Introduction to Experimental Design and Analysis

November - December, 2014

An experimental design statistics course offered by the American Society of Agronomy.

Instructor Dr. Carla Goad Associate Professor of Statistics Department of Statistics, Oklahoma State University Phone: 405-744-5684 Email: carla.goad@okstate.edu

Class Schedule/Time

Mondays from November 10 – December 1, 2014 2:00 to 4:00 pm Eastern/ 1:00 to 3:00 pm Central/12:00 Noon to 2:00 pm Mountain/11:00 am to 1:00 pm Pacific

Communication Requirements

The course is delivered live via the Web using GoToMeeting software. All sessions are also recorded. *An email address and high-speed internet access are required*. GoToMeeting Systems Requirements: http://support.citrixonline.com/GoToMeeting/help_files/GTM010003#What

Student Directory Information Student name, city/state/country, phone, and email will be included in a listing on the course website and will be available *only* to other Introduction to Statistics students and those administering the course. Students can opt out of this listing when registering for the course.

Use of Class Materials The lecture notes, class recordings, worksheets, and other materials developed specifically for this class are for the educational purposes and use of students registered for this class. They are not to be copied, forwarded or shared in any way with anyone for any other use without the permission of the instructor.

Class Web Site Students registered for the class will have access to the class web site where the following will be posted:

Lecture video recordings (audio with lecture slides) Lecture notes in PDF format.

Access to the class web site will begin by November 10, 2014 and end one month following the last class period, ending January 1, 2015.

Course Description In this course students will review ANOVA concepts and learn more experimental design concepts including factorial experiments, blocked designs, and split unit experiments. Students will learn to identify treatment structures, design structures and mixed models, and perform analyses of data from experimental designs using SAS and interpret the results.

Course Instructor

Carla Goad is an Associate Professor of Statistics in the Department of Statistics at Oklahoma State University. She has over twenty years of experience teaching applied statistical applications and SAS programming. Since 1994 she has served as a statistical consultant for the Oklahoma Agricultural Experiment Station working with researchers in plant, animal, and food sciences. In addition to her consulting projects her interests include topics in design of experiments and online education.

Syllabus

	Session/Topics
Nov 10	Experimental Design Terminology
	Analysis of Variance Notation and Models: CRD
	Power Analysis
	Post hoc Analyses: Contrasts
	Simultaneous Contrasts
	SAS/GLM and SAS/GLMPOWER Examples
Nov 17	Multiple Comparisons (Post-Hoc Comparisons)
	LSD, Tukey, Dunnett
	SAS/GLM and ODS Graphics Examples
Nov 24	Introduction to Factorial Experiments
	ANOVA for a Two-way Factorial
	Two-way Factorial: Contrasts and Comparisons
	Power Analysis
	Three-way Factorial
	SAS/GLM and SAS/GLMPOWER Examples
Dec 1	Introduction to Random and Fixed Effects Models
	Fixed, Random, and Mixed Models
	Randomized Complete Block Designs
	Post hoc Analyses for RCBD's
	Factorial Treatment Structure in a RCBD
	Split Plot Experiments
	SAS/MIXED and SAS/GLIMMIX Examples