UNIVERSITY OF MICHIGAN-DEARBORN

Psyc 381: Principles of Statistics and Experimental Design (3 credit hours)

Instructor Contact Info	Eric Fuller, Ph.D. Email: ericfull@umich.edu Main Office #: 313-593-5520	This course taught by a LEO Lecturer.	Course Details	Fall 2017 Course # 10405 Psyc 381 Section # 003
Office Hours	Office: 4020 CASL Building Tuesday: 12:30 – 1:45pm Thursday: 12:30 – 1:45pm		Classroom & Meeting Times	1044 CASL Building Tues: 11:00 – 12:15pm Thurs: 11:00 – 12:15pm

Supplemental Instruction

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 and voluntary. 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/si/index.shtml.

Supplemental Instruction sessions are offered as a free service for students in this class. These sessions are for all learners from straight A to struggling students. SI helps you to integrate diverse materials, 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 those who attend at least 6 sessions!

SI Leader: **Eric James** Email: ejjames@umich.edu

Course Information

Course Description: An introduction to basic principles of experimental design and statistical analysis as employed in psychological research. Topics covered include data-gathering, descriptive statistics, hypothesis-testing and one- and two-sample experiments, correlational designs, and one- and two-way analysis of variance.

Textbook: Gravetter, F. J., & Wallnau, L.B. (2016). *Statistics for the Behavioral Sciences* (10th ed).
Publisher: Cengage Learning ISBN-13: 9781305504912

Course Learning 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-tests, F-tests), 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; calculate the more basic forms of these tests from formulas; and interpret basic results using statistical software.
- 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.

Program Goals

1	**Knowledge Base of Psychology:** Demonstrate a familiarity with the major concepts, theoretical perspectives, empirical findings, and historical trends in psychology
2	**Research Methods in Psychology:** Understand and apply basic research methods in psychology, including research design, data analysis, and interpretation; demonstrate information competence and the ability to use research data bases and statistical software packages
3	**Critical Thinking Skills in Psychology:** Respect and use critical and creative thinking, skeptical inquiry, and, when possible, the scientific approach to solve problems related to behavior and mental processes
4	**Application of Psychology**: Understand and apply psychological principles to personal, social, and organizational issues; includes personal development
5	**Ethics and Psychology:** Demonstrate ability to weigh evidence, tolerate ambiguity, act ethically, and reflect other values that are the underpinnings of psychology as a discipline
6	**Writing/Presentation Skills:** Demonstrate ability to communicate effectively in a variety of formats
7	**Cultural and Diversity Awareness:** Recognize, understand, and respect the complexity of sociocultural and international diversity
8	**Career Planning and Development:** Emerge from the major with realistic ideas about how to implement psychological knowledge, skills, and values in occupational pursuits in a variety of settings

Dearborn Discovery Core Goals: Quantitative Thinking and Problem Solving Courses

http://umdearborn.edu/faculty-staff/hub-teaching-learning-resources/assessment/dearborn-discovery-core-goals

1. Students are able to interpret information presented in mathematical form (e.g. with functions, equations, graphs, diagrams, tables, words, geometric figures).
2. Students are able to represent information/data in mathematical form as appropriate (e.g. with functions, equations, graphs, diagrams, tables, words, geometric figures).
3. Students are able to carry out mathematical (e.g. algebraic, geometric, logical, statistical,) procedures flexibly, accurately, and efficiently to solve problems.
4. Students are able to evaluate the validity of logical or quantitative arguments.

Course Requirements & Assessment

Canvas Quizzes: A series of quizzes will be posted throughout the semester on Canvas. Quizzes will generally be based on the material that was recently covered for that week. Thus, you should read the assigned chapters and review your notes to successfully answer all the questions for each quiz. Each quiz will consist of 20 questions that will require a combination of hand-calculations, statistical interpretations, and general knowledge of the weekly topic – treat these questions as practice for their associated exams. Quizzes will generally be assigned once per week and will (typically) need to be completed within a week. Each quiz will have its due date posted on Canvas and the assigned deadlines will be strictly enforced.

Chapter Assignments: Students will be assigned work to complete with the goal of improving their skills when working with raw data and evaluating various concepts related to the use of statistics and research design. These assignments will typically require a combination of hand calculations, responding to short-essay questions, and working with SPSS (a software package designed to statistically analyze raw data). The SPSS portions will focus on familiarization with the software (e.g., data entry, conducting analyses) and the interpretation of statistical findings. Students will be shown how to conduct various analyses in class and will be expected to conduct them on their own with provided data sets. Using the results from SPSS, students will also be expected to provide a properly formatted summary of findings written in APA-style.

Exams: Three exams will be given in this course. The exam content will vary in format, including multiple choice questions, computations, data interpretations, short answer, reading SPSS output, and essay questions. The exams will be entirely closed book and you will have the entire class period to complete them. Although the exams are not designed to be cumulative, the exams will build off of each other due to the nature of the course material. Thus, constant review of all relevant material is suggested when preparing for an exam. For each exam, a brief review guide will be provided that identifies relevant topics and a set of key terms and formula that will be required for successful completion of the exam.

Late Work Policy:

1. **Canvas Quizzes**: Unless otherwise noted, students are expected to complete the Canvas quizzes within one week after being assigned. Students will be permitted to submit a "late" quiz (i.e., submission after the assigned deadline posted on Canvas) for up to one week beyond the original due date. Any submission that is considered late based on the stated due dates will be penalized by 20% from the possible quiz score - this penalty will apply regardless of the degree of "lateness" (e.g., the penalty will be assessed equally for a submission that is 20 minutes late vs. 2 days late).

2. **Chapter Assignments**: Unless otherwise noted, students are expected to submit the chapter assignment work within one week after being assigned. Students will be permitted to submit a "late" assignment (i.e., submission after the assigned deadline posted on Canvas) for up to one week beyond the original due date. Any submission that is considered late based on the stated due dates will be penalized by 20% from the possible assignment score. Submissions will not be graded after one week has passed from the original due date and you will receive no credit for that assignment.

   If a student expects to be absent on a day that a submission is due, the student can email me their work to demonstrate that it is complete and then submit a hardcopy of their work by the next class meeting - only hardcopy submissions will be graded.

   It is not uncommon for the university computers and printers to be occupied, broken, or having some sort of technical issue – do not wait until the last minute to complete the assignments or print off your work. **Students always have the option to complete and turn in the assignments early to my office mailbox.**

3. **Exams**: Make-up exams due to an absence will only be permitted in the case of a religious holiday, university-sponsored event, or emergency – any claim of an emergency will need to have the appropriate documentation that can be verified (e.g., accident report, funeral information, doctor's note with contact

information). Make-up exams are typically offered on a fixed schedule so students should be prepared to accommodate a change in their schedule to complete the exam if offered. Any make up exam that is offered may differ in content and format from the original and will need to be completed within a week of the original exam. Do not miss an exam and assume that you will be able to complete it at a later date without meeting these criteria.

Use of Technology: SPSS (IBM SPSS v.2x) can be found on various computer labs on campus. I encourage students to use the BSCI lab located in 4073 CB. Although students may purchase a time-limited SPSS license for use on their own computer, I strongly recommend using the available resources on campus. All SPSS assignments will require the use of SPSS and students will be responsible for making sure they are able to access the program outside of normal class hours.

Extra Credit: You will receive 1% extra credit toward your final grade per hour/assignment completed, up to a total of 2%. Extra credit can be earned through one or a combination of the following ways:

1. SONA: You may participate in up to 2 hours of experiments via the UM-D Subject Pool. **To sign up for experiments, you may access the SONA -Systems Research Participation Management System at https://umd-umich.sona-systems.com.** Note that experiments last different amounts of time – some take half an hour, some take two hours, and some take amounts of time in between (e.g. you might participate in two 1-hour experiments, four ½-hour experiments, one ½-hour experiment and one 1.5-hour experiment). All enrolled students who register on time will automatically be registered in the SONA Systems website.

   Although one purpose of the participation requirement is to provide subjects for psychological research by faculty and students in the department, the studies are also designed to be part of the learning experience of psychology. The studies are designed and conducted by psychology faculty, graduate students, and senior honor students. The collected data is used in psychology journal articles, doctoral dissertations, or senior honor theses. Students who are under the age of 18 may not participate in the Subject Pool experiments.

2. Throughout the semester students may be encouraged to attend and provide a reaction paper to selected campus events related to the field of psychology (e.g., psychology club events, invited speakers, research talks). Details for each of these events will be posted on Canvas and announced during class sessions. Each successfully completed reaction paper will be counted as one "unit" of extra credit (e.g. 1 "unit" = 1% of extra credit).

Grading Policy: Grades will be calculated as the (weighted) earned points out of the total amount possible and assigned the appropriate grade using the chart below. Students can track their grades on Canvas over the course of the semester and should contact me if they believe there is an error with their recorded scores.

Graded Material	Weight
Canvas Quizzes	35%
Chapter Assignments	20%
Exam 1	15%
Exam 2	15%
Exam 3	15%
Extra Credit	02%
Total	**102%**

% Total	Assigned Grade
92.5+	A
90	A-
87.5	B+
82.5	B
80	B-
77.5	C+

% Total	Assigned Grade
72.5	C
70	C-
67.5	D+
62.5	D
60	D-
Below 60	E

General Policy Information

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.

Attendance in this class will not be officially taken. It is strongly recommended that all students make an effort to attend every class period and stay for the entire duration. Active participation is welcomed and encouraged – typically, the students who do well in class are those that speak up, ask questions, and interact with the instructor. If you must leave early, please sit near the back of the room so as to not disrupt other students upon your exit. **During class sessions, I will typically ask questions about the course material that will appear in some way on an upcoming exam so it is to your benefit to attend all class sessions.**

Regardless of the nature of any absence, students will be responsible for any notes, review, handouts, homework assignments, online quizzes, and/or announcements discussed in class. Additional notes will not be provided to students who miss a class period so it is a good idea to get the name and email address of a fellow student or two to exchange information. If an assignment is due in-class and you are absent, it is still your responsibility to make sure it is turned in by the due date. **In short, an unexcused absence from class will not excuse missing a posted deadline for assigned work.**

Academic Integrity

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.

Unless otherwise directed, students are expected to complete their work on their own without the assistance or input from other students. If submitted work is found to be deliberately copied either to or from another student's submission, all students involved will be considered for violations of academic integrity. **Depending on the nature and severity of the violation, grade-related penalties will range from receiving a reduced or no-credit grade on an assignment or exam to receiving a failing grade in the course.**

Course-Specific Examples of Academic Integrity Violations:

- Chapter Assignments: Copying text from/to another student to be submitted as original work (hand-calculations and/or summary of results).
- SPSS Work: Use of a shared data set between multiple students for conducting analyses.
- Exams: Any act of copying from another student's exam or the use of technology to look up information without the explicit approval of the instructor.

U-M Dearborn Campus Policies

Accommodations for Disabilities

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.

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.

Policy on the Incomplete (I) Grade

A student whose coursework for the term (other than final examination) is incomplete in a minor way may, upon completion and approval of the I Contract Form, be granted the privilege of completing the work within a four-month period for the College of Arts, Sciences beginning on the first day of classes of the immediately following term. If granted this privilege, a grade of I will be recorded. Failure to complete the required work within the specified time, or the denial of this privilege by the instructor, will result in a grade of E for the final grade. In extenuating circumstances an extension beyond the stated period may be requested by means of a petition that has been endorsed by the instructor and approved by the Academic Standards Committee. However, such arrangements for completing the work must be made within the above stipulated time period. Failure to complete the required work within the specified time will result in a grade of I being automatically treated as an IE and counted in the student's grade point average. The I will remain on the transcript even after the official final grade is assigned

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.

Reporting Harassment

Title IX of the Civil Rights act recognizes that students should be able to study in a safe atmosphere free of sexual violence, harassment, bias and discrimination. Should you wish to report an incident of sexual assault, harassment, discrimination or bias, visit https://umdearborn.edu/offices/enrollment-management-student-life/incident-and-complaint-reporting.

Course Schedule

Week	Date	Lecture Focus	Chapter Sections
Week 1	----------	----------	----------
	Sept 7	Syllabus & Course Information	N/A
Week 2	Sept 12	Introduction to Statistics in Psychology	1.1, 1.3, 1.4
	Sept 14	Distributions of Data	2.1 – 2.4
Week 3	Sept 19	Central Tendency and Variability	3.1 – 3.6
	Sept 21	Central Tendency and Variability	4.1 – 4.6
Week 4	Sept 26	Standard Normal Distribution & *z* Scores	5.1 – 5.7; 6.2 – 6.3
	Sept 28	Sampling Distributions	6.1 – 6.3, 6.5, 7.1 – 7.5
Week 5	Oct 3	Sampling Distributions	6.1 – 6.3, 6.5, 7.1 – 7.5
	Oct 5	Central Limit Theorem	6.1 – 6.3, 6.5, 7.1 – 7.5
Week 6	Oct 10	**Exam 1**	**Exam 1**
	Oct 12	Introduction to SPSS	Handouts on Canvas
Week 7	Oct 17	***Fall Study Break – No Class***	N/A
	Oct 19	Null Hypothesis Significance Testing (NHST)	8.1, 8.3, 8.4
Week 8	Oct 24	One sample *z* test	8.1, 8.3, 8.4
	Oct 26	Statistical Inference	8.2, 8.5, 8.6
Week 9	Oct 31	One-sample *t* test	9.1 – 9.4
	Nov 2	Correlation (Pearson's *r*)	15.1 – 15.4
Week 10	Nov 7	Correlation (Pearson's *r*)	15.1 – 15.4
	Nov 9	Linear Regression	16.1 – 16.2
Week 11	Nov 14	Evaluating Correlation Research	15.1 – 15.4
	Nov 16	**Exam 2**	**Exam 2**
Week 12	Nov 21	Experimental Research Design	1.2, 11.5
	Nov 23	***Thanksgiving Recess***	N/A
Week 13	Nov 28	Independent samples *t* test	10.1 – 10.5
	Nov 30	Independent samples *t* test	10.1 – 10.5
Week 14	Dec 5	Repeated measures *t* test	11.1 – 11.4
	Dec 7	One-way Analysis of Variance (ANOVA)	12.1 – 12.6
Week 15	Dec 12	One-way Analysis of Variance (ANOVA)	12.1 – 12.6
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----------	Dec 13 (Wednesday)	***University Study Day***	
----------	Dec 19 Tuesday (F) 11:30 – 2:30pm	**Exam 3**	**Exam 3**

Disclaimer

Note: All information in this syllabus is subject to change. Any changes will be announced in class and posted on Canvas. It is the student's responsibility to attend class, check Canvas regularly, and to be informed of such changes.