AGRI 590: Design and Analysis of Experiments

Course Description

This graduate level course in Design and Analysis of Experiments includes an introductions to basic statistical concepts on regression, ANOVA, Chi-square procedure, and single and two factor experimental designs that are being widely used in agriculture research. This course covers single factor experiments; Complete Randomized Design (CRD), Complete Randomized Block Design (CRBD), Latin Square Design, and two factor designs; CRD and CRDB Factorial Design, Split Plot Design, Spilt- Split Plot Design. In addition, multi observational data analysis, mean comparison procedures, and analysis of covariance (ANCOVA) are also discussed in this course.

This course is cohort-based, which means that there is an established start and end date (shown in the detailed class schedule doc).

The major components of the course are included in fifteen lessons (sections) introduced as power point presentations with embedded URLs. In addition, each section is connected with the text book chapters (Introductory statistics, Neil A. Weisss, Adison-Wesley; Statistical procedures for agricultural research, Gomez and Gomez, John Wiley & Sons) as shown in the detailed class schedule document. For each lesson students are assigned an assignment to complete and submit through Black Board@.

It is recommended that students read all power point notes, view embedded URLs, read relevant text book chapters and understand the concepts presented before working on assignments.

There are two exams in this course; the first exam covers sections 1-10 and the second exam covers sections 11-15. The two exams will be served as take home exams offered through Black Board and required to submit by the given date and time.

It is very important students understand that the course materials those are critical to realize how the statistics can be used to solve agricultural problems in the real world context. This course provides fundamental tools and will develop student problem solving skills mainly through the assignments. As a result, this course is beyond simply learning material in the course notes and textbook.

Course Goals

To introduce graduate students to the fundamental concepts and statistical methods necessary to plan, conduct, and interpret effective agriculture experiments.

To enable students select appropriate experimental designs, to perform proper data analyze procedures, and make interpretations.

Course Objectives

1. Students understand the fundamental concepts underlying the analysis of variance.

2. Students appreciate the importance of experimental design in all phases of their research, from initial planning to final analysis and interpretation.

3. Students gain familiarity with the common experimental designs, treatment structures, and error-reduction techniques.

Pre-requisite

AGRI 491. In addition, all graduate students are expected to have thorough knowledge and understanding on basic statistical concept. A brief introduction on some selected statistical concepts is offered by section 1-4 of this course.

Topical outline

- Simple Linear Regression basics, ANOVA basics and Chi-square procedure
- Introduction to agriculture research concepts.
- Singe factor experiments:
  - Complete randomized design (CRD)
  - Complete randomized block design (CRBD
  - Latin Square design
- Mean comparison
  - Pairwise comparison
  - Between group comparison
- Analysis of covariance
- Two factor experiments
  - Factorial experiments CRD and CRBD
  - Split plot design
  - Spilt- Split Plot Design
- Multi Observational data analysis

Course format and student evaluation

This course consists of 15 sections. Each section has one assignment. All assignments are required to submit by the due date and time. The assignments are offered in word format through the Black Board and students are expected to answer on the same document using Microsoft Word© and submit to the instructor via the Black Board. Total grade points earned through the assignments is worth 60% of the final grade of the class.
Each exam will worth 20% of the final grade.

Final grade

Assignments: 60% Two exams: 40% (2 x 20%)

A = 85% or above

B = 75-85%

C = 65-75%

D = 55-65%

F = below 55%

Study material

Study material for each section is presented in three formats

1. Power point presentations

Power point presentations are intended to provide brief introduction to the concepts

2. Videos URLs embedded in the power point presentations.

Video clips embedded in power point presentations will provide further explanations about the concepts discussed. Students are required to view all the video clips embedded as URL links in the power point slides. In order to open and play the embedded URL links; **Right click on the hyperlink** and then activate the **"open hyper link"** option

3. Text books

Sections 1-4 of this course adopts the text book (materials from the book will be provided as course material)
Introductory Statistics,
Neil A. Weisss
Addison-Wesley
ISBN-13: 978-0-321-69133-0

For the sections 5-12, students are required to have the following text book
Statistical Procedures for Agricultural Research.
Kwanchai A. Gomez and Arturo A. Gomez
John Wiley & Sons, NY.
ISBN 0-471-87092-7
Text book chapters would provide further information about the concepts and the data analysis procedures.

The detailed class schedule document and the title slide of each power point presentations provide students directions to the relevant text book chapters and pages associated with each section and assignment.

In order to comprehend the concepts of experimental design principles and analysis procedures, students are required to study and understand the information given in all study materials (power point presentations/ URLs embedded in the power point/additional notes for sections/ book chapters)

COMMUNICATION:

Blackboard announcement would be the mean of communicating students during this course. All blackboard announcements will also be sent via e mail. Therefore, please watch your email, or blackboard announcements, for course communication

Students can communicate the instructor via email: annesly.netthisinghe@wku.edu.

ASSIGNMENT/EXAM SUBMISSION

Students are expected to complete assignments according to the course schedule due dates. If circumstances beyond your control arise, contact instructor as soon as possible. No assignment will be accepted for grading after the due date and time.

WITHDRAWAL POLICY: Any change in registration status must be done officially through the Registrar's Office. If you elect to withdraw from the course prior to the specified drop date, you must submit the necessary forms with the registrar's Office. Failure to comply with this procedure will result in a grade of "F".

ACADEMIC OFFENSES: The maintenance of academic integrity is of fundamental importance to the university. No student shall receive or give assistance not authorized by the instructor in taking an examination or completing assignments which is submitted for purpose of grade determination.