STAT 5132/6032
Design and Analysis of Experiments
Spring 2026

Instructor: Dr. Emily L. Kang
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When: WF 9:30 AM – 10:50 AM
Where: Room 270 60WCharl

Office Hours: R 9:30 AM – 10:30 AM Office
F 12:30 PM – 1:30 PM Office
T 3:00 PM – 4:00 PM Zoom
(or by appointment)

Course Objective
This 3-credit course covers the design and analysis of experiments. Topics include basic concepts in experiment design, single and multi-factor designs, and statistical models for analyzing experimental data. Students will learn to plan experiments, perform appropriate statistical analyses, and draw valid conclusions. The course emphasizes selecting suitable experimental designs for specific research questions.

Transferable Skills
In this course students will develop transferable skills applicable to many career settings:

- Critical Thinking: Understand statistical models and experimental design concepts, evaluate statistical arguments, and recognize the importance of statistical reasoning.
- Quantitative Reasoning: Apply statistical methods to analyze data quantitatively and solve real-world problems.
- Natural Sciences: Use statistical methods appropriately to analyze scientific data and draw valid conclusions.

Assumed Background Knowledge
This course is a continuation of (not a substitute for) STAT 4131/6031. Students are not recommended to take this course without having completed STAT 4131/6031. At minimum, you should have taken an introductory statistics course covering probability distributions, sampling distributions, sample mean and variance, hypothesis testing such as Z-tests, t-tests, paired and independent two-sample t-tests. These topics are typically covered in Probability & Statistics I & II (STAT 2027, 3038).

Course Level and Registration
This is a combined undergraduate/graduate course with separate numbers (STAT 5132 for undergraduate, STAT 6032 for graduate).
Important notes for undergraduates:

- To earn undergraduate credit toward an undergraduate degree, register under STAT 5132.
- Undergraduates may register for STAT 6032, but *credits earned may not necessarily count toward an undergraduate degree.*
- Students in STAT 6032 follow the UC graduate grading scale, which does not include C- or D grades. Any performance at these levels results in an F.

- Some programs (e.g., $4+1$) may require graduate-level credit. Check your program's curriculum guide or consult your advisor if unsure about which course number to use.

Textbook
Required: *Design and Analysis of Experiments, 9th edition*, by D. C. Montgomery.
Optional References:

- *A First Course in Design and Analysis of Experiments* by G. W. Oehlert
- *Statistics for Experimenters* by Box, Hunter, and Hunter
- *Analysis of Messy Data* by Milliken and Johnson (2009)
- *Statistical Principles for the Design of Experiments* by Mead, Gilmour, and Mead (2012)
- *SAS for Mixed Models* by Littell, Milliken, Stroup, Wolfinger, and Schabenberger (2006)

Software
`SAS` will be the primary software used in this course. We will use SAS OnDemand for Academics, which you can access at `https://www.sas.com/en_us/software/on-demand-for-academics.html`. This does not require purchasing or installing SAS, but does require internet access.
You may use SAS OnDemand for homework assignments. Be aware of scheduled maintenance times when the system may be unavailable. Homework due dates will not be extended due to SAS OnDemand maintenance.
`JMP` statistical software (`https://www.jmp.com/en/academic`) is also available for use in this course; however, it is not required, and the course materials primarily focus on `SAS`.
Template SAS programs, datasets, and other materials will be posted on Canvas. Other statistical software may be used for homework unless SAS is specifically required. SAS output will be presented in lectures, homework, and exams.

Homework
Homework will be assigned throughout the semester and announced in class and on Canvas. While collaboration and discussion are encouraged, the work you submit must be your own.
Submission: Upload assignments to Gradescope (accessible via Canvas) by the due date. This is the only acceptable submission method. Include the course name (STAT 5132 or 6032) and your name on all homework. Failure to do so may result in lost or ungraded assignments.
Late Policy: No late assignments will be accepted unless there are extreme and documentable circumstances approved by the instructor. To accommodate unexpected emergencies, your *lowest homework score will be dropped*. Save this option for when you truly need it.
Presentation of Solutions: Interpret statistical results and explain them in proper English within the context of the problem. Full credit requires proper interpretation—not just calculations. For coding and data analysis problems, submit both your code and relevant output along with interpretations.
If you have grading questions, first contact the grader. If the issue remains unresolved, then contact the instructor.

Exams
There will be **two midterm exams** and a **two-hour comprehensive final exam**, all held in the regular classroom. All exams are **closed book and closed notes**. The final exam is comprehensive with slight emphasis on post-midterm 2 material. Full credit requires showing work and justification in proper English within the problem context.

Exam Materials: You may bring cheat sheets (8.5" × 11", both sides, any content except photocopies): one sheet for each midterm, two sheets for the final. Bring a calculator (no cell phone calculators). Sharing cheat sheets or calculators during exams is prohibited.
Qualifying Exam Note: The statistics qualifying exam is closed book/notes with no cheat sheets allowed.

Exam Schedule:	
Midterm Exam 1	*[Tentative] Wednesday, February 11, in class*
Midterm Exam 2	*[Tentative] Wednesday, March 25, in class*
Final Exam	Thursday, April 30, 10:15 AM - 12:15 PM (Comprehensive)

No early final exam will be given—plan travel accordingly. Make-up exams require a written medical excuse from a healthcare professional and prior notification to the instructor.

Final Grade
Your final course grade will be based on the following weighting:

Class Participation & Attendance	Homework	Midterm 1	Midterm 2	Final Exam
5%	15%	25%	25%	30%

Letter grades will be assigned according to this scale:

		B+	87–89	C+	77–79	D+	67–69		
A	93–100	B	83–86	C	73–76	D	63–66		
A-	90–92	B-	80–82	C-	70–72	D-	60–62	F	below 60

Attendance
Beginning Fall 2016, Title IV provisions require undergraduate students to demonstrate participation in each course in order to remain eligible for federal financial aid. To meet this requirement, the University and the College of Arts & Sciences have implemented a simple procedure through Canvas. When you access the Canvas site for each of your courses, you will see a link in the left-hand control panel titled "Attendance Verification." Clicking this link will take you to a short question. Submitting your response will serve as verification of your participation.

Email Correspondence
The best way to contact the instructor is via email at `kangel@ucmail.uc.edu`. All course-related email communication must be conducted through your UC email account or Canvas. The instructor will not send messages to external accounts (e.g., Gmail).

Communication Devices
Personal communication devices (e.g., cell phones) must be **turned off or set to vibrate** during class. Please refrain from texting or using devices in a way that disrupts class.

Virtual Office Hours
In addition to in-person office hours, the instructor will hold virtual office hours via Zoom. Students may reserve a time slot by going to *Canvas → Calendar → Find an Appointment.*

Campus Safety Measures
All faculty, staff, instructors, and students are required to follow campus safety measures, which can

be found here: https://www.uc.edu/about/publicsafety.html.

Academic Integrity
Please help maintain an academic environment of mutual respect and fairness. You are expected to produce original and independent work on exams. For homework, discussion is encouraged; however, copying someone else's work and presenting it as your own constitutes plagiarism. All students must submit their own written work in their own words. Academic misconduct **will not** be tolerated. For more information, see: `https://www.artsci.uc.edu/student-experience/academic-forms-and-policies/misconduct-process.html`.

Accessibility Resources
Reasonable accommodations will be provided for students with documented needs. To access these accommodations, students must contact Accessibility Resources as described on their website: `https://www.uc.edu/campus-life/accessibility-resources.html`.

Religious Accommodations
Ohio law and the University's Student Religious Accommodations for Courses Policy 1.3.7 permits a student, upon request, to be absent for reasons of faith or religious or spiritual belief system or participate in organized activities conducted under the auspices of a religious denomination, church, or other religious or spiritual organization and/or to receive alternative accommodations with regard to examinations and other course requirements due to an absence permitted for the above-described reasons. Not later than fourteen days after the first day of instruction in the course, a student should provide the instructor with written notice of the specific dates for which the student requests alternative accommodations. University policy can be found at: `https://www.uc.edu/about/equity-inclusion/equal-opportunity/student-religious-accommodations-for-courses-policy.html`. Additional information about or questions related to the policy can be directed to the Office of Equal Opportunity (OEO).

Drop and Withdraw Dates
The last day to drop without entry to academic record is January 22. The last day to withdraw is April 5.

Holidays
There will be no class on the following days:
Dr. Martin Luther King Jr.'s Birthday: Monday, January 19, 2026
Spring break: Monday – Sunday, March 16 – 22, 2026

Receiving an 'I' for the course:
You cannot receive receive an incomplete for the course unless 70% of the work in the course (especially the attendance) has been completed. Extenuating circumstances will be handled on a case-by-case basis.

Tentative Schedule

Chapter(s)	**Description**	**Time**
2	Overview and Hypothesis Testing	1.5 wk
3,12,14	Completely Randomized Design	2 wks
4	Randomized Block Designs	1.5 wks
4	Latin Square	1.5 wks
4	Balanced Incomplete Block Design	1.5 wks
5	Factorial Designs	1.5 wks
6	2^k Factorial Design	1.5 wks
7	Blocking and Confounding in 2^k Factorial Design	1.5 wk
8	Fractional Factorial Designs	1.5 wk
11	Gaussian Process, Response Surface (optional, if time permits)	1 wk

Note: The instructor reserves the right to change the class syllabus to meet class needs.

STAT 5132 & STAT 6032 (Spring 2026 WF 9:30AM – 10:50 AM)

STAT : _____

I acknowledge that I have read and understand the course syllabus, including all policies and expectations.

Name (Last, First): _____

Major: _____

Signature: _____

Date: _____