

Basic Statistics for Exercise Science
01:377:275 Section :01
Syllabus - Fall, 2020
Tuesday & Friday, 10:55am-12:15pm, virtual Classroom
Department of Kinesiology and Health
Rutgers University

Course information

Pre/co-requisites: None

Online learning site: Canvas <https://canvas.rutgers.edu/>

Online format: Synchronous

Schedule: Tuesday & Friday, 10:55am-12:15pm

Class lectures will be provided using: TopHat

Technology requirements for this course: Webcam, Chrome Browser, Chrome Test Monitor extension

Instructor information

Instructor: David Weiss

Email: djweiss@kines.rutgers.edu

Virtual Office Hours: by appointment

Virtual office hours format: Top Hat, Zoom

Canvas email will be used for all information/communication related to this course.

Required Course Materials

Required Textbook: SPSS Statistics ISBN:978-1-77330-138-9

Basic Statistics ISBN:978-0-9948021-5-6

The best price for each is online at www.tophat.com. These are both online textbooks, but if you have a need to order from the Rutgers Bookstore, NJ Books, you may.

Required Application Top Hat (www.tophat.com) classroom response system in class. One semester

subscription ISBN: 978-0-9866151-0

Join Code: : **015449**

Required Calculator A hand calculator capable of computing "sum of squares" – an operation that requires at least two memories – **is required**.

Description: This course is designed to develop students' competencies in understanding the rationales and computational procedures required for basic behavioral statistics. After mastering the course content, students will be able to identify, select, compute and interpret basic statistical tests appropriate for exercise science. Students will be briefly introduced to SPSS (Statistical Package for the Social Sciences), one of the powerful and commonly used software analysis used in the medical profession. Students will also be introduced to basic experimental design concepts – the ability to ask researchable questions.

Course Learning Objectives

- Apply effective and efficient mathematical or other formal processes to reason and to solve problems.
- Formulate, evaluate, and communicate conclusions and inferences from quantitative information.
- Formulate, evaluate, and communicate conclusions and inferences from qualitative information.
- Compute and interpret measures of center, location, variation, correlation, regression, ANOVA, etc.
- Know how to apply the rules of probability and determine probabilities using the standard normal distribution

- Construct and interpret confidence intervals and hypothesis tests
- Apply goodness of fit and contests of Independence

COURSE REQUIREMENTS:

- 1. Attendance/participation** - Lectures/discussions cover materials that are not directly available in the assigned readings. Students will be responsible for such material. In order to further incent you, extra credit, on top of your grade will be earned by your registered responses on Top Hat during class. Past statistical analysis has found that the statistical correlation between grades and attendance is +0.64 which means that 36% of the differences in grades are predicted by differences in attendance. Statistically, the effect is huge! Students are expected to attend all classes; if you expect to miss one or two classes, please use the University absence reporting website //<https://sims.rutgers.edu/ssra/> to indicate the date and reason for your absence. An email is automatically sent to me as the instructor.
- 2. Homework Assignments** - Assigned homework problems should be completed by the date assigned on the Homework Schedule to help class discussion and encourage problem solving. Homework assignments have been carefully selected to reflect the problems and concepts to be assessed on all tests. A significant number of these problems (same questions, different numbers) will appear on the exams. Thus, the homework is essential for preparing for both the classes and the exams. The text book will give you feedback on how well you answered a question. If you get the question wrong and cannot figure what went wrong, it is your responsibility to raise the question in class or during an office visit. Over the years, the correlation between final grade and completion of the homework has been approximately +0.60. Thus, completing the homework assignments almost always raises a student's grades in two distinct ways: First, the homework specifically prepares you for the exams. Secondly, you are earning 10% of your semester grade. One half a point will be credited for each attempted question. An extra half point will be credited for a correct answer.
- 3. SPSS Assignments** – A total of eleven SPSS assignments will be assigned. The directions for each assignment will be provided on CANVAS. The Top Hat online textbook will give you step-by-step instructions on how to use the software. Each assignment should take approximately 30 minutes. They will count as 15% of your grade. They should be submitted one class after each test topic has been covered in lecture. A complete schedule of SPSS assignments and their due dates is listed at the end of this syllabus. The exams will include SPSS output tables and you will be asked to read and interpret these tables. The SPSS assignments will prepare you for that portion of the exams. Guidelines for writing the one-page cover sheets for each SPSS assignment will be described in class and will also be available via CANVAS. No SPSS assignment will be accepted past the day that those topics are covered n an exam

How do you access SPSS?

- The software is accessible from several sources. The cheapest and easiest way is to access any university computer. You can either use the "FIND" app and do a search on SPSS, or drill down by following this sequence of folders: IBM, Statistics, SPSS, 24, then you will see at series of icons, the software you need is the blue summation (Sigma).
- Cheap but difficult, is remote access into Rutgers Network. It is still free, but it can be very slow to respond to commands. You must also remember that this technique places you into a “virtual” machine for safety. That means you will not have access to your hard drive, thumb drives or any other screens. To save any files or Output, it must be saved to cloud storage. To log in remotely:
 - Navigate to <https://labgateway.rutgers.edu>. You may be prompted to allow access to your clipboard. If you wish to copy and paste between your local computer and the lab computer, you can choose **Allow**.
 - Log in with your **NetID** and **NetID password**.
 - You must then click “OK” to the warning that all local files will be lost.

- Open the Class Software folder and select “IBM SPSS Statistics”
 - See wasn’t that easy?
- If you want to have the software on your own device, you must rent it. IBM will rent it to you for a semester for about \$100, or you can go to 3rd party sites for a lower price. You do not need version 24 (the one we have access to at Rutgers) any recent version will do , 20,21,22,23. But you will need a full version for the more advanced tests that we will do later in the semester

4. Exams - There will be a total of four exams and a comprehensive final. All exams will be open notes. The exams and the final will consist of short answer and computational problems often requiring the ability to compute statistical solutions using a hand calculator. Each exam will contribute toward 15% of your semester grade and the final will contribute another 15%. You may bring all formulae, notes and sample exams to use during the exam. Sample exams will be available via CANVAS. Students with legitimate scheduling conflicts (e.g., "away" sports competitions) or verifiable illness must notify the instructor **before** any exam. Students who notify the instructor of conflicts **after** an exam will receive a great deal of sympathy but **NO MAKE-UPS**. Only a doctor's note will be acceptable for a missed exam due to illness.

5. Canvas: To access the course, please visit <https://canvas.rutgers.edu>. For [more information](#) about course access or support, contact the Online Learning Help Desk via email at help@canvas.rutgers.edu or call 877-361-1134. The Help Desk can assist you with registration issues (course rosters, student login information) and technical support (browser not working properly, video not playing, document not loading).

In addition, on your Canvas Dashboard, you will see a course named [Student Orientation](#). If you have never used the Canvas system before, it is strongly recommended that you complete this brief and instructive online orientation tutorial. It will quickly show you how to navigate the system and access your course materials. There is no charge for this tutorial and you may enter this tutorial at any time, even prior to the beginning of the semester. Please take this tutorial before you call Technical Support with questions. Additionally, [all tutorial videos \(Links to an external site.\)](#) are available at the Canvas Guides. You may also view the [Getting Started in Canvas](#) guide. To facilitate class learning, please access and print course documents needed for class from the course management system known as Canvas. Course documents are posted in folders under [Resources](#).

Quick Start for Canvas:

Canvas website: If you do not see this course listed, then the site is likely in the “More” dropdown box to right of your tabs. You can rearrange the order of your sites or hide sites from previous semesters by using the Preference tool in My Workspace and clicking on the “Customize Tabs” action button

Online Learning

Top Hat will provide us with a simple and unified platform to conduct our learning experience. Top Hat will contain the two e-books that will help guide your understanding of statistics, statistical methods and the use of software to assist us in performing our analysis. These particular textbooks were chosen for several reasons: 1)Less expensive than traditional textbooks. 2)Less verbose and easier to comprehend. 3)Greater variety of media used in explaining concepts. 4)Provides both the student and instructor continuous feedback on the concepts being presented. The Virtual Top Hat classroom will be our real-time “meeting place” to discuss the concepts and ideas covered in this course.

GRADING: Each exam is equally weighted and constitutes 15% of your final grade. The final is worth an additional 15% of your grade. While the final is comprehensive, it focuses more on decision-making, test selection and interpretation rather than computational skills. The SPSS assignments count as 15% of your grade but information learned via these assignments will also be covered on all exams.

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| Homework | 10 pts. |
| SPSS Assignments | 15 pts. |
| Exam I | 15 pts. |
| Exam II | 15 pts. |
| Exam III | 15 pts. |
| Exam IV | 15 pts. |
| Final Exam | <u>15</u> pts. |
| Total Semester | 100 pts. |

Grades in this course are based upon a mastery system, not a normative system. That is, you must be able to do it, not simply be better than the rest. There is **no curving** in this course. Your final grade will be based upon the following percentages:

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|---------------------|----|----------------|----|--------------------|---|
| 89.5 pts. or higher | A | 79.5-84.4 pts. | B | 69.5-74.4 pts. | C |
| 84.5-89.4 pts. | B+ | 74.5-79.4 pts. | C+ | 59.5-69.4 pts. | D |
| | | | | 59.4 pts. or lower | F |

POCKET CALCULATORS: You may use a calculator for arithmetical computations, but **you must show clearly on paper all steps and computational procedures used to solve each problem.** Correct answers without supporting steps will receive substantial deductions. A hand calculator capable of computing "sum of squares" – an operation that requires at least two memories – **is required**. If you already own a TI-82, TI-83 or higher level model calculator from the calculus course (01:640:135), you may use it. Such calculators cost between \$80 and \$120. However, **inexpensive calculators are available at any major electronic store.** Radio Shack, Best Buy and Staples sell such calculators for as low as \$10 to \$25. They are identified as 10+2 digit scientific calculators). Instruction for the TI-82, TI-83, TI-83+ and TI-84 models will be provided in class. **If you choose any other calculator, you will be responsible for mastering its use.** It must be capable of handling problems which handles the two-memory requirement. **Learning to use the statistical functions on your calculator is essential for successfully completing the requirements of this course.** Reliance on Aunt Tilly's \$1.98 calculator with only one memory virtually guarantees you will get to repeat this course.

Expectations

- Engage with all online class material
- Complete all assigned readings and assignments on time
- Actively participate in all class activities, including online discussions.
- Follow the honor code when completing all quizzes and projects
- Ask questions to enhance understanding of the material
- Communicate with the instructor if you have questions pertaining to the material or the course
- Check your email and Canvas announcements regularly to stay informed about class updates

Email Etiquette

- When emailing your instructor, please use your Rutgers e-mail address and identify yourself by full name and section number. Students are expected to use appropriate e-mail etiquette, and maintain reasonable expectations for instructor responses. The instructor will respond to student emails within 1-2 business days.

Plagiarism

- By enrolling in this course, you are indicating implicitly that you have read, understood, and accepted Rutgers University's policies and procedures regarding academic integrity and dishonesty. Plagiarism and cheating will not be tolerated and all University policies apply. Specifically, if plagiarism or cheating is suspected, the student(s) will be asked to meet with the instructor. If the instructor concludes that an instance of plagiarism or cheating has occurred, the student(s) will be subject to an appropriate sanction or penalty outlined in Rutgers University Academic Integrity Policy.
- *Please note that plagiarism is using the ideas or writings of another as one's own. It varies in degree and severity. The most severe is the use of another's entire paper word-for-word. Less severe is the use of another's sentence, paragraph, or ideas without giving credit to that individual (i.e., without providing a reference).*

Diversity & Inclusion

- The Department of Kinesiology and Health supports an inclusive learning environment wherein diversity and authenticity are valued. We are committed to creating a culture of equality that respects the diverse voices of our students, faculty, and staff. We will continuously strive to create a curriculum and academic environment to reflect the community we serve, and drive innovation, social responsibility and excellence. Our diversity in thought, skill, and academic discipline is a resource and strength, which stands to benefit the whole and positively contribute to University and global reach.

ACADEMIC INTEGRITY: All students are responsible for locating, reading and abiding by the *University Policy on Academic Integrity for Undergraduate and Graduate Students*. The policy is available on-line at at <http://academicintegrity.rutgers.edu/academic-integrity-policy> or on the e-Companion in the Webliography and must be read and fully understood before taking any exam in this course. To encourage such preparation, you will be required to sign a statement on each exam that you have done so and extra credit questions on several exams will focus on academic integrity issues.

THE THREE MOST IMPORTANT SURVIVAL RULES:

1. Don't fall behind
2. Don't fall behind

3. Don't fall behind

UNIVERSITY SERVICES

Although many of these offices remain closed to in-person visits, all remain accessible virtually. We encourage students to continue to use these resources during this semester of remote learning.

| Service | Description | Contact Information |
|------------------------|---|--|
| Student Accommodations | If you are a student in need of accommodations, please register with the Office of Disability Services in order to initiate the accommodations process. Please present your letter of accommodation to your instructor during the first week of the semester. Please note that accommodations are not | (848) 445-6800 Lucy Stone Hall, Suite A 145, Livingston Campus, 54 Joyce Kilmer Avenue, Piscataway, NJ 08854 https://ods.rutgers.edu/ |

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| | retroactive. | |
| Just In Case Web App | Access helpful mental health information and resources for yourself or a friend in a mental health crisis on your smartphone or tablet and easily contact CAPS or RUPD. | http://codu.co/cee05e |
| Counseling, ADAP & Psychiatric Services (CAPS) | CAPS is a University mental health support service that includes counseling, alcohol and other drug assistance, and psychiatric services staffed by a team of professional within Rutgers Health services to support students' efforts to succeed at Rutgers University. CAPS offers a variety of services that include: individual therapy, group therapy and workshops, crisis intervention, referral to specialists in the community and consultation and collaboration with campus partners. | (848) 932-7884 17 Senior Street, New Brunswick, NJ 08901 www.rhscaps.rutgers.edu/ Medical Services: http://health.rutgers.edu/medical-counseling-services/medical/ Counseling Services: http://health.rutgers.edu/medical-counseling-services/counseling/ |
| Violence Prevention & Victim Assistance (VPVA) | The Office for Violence Prevention and Victim Assistance provides confidential crisis intervention, counseling and advocacy for victims of sexual and relationship violence and stalking to students, staff and faculty. To reach staff during office hours when the university is open or to reach an advocate after hours, call 848-932-1181. | (848) 932-1181 3 Bartlett Street New Brunswick, NJ 08901 www.vpva.rutgers.edu/ |
| Scarlet Listeners | Free and confidential peer counseling and referral hotline, providing a comforting and supportive safe space. | (732) 247-5555 https://rutgers.campuslabs.com/engage/organization/scarletlisteners |
| Academic Support | School of Arts and Sciences Academic Advising for personal, career, and educational goals. Department of Kinesiology & Health Academic Advising for questions about Exercise Science or Sport Management major/minor requirements. | SAS: https://sasundergrad.rutgers.edu/ Dept. of Kinesiology & Health: Daria Gonzalez Loree Gym, Room 110 Email: Daria.Gonzalez@rutgers.edu https://kines.rutgers.edu/academics/academic-advising |

| | READINGS | TOPICS |
|----------|-----------------|--|
| Sept 1,4 | Chapter 1 | Course Format, Requirements and Grading; Descriptive v. Inferential Statistics: Basic |

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| | | Number Scales; Basic Experimental Design Concepts; Discrete vs. Continuous Variables; Statistical Notation Techniques |
| Sept. 11 | Chapter 2 | How to Lie with Statistics; Frequency Distributions; Graphing Techniques; Using Your Hand Calculator; Selecting Measures of Central Tendency - Mean Median, Mode; Percentiles; |
| Sept. 15,18 | Chapter 2 | Variability, Variance, Range, Standard Deviations; Sum of Squares (Definitional vs. Computational Formula); Standardized Scores; z-scores |
| Sept. 22, 25 | Chapter 3 | Probability; Normal Curve; Percentiles & Percentile Ranks; Binomial Distribution |
| Tuesday, September 29, 2020 10:55 AM – Exam I | | |
| Oct. 2 | Chapters 6 & 9 | Sampling Theory and Statistical Inference; Sampling Distributions; Standard Error; Experimental Design; Null Hypothesis; Levels of Significance; One vs. Two-Tailed Tests |
| Oct. 6, 9 | Chapters 10 & 11 | Single Sample t-Tests; the t-Distribution; (t vs. z: When, Where & Why?); Independent Groups t-Tests; F-Max Test for Homogeneity of Variance; Measuring Treatment Effect Size – Cohen's d |
| Oct. 13, 16 | Chapter 11 & Appendix 1 | t-tests for Two Related Samples; Parametric vs. Non-Parametric Tests; Sign Test; Mann-Whitney U; Wilcoxon Signed Ranks Test |
| Oct. 20, 23 | Chapter 8 | Confidence Intervals for Single Samples, Independent Samples and Paired Samples – Important Alternatives to the t-tests Used in the Health Professions |
| Tuesday, Oct 27, 2020 10:55 AM – Exam II | | |
| Oct. 30 | Chapter 13 | One- & Two-Way Chi Square; Interpreting Contingency Tables; Using Your Calculator for Two Data Sets; Understanding Basic Correlations: Pearson's r; Tests of Significance for Correlations (Are they real?) |
| Nov. 3, 6 | Chapter 14 | Spearman's rho, Point Biserial and the Phi Correlation; Linear Regression and Prediction; One-Way Independent Groups Analysis of Variance (ANOVA) |
| Nov. 10, 13 Tues. 17 | Chapter 12 & Appendix 1 | One-Way ANOVA Post-hoc Testing: Tukey's HSD (Where are they?) & Eta Squared (How big?); Kruskal-Wallis Nonparametric One-Way Independent Groups “ANOVA” (a form of Chi Square); Post Hoc Test - Multiple Mann-Whitney U-Tests |
| Friday, Nov. 20, 2020 10:55 AM – Exam III | | |
| Nov. 20, 27 | Chapter 12 & Appendix 1 | Parametric One-Way Repeated Measures ANOVA and Friedman's Non-Parametric Repeated Measures “ANOVA” (a form of Chi Square); Nemenyi's Post Hoc Test of Rank |

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| | | Differences |
| Dec.1 | Chapter 14 | Two-Way Independent Groups Analysis of Variance; Two-Way Post-Hoc Testing; Interpreting Main Effects and Interactions. |
| Friday, Dec. 4, 2020 10:55 AM – Exam IV | | |
| Dec. 8 | | Decision Making & Interpretation of Testing Results: Selecting the "Right" Test for the "Right" Job; |
| | | |
| | | Comprehensive Final Exam TBA |

Basic Statistics for Exercise Science
01:377:275
Fall, 2020
SPSS Assignments

| # | Topic | Assigned Date | Due Date |
|----|-----------------------------------|----------------|------------------------|
| 1 | Descriptive Statistics | Fri. Sept. 11 | Fri. Oct. 2 11.59 PM |
| 2 | z-Score Transformation | Tues. Sept. 22 | Fri. Oct. 2 11.59 PM |
| 3 | Single Sample t-test | Tues. Oct. 6 | Fri. Oct. 30 11.59 PM |
| 4 | Independent Groups t-test; | Fri. Oct. 9 | Fri. Oct. 30 11.59 PM |
| 5 | Paired Samples t-test | Tues. Oct. 13 | Fri. Oct. 30 11.59 PM |
| 6 | Mann-Whitney U-Test | Fri. Oct. 30 | Tues. Nov. 24 11.59 PM |
| 7 | Two-Way Chi Square Test | Tues. Nov. 3 | Tues. Nov. 24 11.59 PM |
| 8 | Pearson and Spearman Correlations | Fri. Nov. 6 | Tues. Nov. 24 11.59 PM |
| 9 | One-Way Independent Group ANOVA | Tues. Nov. 10 | Tues. Nov. 24 11.59 PM |
| 10 | One-Way Repeated Measures ANOVA | Fri. Nov. 20 | Tues. Dec. 8 11.59 PM |
| 11 | Two Way Independent Groups ANOVA | Tues. Nov. 24 | Tues. Dec. 8 11.59 PM |