 ................................. (25%)
Exam 2 ................................. (25%)
Final Exam ............................. (30%)
Homework ............................ (15%)
Project................................. (5%)

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).

**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: TR 4:00pm-5:15pm

Meeting Place: The new SSE Building (4)
Office Hours: MW 9am-10:30am, TR 12:30pm-4pm, and by appointment

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).
11. Repeated Measures Design (Chapter 15.4)

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 mandatory.

Withdrawal: Dead line 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 25% of the final grade. If a student is excused from this exam, then the final exam for this student would count for 25%+30%=55% of the final grade, i.e. the weight of the term exam is added toward the weight of the final.