STA 4211 Design of Experiments
Fall 2025

Instructor: Beth Johnson
Email: ejohnson5@ufl.edu
Office: 116-A Griffin-Floyd Hall
Telephone: 352-273-1897

Class Meeting Times and Locations:

- Tuesday Time: 3:00 - 4:55pm Place: CSC E221
- Thursday Time: 3:00 - 3:50pm Place: AND 0134

Instructor Office Hours: W 4:00 - 5:30pm and R 11:30am - 1:00pm or by appointment

Graduate Teaching Assistant: Anh Nguyen
GTA Office Hours/Location: M 10am-12pm and W 10am – 12pm/ Location TBD

UF Course Catalog Description: The basic principles of experimental design: analysis of variance for experiments with a single factor; randomized blocks and Latin square designs: multiple comparison of treatment means; factorial and nested designs; analysis of covariance; response surface methodology. **Prerequisite:** STA 4210.

Course Objectives:
This course introduces the design and analysis of statistical experiments. Experimental design techniques are used in a wide variety of academic, industrial, and scientific areas. We will cover widely used designs and discuss practical and computational issues regarding their analysis and interpretations.

Learning Outcomes: by the end of the course students should be able to:

- State the benefits and limitations of common experimental designs;
- Apply sound principles of experimental design, including the use of orthogonality, randomization, blocking, and replication;
- Plan a practical experimental design, including the use of parsimonious methods when experimental resources are limited;
- Analyze factorial experiments using exploratory data analysis, informal and formal inferential methods; and
- Communicate experimental designs to technical and non-technical audiences.

Required Course Materials:

- Textbook: Oehlert, G. (2010). *A First Course in Design and Analysis of Experiments*, *freely available* as PDF. Thanks Prof. Oehlert! The textbook is available on the Canvas course page and here is the link to download: http://users.stat.umn.edu/~gary/book/fcdae.pdf

- Scientific or Graphing Calculator: You will need a calculator capable of basic arithmetic operations and taking square roots will be needed for in-class exams. Internet-enabled electronic devices, such as cell phones or tablets, cannot be used as calculators during exams.

- Web-enabled device: You will need some type of web-enabled device such as a laptop, smartphone, or tablet to access Canvas notes and complete assignments.

- Course Computer Programs and Applets: Some assignments will require you to use statistical applets or the statistical software package R to analyze and visualize data

Course Resources:

The Canvas, https://lss.at.ufl.edu/, course website will be used extensively throughout the semester to post notes and make course announcements. You must log on using your Gatorlink username and password and access the course webpages from there. Important information about the course will be posted here including this syllabus, announcements, notes, assignments and your grades throughout the semester and computer output to supplement the examples done in class.

Study Approach:

You are to read the posted course notes and the corresponding textbook sections before class to familiarize yourself with the material and its organization. The course notes will be posted on Canvas. Next, you should carefully re-read the course notes and textbook sections after each lecture to increase understanding. Remember to use the notes to help you to complete all assignments.

Help:

Remember to ask for help! You can come by during my scheduled office hours or make an appointment to see me. I can also answer some questions via email. *Emails received during the working week will be answered within 24 hours; however, emails received over the weekend may not be answered until Monday morning.*

- Always use GatorMail for email. I do not check Canvas inbox regularly.
- **Always put STA 4211 in the subject line of your email**. I teach multiple courses and use course numbers to search for emails from students.

Course Assignments:

Your final course grade will be based on a combination of assessment types including homework, exams, in-class activities, a class project, and an ALC exam. Due dates will be posted on the Canvas course page and announced in class.

Homework: There will be 3 assignments. You will have at least one week to upload your solutions from the time the homework questions are posted on Canvas.

Exams: There will be 4 in-class exams. For each exam, you can bring one hand–written 8.5" by 11" one-sided sheet of paper with formulas and/or notes.

In-Class Activities: There will be several "In-Class Data Analysis" activities. These will be graded on a participation/attendance basis.

ALC Exam*: Around the second week of classes a 20-point Academic Learning Compact (ALC) Exam with 20 multiple choice questions, testing knowledge of fundamental concepts in applied statistics will be given. Students are required to score at least 15 to pursue the STA major.

Final Project and Presentation*: A statistical data analysis project will be prepared, along with a 10-minute presentation. More information will be provided on Canvas.

Missed Exams: If an exam is missed, you must inform me on, or soon after, the date of the exam. Documentation must be provided. No early exams will be given under any circumstances.

Late Homework: Will not be accepted and will receive a grade of 0 unless extenuating circumstances are documented.

Grading Scheme:

Exam #1	15%
Exam #2	15%
Exam #3	15%
Exam #4	22%
Homework	15%
In-class activities	4%
Project Report and Presentation*	10%
ALC exam*	4%

Numeric Score	Letter Grade
92-100	A
89-91	A-
86-88	B+
82-85	B
79-81	B-
76-78	C+
69-75	C
66-68	C-
60-65	D
0-59	E

Your final overall numeric score is rounded to the nearest integer. So, for example, if your average is 76.4 your grade will be 76.
If your grade is 76.5, your grade will be 77. Letter grades will be assigned according to the table shown. The instructor reserves the right to adjust the percentages if needed.

*Requirements of the Department of Statistics for this course. These comprise the three (3) Student Learning Outcomes (SLO) required for majors. More on these later in the course (which will also be posted on the class website)

Tentative Schedule Fall 2025						
Week	**days**	**Day**	**Date**	**Topic**	**Readings**	**Assignment**
1	1	R	21-Aug	Statistical Prerequisites	Ch 1	
1	2	T	26-Aug	Statistical Prerequisites/Design Vocabulary	Ch 1	
1	3	T	26-Aug	Randomization	Ch 2	
2	4	R	28-Aug	Randomization	Ch 2	
2	5	T	2-Sep	Completely Randomized Designs (CRD)	Ch 3	
2	6	T	2-Sep	1-way ANOVA	Ch 3	
3	7	R	4-Sep	1-way ANOVA	Ch 3	
3	8	T	9-Sep	KW Test	Ch 3	
3	9	T	9-Sep	Practice and Review		HW1 due
4	10	R	11-Sep	Exam 1		
4	11	T	16-Sep	Multiple Comparison	Ch 5	
4	12	T	16-Sep	Multiple Comparison	Ch 5	
5	13	R	18-Sep	Checking Assumptions	Ch 6.3	
5	14	T	23-Sep	Orthogonal Contrasts	Ch 4.3	
5	15	T	23-Sep	Orthogonal Contrasts	Ch 4.3	
6	16	R	25-Sep	Randomized Block	Ch 13.1-13.2	
6	17	T	30-Sep	Randomized Block	Ch 13.1-13.2	
6	18	T	30-Sep	Practice and Review		HW2 due
7	19	R	2-Oct	Exam 2		
7	20	T	7-Oct	Balanced 2-Factor Designs	Ch 8.1-8.6	
7	21	T	7-Oct	Balanced 2-Factor Designs	Ch 8.1-8.6	
8	22	R	9-Oct	Friedman Test	Handout	
8	23	T	14-Oct	Unbalanced 2-Factor Designs (BIB)	Ch 14.1	
8	24	T	14-Oct	Latin Square Designs	Ch 13.3	
9	25	R	16-Oct	Latin Square Designs	Ch 13.3	
9	26	T	21-Oct	Graeco-Latin Squares Designs	Ch 13.4	
9	27	T	21-Oct	Practice and Review		HW3 due
10	28	R	23-Oct	Exam 3		
10	29	T	28-Oct	General Factorial Model	Ch 8.7	Project Proposal
10	30	T	28-Oct	General Factorial Model	Ch 8.7	
11	31	R	30-Oct	Random Effects Models	Ch 11.1-11.5	
11	32	T	4-Nov	Random Effects Models	Ch 11.1-11.5	
11	33	T	4-Nov	Nested and Repeated Measures Designs	12.1-12.3	
12	34	R	6-Nov	2**k Designs	Ch 15	
12		T	11-Nov	Veteran's Day		
12		T	11-Nov	Holiday		
13	35	R	13-Nov	2**k Designs	Ch 15	
13	36	T	18-Nov	Confounding	Ch 15	
13	37	T	18-Nov	Confounding	Ch 15	
14	38	R	20-Nov	Fractional Replication	Ch 15	Project Due*
14		T	25-Nov	Thanksgiving Holiday		
14		T	25-Nov			
15		R	27-Nov			
15	39	T	2-Dec	Review		
15	40	T	2-Dec	Exam 4		

Course Policies

"This course complies with all UF academic policies. For information on those polices and for resources for students, please see this link."

(The direct link is https://syllabus.ufl.edu/syllabus-policy/uf-syllabus-policy-links/.)

Grading Policies:

Requirements for class attendance and make-up exams, assignments, and other work in this course as well as policies regarding absences, religious holidays, illness, and student athletes are consistent with UF Attendance Policies, see link above.

There is no "extra credit" or forgiven grades – you are responsible for all your work done (or left undone).

If you have a question concerning a graded assignment, you should notify me within seven days after a graded assignment is posted to schedule a meeting.

Incompletes are only assigned when extraordinary circumstances (such as an accident, or extended hospitalization), arising after the date for dropping the course, prevent the student from completing the course requirements. Having a failing grade in the course is not a valid reason for requesting an Incomplete. Information on Medical Withdrawal can be found at https://umatter.ufl.edu/ . Information on how to Drop a class can be found in UF's Academic

Additional make-up policy requests:

- Every effort should be made to complete the assignment/exam during the assigned period. Only extreme situations will warrant a make-up. Contact the instructor prior to the exam – or as soon as you realize you will be unable to take the exam at the scheduled time. Each case will be reviewed individually. Valid and detailed documentation is a prerequisite for scheduling a make-up under such extenuating circumstances.
- Every effort will be made to make up any missed exam within a week of the assignment deadline. The student is responsible for attending scheduled make-up. Instructor reserves the right to utilize the UF posted final exam day as a make-up date.
- The UF Religious Holidays Policy is available using the link above.
- Please reference the most recent Academic Calendar for official holidays and drop dates, https://catalog.ufl.edu/UGRD/dates-deadlines/pdfs/

If you have a disability that requires academic accommodation, contact the Disability Resource Center (DRC). The DRC will provide documentation to the students who must then provide this documentation to the instructor when requesting information. You must submit this documentation prior to submitting any assignments for which you are requesting accommodation.

Honor Code on Exams**:** You are required to abide by the University of Florida Student Honor Code. Any violation of the academic integrity expected of you will result in a minimum academic sanction of **a failing grade on the assignment or assessment.** Any alleged violations of the Student Honor Code will result in a referral to Student Conduct and Conflict Resolution. Please review the Student Honor Code and Student Conduct Code at sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/

Classroom Behavior**:** During class students should silence their cellular phones and refrain from eating, drinking, reading newspapers, doing homework, listening to music, excessive talking and all other behaviors that are distracting and disrespectful to the instructor and their fellow students.

Privacy Policy: Student records are confidential. Only information designated "UF directory information" may be released without your written consent. This applies to parents or anyone else who contacts me about your grades.

Faculty Course Evaluations**:** Student feedback is welcomed by the instructor and beneficial to future students in the course. Students are requested to provide feedback on the quality of instruction in this course by completing a brief confidential evaluation towards the end of the semester at https://evaluations.ufl.edu. Summaries of the evaluation results can be found at https://evaluations.ufl.edu/results.

Other University Services:

U Matter, We Care, https://umatter.ufl.edu/ offers care related resources and programs focused on health, safety, and holistic well-being.

Academic Resources:

E-learning technical support: Contact the UF Computing Help Desk at 352-392-4357 or via e-mail at helpdesk@ufl.edu.

Writing Studio: 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing papers.

Student Complaints On-Campus: Visit the Student Honor Code and Student Conduct Code webpage for more information.