



**Principles of Statistics and Experimental Design
Psychology 381-001 (CRN: 20793)
Winter 2018**



Arlo Clark-Foos, Ph.D.

Lecture

Location: 1046 CB

Time: MW 9:30 - 10:45 AM

Instructor

Office: 4056 CB

Office Hours: By Appointment

Phone: 313-583-6341

Email: acfoos@umich.edu

Required Text:

Nolan, S. A. & Heinzen, T. E. (2008). *Statistics for the Behavioral Sciences* (4th ed.). New York: Worth.

Course Website (also on Canvas): <http://www-personal.umd.umich.edu/~acfoos/Courses/381.html>

Course Overview: At the core of any science is an understanding of basic statistics. It is through statistics that we report our findings and understand those of others. As such, this course is an introduction to the basic principles of experimental design and statistical analysis as employed in psychological research. Topics covered include data-gathering, descriptive statistics, hypothesis-testing, one- and two-sample experiments, correlational designs, and one- and two-way analysis of variance.

Course Objectives:

- Understand how research methods are used to test alternative explanations of human thought and behavior in a variety of problem domains, both basic (theoretical) and applied (practical).
- Demonstrate competence in designing basic experimental, quasi-experimental, and correlational research designs; an understanding of research concepts such as the experimental control of variables, confounding variables, and experimental validity (e.g., internal and external validity); and an understanding of reliability and validity as these concepts pertain to psychological tests and measures.
- Identify basic descriptive statistics, such as measures of central tendency (e.g., mean, median, mode), variability (e.g., standard deviation, variance, range), and association (correlation); and understand how these may be used to assess patterns in measurements and among variables.
- Identify basic inferential statistics (e.g., t-test, F-test), including nonparametric statistics (e.g., chi-square), demonstrate an understanding of generalizability and how these tests protect against sampling error; interpret these tests when encountered in the research literature; and calculate these tests from formulas.
- Become better consumers of statistics, demonstrating an awareness of random error and the importance of logic in examining data and arriving at conclusions; real world problems will be approached with a greater appreciation and understanding of algorithmic, as opposed to heuristic, problem-solving and decision-making processes.

Attendance

A student is expected to attend every class and laboratory for which he or she has registered. Each instructor may make known to the student his or her policy with respect to absences in the course. It is the student's responsibility to be aware of this policy. The instructor makes the final decision to excuse or not to excuse an absence. An instructor is entitled to give a failing grade (E) for excessive absences or an Unofficial Drop (UE) for a student who stops attending class at some point during the semester.

Disability Statement: The University will make reasonable accommodations for persons with documented disabilities.

Students need to register with Counseling & Disability Services (DS) every semester they are enrolled. DS is located in 2157 UC (http://www.umd.umich.edu/cs_disability/). To be assured of having services when they are needed, students should register no later than the end of the add/drop deadline of each term. If you have a disability that necessitates an accommodation or adjustment to the academic requirements stated in this syllabus, you must register with DS as described above and notify your professor.

Drop/Add

It is your responsibility to be aware of the drop/add dates for this course. The instructor will not grant withdrawal requests made after that date unless extenuating circumstances are presented (i.e., failing due to lack of effort does not qualify).

Late Assignments

The final copy of any assignment is due at the beginning of class. Your grade on that assignment will be penalized 10 points for any day, or part of a day, that it is late.

Academic Integrity Policy: The University of Michigan-Dearborn values academic honesty and integrity. Each student has a responsibility to understand, accept, and comply with the University's standards of academic conduct as set forth by the Code of Academic Conduct (<http://umdearborn.edu/697817/>), as well as policies established by each college. Cheating, collusion, misconduct, fabrication, and plagiarism are considered serious offenses and violations can result in penalties up to and including expulsion from the University. Disciplinary action will be taken in cases of plagiarism. At the instructor's discretion, the penalty may be a grade of zero on the assignment up to and including recommending that the student be expelled from the University. It is the sole responsibility of the student to understand and follow academic guidelines regarding plagiarism.

Religious Observances

If there is an academic requirement stated on this syllabus that conflicts with a religious observance for your faith, you must notify me in writing no later than the end of the add/drop deadline. Upon receipt of your written notification, we can discuss a reasonable accommodation.

University-Sponsored Activities

If your athletic schedule or your schedule for another University-sponsored extracurricular activity will interfere with your participation in this class in any way, please bring me a letter from the director of the relevant program, specifying the reason and the affected dates, no later than the end of the add/drop deadline. Upon receipt of your official written notification, we can discuss a reasonable accommodation.

Plagiarism Checking

All written assignments (literature review papers and lab reports) must be submitted in a paper copy (for grading) and an electronic copy, via Canvas, for plagiarism checking. Any paper that is not checked, or does not pass the check, for plagiarism, will receive a zero for the assignment and may result in a violation of the academic code of conduct.

Emergency Preparedness

All students are encouraged to program 911 and UM-Dearborn's University Police phone number (313) 593-5333 into personal cell phones. In case of emergency, first dial 911 and then if the situation allows call University Police.

The Emergency Alert Notification (EAN) system is the official process for notifying the campus community for emergency events. All students are strongly encouraged to register in the campus EAN, for communications during an emergency. The following link includes information on registering as well as safety and emergency procedures information: <http://umdearborn.edu/emergencyalert/>.

If you hear a fire alarm, class will be immediately suspended, and you must evacuate the building by using the nearest exit. Please proceed outdoors to the assembly area and away from the building. Do not use elevators. It is highly recommended that you do not head to your vehicle or leave campus since it is necessary to account for all persons and to ensure that first responders can access the campus.

If the class is notified of a shelter-in-place requirement for a tornado warning or severe weather warning, your instructor will suspend class and shelter the class in the lowest level of this building away from windows and doors.

If notified of an active threat (shooter) you will Run (get out), Hide (find a safe place to stay) or Fight (with anything available). Your response will be dictated by the specific circumstances of the encounter.

UM-D Writing Center

The Writing Center offers support in all stages of the writing and research process. Consultants are not editors, but experienced readers able to offer students guidance on a range of issues relevant to improving their communication effectiveness. Consultants can help students in many ways, including understanding assignment goals; formulating an approach to an assignment; developing confidence for new writing tasks; considering audience, purpose, and context; developing a focus/thesis; articulating and organizing ideas; discussing supporting evidence and whether additional evidence is needed; generating revision strategies; identifying and using appropriate resources; improving control of grammar and mechanics; and becoming more skilled in using APA, MLA, Chicago, and other documentation styles. Let me know how helpful this service is for you.

Drop-in sessions are sometimes available, but it is best to make an appointment. During midterms and finals, consulting sessions are by appointment only. Contact information for the Writing Center:

Phone: 313-593-5543

Website: http://www.casl.umd.umich.edu/writ_center/

Policies on Incomplete Grades for CASL from the Registration and Records website:

<http://umdearborn.edu/casl/687370/>

Psychology Program Goals

This class is designed to teach you content unique to this course (Cognitive psychology) as well as any skills necessary to conduct yourself as a professional in the field. Doing so will allow you to attain the goals we, as psychology faculty, have set out for you as a psychology student. For more information on these goals, visit the following link:

https://umdearborn.edu/casl/fileadmin/casl/departments/behavioralsciences/public/psychology/forms/Psychology_Program_Goals__1_.pdf

Supplemental Instruction

Supplemental Instruction (SI) sessions are offered as a free service for students in this class. Because SI targets both introductory and other courses perceived as having difficult material, sessions are for all learners from straight 'A' to struggling students. SI helps you to integrate diverse concepts, retain information effectively, reduce the time you need to study because you will be more efficient in what and how to study, and generally tend to improve the performance of anyone who attends 5 or more sessions!

A Supplemental Instruction (SI) component is provided for all students who want to improve their understanding of the material taught in this course. SI sessions are led by a student who has already mastered the course material and has been trained to facilitate group sessions where students can meet to compare class notes, review and discuss important concepts, develop strategies for studying, and prepare for exams. Attendance at SI sessions is free, voluntary, and anonymous to the professor. Students may attend as many times as they choose. SI sessions begin by the second week of class and continue throughout the semester. Session schedules will be announced in class. For information about SI, visit: <http://www.umkc.edu/asm/umkcsi/index.cfm>

The SI leader for this class is Nicholas Paron and his e-mail is nparon@umich.edu

Grading

There will be a few homework assignments (20% combined value) and four exams (80% combined value).

Homework	_____/200 points	20 %
Exam 1	_____/200 points	20 %
Exam 2	_____/200 points	20 %
Exam 3	_____/200 points	20 %
Exam 4	_____/200 points	20 %
Total	_____/1000 points	100 %

I will usually round up, for example from 79.5% to 80%, but do not count on it. As a general principle, I will never work harder for your grade than you do. Students who have poor attendance and participation should not expect me to “make up” points for them. Students who have done all that is in their power to do their best can be assured that will be carefully considered in making any borderline decision. I try to apply consistent standards and treat students fairly, as well as fulfill my responsibilities to UMD in making difficult decisions about grades.

There will be four closed-book, closed-note exams. Each exam will be worth 20% of your total grade (200 points each). The last exam will not be cumulative. These exams will consist of some weighting of short answer questions, statistical calculations, and graphing questions. The exams will cover material presented in lectures and/or in the book. There will also be regular homework assignments designed to help you practice the types of statistical problems you will encounter on the exams. These homework assignments will make up a further 20% (200 points) of your final grade.

Letter Grade	Percentage Equivalent	Points Equivalent
A+	> 100%	> 996
A	93%-100%	926-996
A-	90%-92%	896-925
B+	87%-89%	866-895
B	83%-86%	826-865
B-	80%-82%	796-825
C+	77%-79%	766-795
C	73%-76%	726-765
C-	70%-72%	696-725
D+	67%-69%	666-695
D	63%-66%	626-665
D-	60%-62%	596-625
E	<60%	< 596

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Topic Outline

Module I.

- *Introduction to Statistics and Research Design (Ch. 1)*
 - *Descriptive Statistics (Ch. 2)*
 - *Visual Displays of Data (Ch. 3)*
 - *Probabilities and Research (Ch. 4)*
- EXAM 1 (1/25)

Module II.

- *Correlation (Ch. 5)*
 - *Regression (Ch. 6)*
- EXAM 2 (2/15)
SPRING BREAK: NO CLASS FEBRUARY 27 and March 1

Module III.

- *Inferential Statistics (Ch. 7)*
 - *Hypothesis Testing with One Sample: z tests (Ch. 8)*
 - *Hypothesis Testing with Two Samples: t tests (Ch. 9)*
- EXAM 3 (3/22)

Module IV.

- *Hypothesis Testing with Three or More Groups (Ch. 10)*
 - *Two-Way ANOVA & Interactions (Ch. 11)*
 - *Confidence Intervals, Effect Size, and Power (Ch. 12)*
 - *Chi Square (Ch. 13)*
- EXAM 4 (4/18)

* This syllabus is a general plan for the course. Any deviations deemed necessary by your instructor will be announced in class.