PSYS 313 Statistics in Psychology

PSYS 313 Statistics in Psychology Section C79 (CRN: 41490) Asynchronous

Instructor: Dr. Andy Mienaltowski (Dr. M'ski)

E-mail: andrew.mienaltowski@wku.edu

Phone/Text: (270) 681-0270 ... a Google Voice number that also receives text messages **Assistance Hours:** Please email Dr. Mienaltowski for an appointment if assistance is needed. There is some availability to discuss course material via phone Zoom between 10AM and 4PM by appointment.

Basic Course Info

Course Description: 3 hours. Methods of organizing, describing, and analyzing psychological data. (Prerequisites: PSYS/PSY 210 and PSYS/PSY 211 with a grade of "C" or better.)

Course Objectives:

- Describe the measures of central tendency and variability
- Present visual representations of data
- Develop a basic foundation in using data for statistical inferences
- Use statistical tests to examine the impact of independent variables on dependent variables
- Explore relationships between observed variables and examine the predictive value of one or more factors in describing an outcome
- Select the appropriate statistical test for the research question under examination
- Apply knowledge of statistical tests using stats software used by psychologists (e.g., Jamovi)

This course is an online asynchronous course, and the chief method of delivery will require you to (a) watch my instructional videos over key course learning objectives, and (b) complete activities that serve as a means for you to develop your conceptual understanding of statistics in psychology and as a means for you to directly apply these skills to narrow data sets.

To successfully complete this course, you must have a strong internet connection. You also must download or access Jamovi software for completing some of the activities. Without a consistent internet connection, you will be unable to meet the course's objectives and submit assignments.

Materials for the course

Nolan, S. A., & Heinzen, T. E. (2013). *Essentials of Statistics for the Behavioral Sciences (2nd ed)*. New York: Worth. (paperback ISBN-10: 1429242272; ISBN-13: 9781429242271) or

- (3rd ed). New York: Worth. (paperback ISBN-10: 1464107777; ISBN-13: 9781464107771)
- (4th ed). New York: Worth. (paperback ISBN-10: 1319143636; ISBN-13: 9781319143633)
- DO NOT BUY THE 5th edition of "Essentials of Statistics for the Behavioral Sciences". Important content was left out.
- Nolan, S. A., & Heinzen, T. E. (2020). Statistics for the Behavioral Sciences (5th ed). ISBN-13: 9781319190743

My lecture figures often come from the above texts. You are welcome to use this fantastic free textbook to save money:

 Navarro, D. J., & Foxcroft, D. R. (2019). Learning Statistics with Jamovi: A tutorial for psychology students and other beginners (version 0.70). doi: 10.24384/hgc3-7p15 [https://www.learnstatswithjamovi.com/

I normally use the Nolan and Heinzen books listed above, but am open-minded to other authors' coverage provided that they include correlation, regression, between-subjects ANOVA, and within-subjects ANOVA (or repeated measures ANOVA). You can use other published works for this course if you so choose.

Other Required Materials:

A calculator or spreadsheet Jamovi statistical software – Free for Windows, Mac OS, Linux, or Chrome at <u>www.jamovi.org</u> . Also available as a browser based version.

What to expect in the class

This course provides a foundation in calculating descriptive statistics and in the appropriate use of inferential statistics to (a) examine if experimentally manipulated factors impact outcome measures and (b) explore the value that observed variables have in predicting other observed variables. Statistics involves math, but the performance of calculations are meant to be more routine than complex. We will work through examples to understand why a specific test is applied, and how to interpret the outcome and what it means for the measures/manipulations used. Doing this will require the use of some mathematical operations with formulas. The more exciting part of the course involves using Jamovi statistics software to do math for us so that we can focus our attention on interpreting the outcomes of statistical tests. Psychologists exclusively use stats software to analyze data instead of using a calculator or doing these tests by hand. Because this course is preparing you to analyze data in the real world, it is vital that you have an opportunity to use stats software.

This course does not use exams. As you learn, your progress in the course will be assessed using activities instead of exams. There are two types of activities – Blackboard-based activities and Jamovi activities. For these activities, you can use your books, your notes, and the videos that I provide. These activities emphasize applied learning that capture your understanding of the concepts that we cover instead of rote memorization.

Attendance Policy

This is an asynchronous course, so you are required to meet the deadlines specified for each activity. This will require that you work on your own and invest time into learning from the videos that I share. I strongly recommend that you watch every YouTube video that is shared with you for this course. If you do not watch the videos, you will not make progress in the course.

You will not have the regular face-to-face interactions with your peers and your instructor that you would otherwise have in a traditional classroom setting. **To complete the assignments in this course, you MUST monitor your own progress and self-regulate.** You will be expected to organize and manage your time well so that you can meet the deadlines that are set for you in the course calendar at the end of the syllabus. It is strongly recommended that you set aside time to watch videos, to read, and to complete the course activities. It is vital that you make a schedule to ensure that you are devoting enough time to the course. You should not take this course this summer if you do not have time to invest in the course.

Late Work Policy

Omnibus late work policy:

All students can submit their activities up to 24 hours late on Blackboard for full credit with no questions asked. After this point, the activity is given a zero.

It is not possible to wait until well into the course to submit all of your work. The deadlines in this course are real and are important to the pedagogy. It is important to learn stats consistently and in small chunks that allow for you to demonstrate your knowledge and skills and get feedback. If you prefer more control over deadlines, please sign up for the On Demand version of this course offered by the Department of Psychology.

Readings

The textbook covers stats tests using step-by-step guides and examples. You should read the textbook, whichever one you choose. At minimum, you should skim through each section while we cover the content to ensure that you understand what is discussed. The recommended textbooks include worked out examples! Some also include sample problems with solutions in the appendices at the end of the book. If you do purchase a copy of a textbook instead of using the free book, then I recommend that you purchase an older, used edition to keep indefinitely.

How will my learning be assessed? Tell me more about the activities.

Learning is assessed using 20 activities that create distinct modules to break up the material and facilitate progress in the course. There are 2 types of activities: Blackboard-based activities and Jamovi activities. The topics and point values for each activity can be found in the course calendar in this syllabus. You are allowed to use your books and notes on these activities as well as course videos. You are expected to complete these activities on your own.

Blackboard-based Activities (11 activities) – 480 points:

Due at the end of each week on **Fridays at 4PM**, except for the final week of class where the activities are due on Thursday at 4PM. These activities will be broken down into 2 parts – a *multiple-choice segment* and a *short answer segment*.

For the multiple-choice segment, you will have up to 2 attempts and will immediately
receive feedback on each attempt. For the short answer/essay segment, you will only have
1 attempt. Because this segment requires scoring, you will not get immediate feedback. I
will endeavor to score this segment as quickly as I can.

Jamovi Activities (9 activities) – 245 points:

These activities will also be due on **Fridays at 4PM**, except for the final week of class where the activities are due on Thursday at 4PM. Jamovi activities are broken down into 2 parts - **EdPuzzle** *video segment* and **Analysis segment**. You have only 1 attempt for each segment.

- **EdPuzzle segment:** Watch a short video on use of Jamovi to perform tests in the Analysis segment. While watching, you answer multiple-choice items and get immediate feedback.
- **Analysis segment:** Follow instructions to perform statistical tests within Jamovi, annotate your output, and export your output as a pdf file to upload to Blackboard.

How is my grade determined in PSYS 313?

Overall, you have an opportunity to earn up to 750 points in the course. **Do not trust any percentage given to you by Blackboard.** Grades are determined by adding the points earned on all activities and then comparing a student's point total to the grading scheme below.

Points available in PSYS 313

Syllabus Agreement...25 pointsBlackboard-based Activities...480 pointsJamovi Activities ...245 points

Total 750 points available

Grading Scheme: (no rounding)

672 to 750 points	= A	(4.0)
597 to 671 points	= B	(3.0)
522 to 596 points	= C	(2.0)
447 to 521 points	= D	(1.0)
< 447 points	= F	(0.0)

Reasonable assistance versus Cheating: Academic Integrity

Can I work on my activities with others in the class or a tutor?

No. The purpose of activity-based assessment is to provide individual-specific feedback for each student in the course. If you discuss material in the videos with others, you are furthering your learning of the course material, so this is allowed. If others work out the answers to the questions for you, there is no evidence that you are learning about the stats tests in this course.

Can I use homework websites and services for assistance?

NO! Use of these sites or services is prohibited for PSYS 313. I have created the activities for this course, so they are my intellectual property. Attempts to illegally distribute my activities will result in an F in the course and a hearing with the university's judicial affairs office. You may also be subject to civil legal action for distributing my intellectual property without permission. Note that cheat sites do NOT protect their clients. They turn over client information (including meta-data) to universities.

Seek assistance through legitimate means. If you need assistance, reach out. The temptation to cheat is greatest when time management becomes an issue. If this happens to you, please do not panic and feel tempted to cheat. Please reach out to me instead. **Cheating will result on a zero on the activity for the first offense. For the second offense, the student will earn a F in the course and be referred to WKU Student Judicial Affairs.**

Important policies and guidelines that apply to all WKU courses

Students with Disabilities: Students with disabilities who require accommodations (academic adjustments and/or auxiliary aids or services) for this course must contact the Student Accessibility Resource Center, 1074 DSU (Downing Student Union); <u>https://www.wku.edu/sarc</u>. Their phone number is (270) 745-5004. TDD: (270) 745-3030. Their email is <u>sarc.connect@wku.edu</u>. Please do not request accommodations directly from the instructor without a letter of accommodation from the SARC.

Important information: The university wants you to be aware that important information relevant to all of your courses can be found at this link: <u>https://www.wku.edu/syllabusinfo/index.php</u>

Title IX/Discrimination & Harassment: WKU is committed to supporting faculty, staff and students by upholding WKU's Title IX Sexual Misconduct/Assault Policy #0.2070 and Discrimination/Harassment Policy #0.2040. Under these policies, discrimination, harassment and/or sexual misconduct based on sex/gender are prohibited. If you experience an incident of sex/gender-based discrimination, harassment and/or sexual misconduct, you are encouraged to report it to the Title IX Coordinator, Andrea Anderson, 270-745-5398 or Title IX Investigators, Michael Crowe, 270-745-5429 or Joshua Hayes, 270-745-5121. Please note that while you may report an incident of sex/gender based discrimination, harassment and/or sexual misconduct to a faculty member, WKU faculty are "Responsible Employees" of the University and MUST report what you share to WKU's Title IX Coordinator or Title IX Investigator. If you would like to speak with someone who may be able to afford you confidentiality, you may contact WKU's Counseling and Testing Center at 270-745-3159. Relevant university documents:

- www.wku.edu/eoo/documents/titleix/wkutitleixpolicyandgrievance procedure.pdf
- www.wku.edu/policies/hr policies/2040 discrimination harassment policy.pdf

PSYS 313 Statistics in Psychology

Asynchronous Course Map – Week by Week Breakdown of Relevant Blackboard Materials Week 1: Tuesday, July 5 through Friday, July 8

Please start the term by reading the syllabus and completing the syllabus agreement found in the Activities page of the course on Blackboard.

M'ski YouTube Video Links

- Orientation to Asynchronous PSYS 313 course
- Research Design and Descriptives (Approximately 154 minutes)
 - Review of Research Design (51:38)
 - Visualizing Data (45:14)
 - Measures of Central Tendency (26:16)
 - Measures of Variability (21:04)
 - What is the standard deviation and how do you calculate it? (8:55)
- Z-scores and hypothesis testing (Approximately 50 minutes)
 - o Z-scores (40:21)
 - Converting a percentile score that is greater than the 50th percentile to a z-score and then to a raw score (4:57)
 - Converting a percentile score that is less than the 50th percentile to a z-score and then to a raw score (4:32)

Activities due on Friday, July 8 by 4PM

- Syllabus agreement found on the course activities page (25 points)
- Jamovi 1 Jamovi Installation video and file opening (15 points)
- Blackboard 1 Research Methods, Central Tendency, and Variability (30 points)
- Jamovi 2 Jamovi Frequency tables and Descriptives (25 points)
- Blackboard 2 Z-score for individuals (20 points)

.....

Week 2: Saturday, July 9 through Friday, July 15

M'ski YouTube Video Links

- Z-scores and hypothesis testing (Approximately 190 minutes)
 - o Z-scores (40:21)
 - Converting a percentile score that is greater than the 50th percentile to a z-score and then to a raw score (4:57)
 - Converting a percentile score that is less than the 50th percentile to a z-score and then to a raw score (4:32)
 - Central Limit Theorem (39:08)
 - Relating Sampling to Hypothesis Testing (46:29)
 - Hypothesis testing with a z-test (34:21)
 - Hypothesis testing with a z-test (second example) (25:38)
 - Confidence Intervals and Effect Sizes (43:50)
- t-tests (Approximately 98 minutes)
 - Single Sample t-test Part 1 (34:46)
 - Single Sample t-test Part 2 (25:08)
 - Single Sample t-test Part 3 (37:48)

Activities due on Friday, July 15 by 4PM

- Blackboard 3 Z-score for samples and central limit theorem (30 points)
- Blackboard 4 Z-scores hypothesis testing (40 points)
- Blackboard 5 One-sample t-test (40 points)
- Jamovi 3 Jamovi one-sample t-test (25 points)

Week 3: Saturday, July 16 through Friday, July 22

M'ski YouTube Video Links

- t-tests (Approximately 192 minutes)
 - Paired Samples t-test Part 1 (29:28)
 - Paired Samples t-test Part 2 (29:05)
 - Independent samples t-test Part 1 (41:24)
 - Independent samples t-test Part 2 (20:19)
 - One-tail independent samples t-test example (32:08)
 - Two-tail independent samples t-test example (26:33)
 - o Independent samples t-test example in Jamovi (11:26)

Activities due on Friday, July 22 by 4PM

- Blackboard 6 Paired sample t-test (40 points)
- Jamovi 4 Jamovi paired-samples t-test (25 points)
- Blackboard 7 Independent sample t-test (60 points)
- Jamovi 5 Jamovi independent samples t-test (25 points)

Week 4: Saturday, July 23 through Friday, July 29

M'ski YouTube Video Links

- ANOVAs (Approximately 243 minutes)
 - What is an ANOVA? Between-Subjects ANOVA 1 (24:23)
 - Complete example of ANOVA Between-Subjects ANOVA 2 (42:26)
 - Between-subjects ANOVA 3 (groups with unequal sample sizes) (39:36)
 - Between-subjects ANOVA 4 (another example with unequal sample sizes) (31:37)
 - Within-Subjects ANOVA 1 (Partitioning sums of squares) (14:43)
 - Within-Subjects ANOVA 2 (A complete example) (41:25)
 - Within-Subjects ANOVA 3 (another full example) (35:12)
 - Within-Subjects ANOVAs tricks to calculate SS subjects (11:20)
 - Also refer to notes on how to write up ANOVA in APA format

Activities due on Friday, July 29 by 4PM

- Blackboard 8 Between-subjects ANOVA (60 points)
- Jamovi 6 between-subjects ANOVA (35 points)
- Blackboard 9 Within-subjects ANOVA (60 points)
- Jamovi 7 within-subjects ANOVA (35 points)

Week 5: Saturday, July 30 through Thursday, August 4

M'ski YouTube Video Links

- Correlations (Approximately 73 minutes)
 - Correlations 1 (31:08)
 - Correlations 2 (13:24)
 - Correlations 3 (15:20)
 - Correlations 4 (12:28)
- Regression Analyses (Approximately 159 minutes)
 - Regression 1 (42:51)

PSYS 313 Statistics in Psychology

- Regression 2 (30:33)
- Regression 3 (32:58)
- Regression 4 (22:59)
- Regression 5 (30:05)

Activities due on <u>Thursday</u>, August 4 by 4PM

- Blackboard 10 Correlation (40 points)
- Jamovi 8 Correlation (25 points)
- Blackboard 117 Regression (60 points)
- Jamovi 9 Regression (35 points)