

Department of Environmental Health

I. Course Information:

Title: Experimental Design

Course #: BE7089

Credit Hours: 3

Term: Fall 2019

Prerequisites: N/A

II. Instructor Information:

Name: Liang Niu

Office Information: KL 143

Office: (513)558-7221

Email: niulg@ucmail.uc.edu

Office Hours: Thursday 12:00PM - 1:00PM

Communication Policy: Students are encouraged to contact me anytime via email or phone. A response will be given within 36-48 hours except on weekends. Virtual office hours will be held using Adobe Connect (see Bb for more information).

III. Course Materials

No textbook is required. The lecture notes will be self-sufficient.

IV. Course Description:

In this course, we will study the basic principles of design, Completely Randomized Design (CRD), one-way random effects model, two-way design (two-way ANOVA), Randomized Complete Block Design (RCBD), Balanced Incomplete Block Design (BIBD), Latin square design, split-plot design.

V. Student Learning Outcomes:

Upon successful completion of this course, the learner will be able to:	How is this outcome assessed?
1. Construct a public health and biomedical research question and convert it into mathematically sound and statistically testable hypothesis.	Homework and project
2. Analyze and interpret data from various studies including clinical trials, observational studies and public health surveys.	Homework and project
3. Interpret statistical results and findings appropriately and accurately	Homework and project

VI. Instructional Methods (Including Description about Bb):

The course has the Blackboard (Bb) Learning Management System to provide student-centered online learning that will enhance the teaching and learning process. If you are not familiar with these tools, please visit [IT@UC's Knowledge Base for Blackboard](#).

VII. Course Communication:

University policy requires that the email set up in Blackboard is the primary means of communication. It is advisable that you use your UC email for this purpose and that you check it often. If you choose to change your email in Blackboard to a non-UC email it is your responsibility to ensure you check it frequently.

VIII. Course and Grading Policies:

- 1. Course Contract:** Upon officially registering for the course, the student assumes responsibility for understanding and complying with the entire contents of the course syllabus. It is the student's responsibility to raise questions or concerns directly with the instructor. The course instructor reserves the right to change, modify, add or delete any class assignment, reading, or activity at any time. Such changes will be made at the earliest possible time
- 2. Academic Code of Conduct:** Academic misconduct or dishonesty is defined in the University of Cincinnati Student Code of Conduct. Academic misconduct includes, but is not limited to: acts of cheating, plagiarism, falsification, and misappropriation of credit. The Student Code of Conduct defines behavior expected of all University of Cincinnati students. It is each student's responsibility to know and comply with the University's Student Code of Conduct. Disciplinary procedures are explained in a step-by-step manner, and the procedures for appeal of decisions are stated. (see: [UC's Student Code of Conduct](#))

Plagiarism is defined as:

- Submitting another's published or unpublished work in whole, in part, or in paraphrase, as one's own without fully and properly crediting the author with footnotes, quotation marks, citations, or bibliographic reference.
- Submitting as one's own original work, material obtained from an individual, agency, or the internet without reference to the person, agency or webpage as the source of the material.
- Submitting as one's own original work material that has been produced through unacknowledged collaboration with others without release in writing from collaborators.
- Submitting one's own previously written or oral work without modification and instructor permission.

Plagiarism will not be tolerated and according to the Student Code of Conduct

(https://www.uc.edu/conduct/Code_of_Conduct.html), may result in the following consequences:

- Formal report of academic misconduct.
- Reduced or failing grade on the exercise.
- Reduced or failing grade for the course.
- Recommendation to the College Hearing Panel/Dean/Provost for probation, suspension, or dismissal.

3. **Disability:** Students with disabilities who need academic accommodations or other specialized services while attending the University of Cincinnati will receive reasonable accommodations to meet their individual needs as well as advocacy assistance on disability-related issues. Students requiring special accommodation must register with the Disability Services Office. [UC's Disability Services Office](#).
4. **Counseling Services, Clifton Campus:** Students have access to counseling and mental health care through the University Health Services (UHS), which can provide both psychotherapy and psychiatric services. In addition, Counseling and Psychological Services (CAPS) can provide professional counseling upon request; students may receive five free counseling sessions through CAPS without insurance. Students are encouraged to seek assistance for anxiety, depression, trauma/assault, adjustment to college life, interpersonal/relational difficulty, sexuality, family conflict, grief and loss, disordered eating and body image, alcohol and substance abuse, anger management, identity development and issues related to diversity, concerns associated with sexual orientation and spirituality concerns, as well as any other issue of concerns. After hours, students may call UHS at 513-556-2564 or CAPS Cares at 513-556-0648. For urgent physician consultation after-hours students may call 513-584-7777.
5. **Title IX:** Title IX is a federal civil rights law that prohibits discrimination on the basis of your actual or perceived sex, gender, gender identity, gender expression, or sexual orientation. Title IX also covers sexual violence, dating or domestic violence, and stalking. If you disclose a Title IX issue to me, I am required forward that information to the Title IX Office. They will follow up with you about how the University can take steps to address the impact on you and the community and make you aware of your rights and resources. Their priority is to make sure you are safe and successful here. You are not required to talk with the Title IX Office. If you would like to make a report of sex or gender-based discrimination, harassment or violence, or if you would like to know more about your rights and resources on campus, you can consult [UC's webpage for Title IX](#) or contact the office at 556-3349.
6. **Missed and/or late examinations, quizzes, and graded exercises:** There is no makeup for missed homework.
7. **Weather Related Protocol:** When inclement weather threatens the safety of the University of Cincinnati community, the Senior Vice President for Administration and Finance may invoke University Rule [3361: 10-55-01](#) and declare an emergency closing.
 College of Medicine Students: Graduate Students – follow all University snow policies and procedures. All classes and exams are canceled when the university has closed. On days when the University delays opening, classes and exams will resume at the hour that the University reopens if this is at or before 3 pm.
8. **Criteria for letter grades:**
 Your course grades will be based on your performance on the following:

<i>Class Participation</i>	<i>10 points</i>
<i>Assignments (4)</i>	<i>10 points each</i>
<i>Projects (1)</i>	<i>50 points</i>
<i>Total Points Available</i>	<i>100 points</i>

Grading Scale:

<u>Overall Percentage / Points</u>	<u>Letter Grade</u>
93% and above	A
90%	A-
87%	B+
83%	B
80%	B-
77%	C+
73%	C
70%	C-
Below 70%	F

IX. Course Schedule:

1. Introduction (1 week)
 - 1.1 Examples of experimental design
 - 1.2 Elements of experimental design
 - 1.3 Statistics review
2. Completely Randomized Design (CRD) (2 weeks)
 - 2.1 An example
3. One-way random effects model (1 week)
 - 3.1 An example
4. Two-way design (3 weeks)
 - 4.1 A balanced example
 - 4.2 Unbalanced two-way design
5. Randomized Complete Block Design (RCBD) (1 week)
 - 5.1 An example
6. Designs of clinical trials (2 weeks)
 - 6.1 Introduction (phase, blinding)
 - 6.2 Parallel group design
 - 6.3 Cluster randomized design
 - 6.4 Crossover design
 - 6.5 Group sequential design
 - 6.6 Adaptive design
7. Design of observational studies (1 week)
 - 7.1 Observational study vs. interventional study
 - 7.2 Types of observational studies
 - 7.3 Longitudinal setting in the observational studies
 - 7.4 Biasness, confounding, propensity score and multivariate matching
8. Review and project presentation (2 weeks)
 - 8.1 Review
 - 8.2 Project presentation