

## RUTGERS UNIVERSITY

### QUANTITATIVE METHODS 830:200:01-05 FALL 2021

**DAYS/TIMES:** Tuesdays & Thursdays 1:00 – 2:20 PM

**RECITATION:** See below for day/time/location your section will meet

**NOTE:** This is NOT an “asynchronous” class. Although pre-recorded lectures will be available at all times, exams MUST be taken during the designated time period and recitations must be attended in-person (except Sec 05 – see below).

Instructor: Dr. Stephen Kilianski

Office: Tillett Hall 225

Dept. Office Phone (848) 445-4036

Office Hours: See below

Email: skilians@psych.rutgers.edu

#### RECITATION SECTIONS & TEACHING ASSISTANTS

- |           |                      |  |
|-----------|----------------------|--|
| <b>01</b> | Tues. 9 – 10:20 AM   | LSH B115                                     |
| <b>02</b> | Tues. 3 – 4:20 PM    | TIL 116                                      |
| <b>03</b> | Wed. 11AM – 12:20 PM | PH 115                                       |
| <b>04</b> | Wed. 9 – 10:20 AM    | SEC 209                                      |
| <b>05</b> | Thurs 11AM – 12:20PM | ONLINE – SEE BELOW FOR RECITATION PROCEDURES |

**Textbook:** Inferential Statistics: Drawing Conclusions about Populations from Sample Data. Kilianski, S.. (2020). This is my self-authored text designed specifically for this course. It is in MS Word format and is available on the Sakai course site in the Resources folder. There is no cost associated with access to it. **YOU MUST READ THE CORRESPONDING TEXT CHAPTERS BEFORE OR SOON AFTER EACH LECTURE IN ORDER TO FULLY MASTER THE SUBJECT MATTER!**

**Goals:** RELAX...you know all the math you need to know right now! If you can add, subtract, multiply, and divide, you can handle this course without any problem. Let go of your anxieties – in this course, they are your worst enemy. The subject matter is not difficult. The intent is to focus on what you need to know from a scientific perspective and to avoid the irrelevant and tangential. What you need to know I will make sure you understand very well. If you put in the effort, it is my mission to make sure that you succeed.

This course has been certified as satisfying both Quantitative and Formal Reasoning Learning Outcome Goals (QQ and QR) of the SAS Core Curriculum.

Specifically, students will be able to:

- a) Formulate, evaluate, and communicate conclusions and inferences from quantitative information (QQ)
- b) Apply effective and efficient mathematical or other formal processes to reason and to solve problems

**Course Requirements: Two (2) Hourly Exams.** Each of these will consist of two parts administered separately. One part will be conceptual (no calculations, multiple-choice and T/F objective questions) worth 40 points. Those exams will be given online (via Tests & Quizzes in Sakai) during the standard course time period (1:00 – 2:20 See Class Calendar below). The other portion will be computational (calculating the appropriate statistics, determining whether or not to reject the null hypothesis, and describing results in layperson’s terminology) worth 60 points. Except for the actual numbers, the structure and process involved in solving the computational problems will be identical to those used in lecture and in recitation. For the computational portion of the exam you will need copies of the relevant tables and will be permitted to use one 8.5 x 11 sheet of paper (2-sided) with any formulas or notes on it. Only calculators are permitted – no other electronic devices may be used. The computational exams will be administered on-line via the Assignments tool in Sakai during the standard course period (1:00-2:20. See Class Calendar below). **The scores on these two exams will account for approximately 58% of your grade (200 pts. – 100 pts. each).**

**Comprehensive Final Exam.** This will consist of two parts administered separately during the final exam session in the lecture hall. One part will be conceptual (no calculations, multiple-choice objective questions) worth 40 points; the other will be computational (calculating the appropriate statistics, determining whether or not to reject the null hypothesis, and describing results in layperson’s terminology) worth 60 points. Except for the actual numbers, the structure and process involved in solving the computational problems will be identical to those used in class and in recitation. For the computational portion of the exam you will be allowed to use two 8.5 x 11 sheet of paper with any formulas or notes on them. Only calculators are permitted – no other electronic devices may be used **This score will account for approx. 27% of your grade (100 pts.).**

**Classwork assignments.** You will be doing many computational assignments in class during your recitation section. You will turn them in for credit (50 points possible total). Obviously, if you’re not there, you can’t

get the credit for in-class assignments. NOTE: SEC 05 HAS ONLINE RECITATION ASSIGNMENTS. STUDENTS IN THAT SECTION WILL ACCESS THESE PROBLEMS VIA THE ASSIGNMENTS TAB IN SAKAI AND WILL UPLOAD THEIR WORK THERE. IT WILL BE AVAILABLE DURING THE DESIGNATED HOURS (TH 11 AM-12:20 PM) AND YOU WILL HAVE 24 HOURS TO UPLOAD THE COMPLETED WORK. MORE DETAILS WILL BE PROVIDED AS THE SEMESTER PROCEEDS. Recitations meet 10 times during the semester, so there are 10 of these assignments. "Forgiveness" will be granted for up to 3 missed classwork assignments (i.e., if you do only 7 of the 10, you still get 50 points). **These assignments account for approximately 15% of your grade (50 pts.).**

**Extra Credit for Recitation Attendance/Classwork.** You can earn an additional 5 points extra credit for *each* recitation attended/work done beyond the 7 specified above. Therefore if you attend (and do the work for) all 10 recitations you would earn the 50 points for the first 7 and an additional 5 for the each of the other 3.

***Make-up Exams:*** In order to qualify for a make-up for any exam you must notify me ***in advance*** by telephone or email ***and*** provide documentation (i.e., an MD's note, an obituary or funeral notice, police report, etc.). If you don't meet ***all*** of these criteria, you will not be permitted to take a make-up.

***Office Hours:*** In-person hours (TBA) and via Zoom (must be scheduled in advance via email)

***Academic Integrity:*** Collusion (getting any form of assistance from other students or outside sources) on exams is prohibited. Students suspected of doing so will be brought up on charges before university's Office of Student Conduct, and penalties, up to and including expulsion, will be imposed for those found guilty. (See <http://policies.rutgers.edu/PDF/Section10/10.2.13-current.pdf> for specifics)

***Attendance:*** Attendance at recitation sessions is mandatory (except for Sec 05). Making up recitation assignments is subject to the same rules as making up exams. **NOTE: With respect to lectures they will be posted and available for extended time periods. However, you should try to view them one-at-a-time, with spacing and text reviewing between, adhering to a schedule that parallels the class calendar.**

**Trying to master the content of multiple lectures in one sitting is a prescription for failure. PLEASE DON'T DO IT. ALWAYS READ THE CORRESPONDING TEXT CHAPTER (see class calendar below) BEFORE OR SOON AFTER VIEWING EACH LECTURE.**

***Grading:***

Based on the total points you have accumulated on the 2 hourly exams (100 each), the final (100), the in-class recitation assignments (50) (a maximum of 350 total), and any extra credit earned, grades will be assigned as indicated below:

315-350 = A	262-279 = C+	< 210 = F
297-314 = B+	245-261 = C	
280-296 = B	210-244 = D	

***THIS GRADING RUBRIC APPLIES TO ALL STUDENTS IN THIS CLASS – NO EXCEPTIONS FOR ANY REASON.***

***General Principle***

Please ask questions! It's the only reliable way we have of knowing whether you've understood what we're trying to convey. Even if you can't articulate what it is you don't understand, just say "I have no idea what you're talking about," or, "I'm lost," or "Help!" Chances are that if you don't get it, there are a number of your classmates who are also floundering. Help everyone out by asking, please!

**(Unfortunately, with pre-recorded lectures this doesn't apply as written. Inquiries are still encouraged either via email, or during in-person office hours or individually-scheduled Zoom sessions. TAs also provide this support)**

***Materials***

A simple electronic calculator is all you need. They cost as little as \$3 - \$5. **Bring a device to access the Sakai site to every recitation, as the assigned problems will be available there. For computational exams, copies of the tables of critical values (from the text) and one 8.5 x 11 formula sheet (both sides) are needed, in addition to your calculator.**

**CLASS CALENDAR**  
**QUANTITATIVE METHODS 830:200:01-05 FALL 2021**

DATE	TEXT CHAPTERS	TOPICS & EVENTS	
Thurs. 9/2		Orientation and review of syllabus and resources available.	<b>No recitation sessions this week</b>
Tues. 9/7  Lecture #1	Chapter 1	Types of measurement – nominal, ordinal, interval, ratio. Independent vs. dependent variables. Descriptive vs. Inferential Statistics: Drawing conclusions about populations from sample data.	<b>No recitation sessions this week</b>
Thurs. 9/9  Lecture #2	Chapter 2	Measures of central tendency – mean, median, mode. Graphing frequency distributions.  Measures of variability – range, variance, and standard deviation. Kurtosis and skew.	<b>Recitation 1</b>  W/E 9/17
Tues. 9/14 Lecture #3	Chapter 3	Characteristics of the normal distribution and the use of z-scores.	
Thurs. 9/16  Lecture #4	Chapter 3 (cont'd) & Chapter 4	Characteristics of the normal distribution and the use of z-scores (cont'd). Introduction to the Z-test, the Sampling Distribution of the Mean and its characteristics (Central Limit Theorem).	<b>Recitation 2</b>  W/E 9/24
Tues. 9/21  Lecture #5	Chapter 4 (cont'd)	The Z-test (inference regarding population means) and confidence intervals (for estimating population means). Null and alternative hypotheses. Alpha levels and statistical significance.	
Thurs. 9/23 Lecture #6	Chapter 4 (cont'd)	The t-test – Testing for mean differences. Single-sample t-test. Inferences about populations from samples.	<b>Recitation 3</b>  W/E 10/1

Tues 9/28 Lecture #7	Chapter 5	The Sampling Distribution of the Difference and the independent samples t-test.	
Thurs 9/30 Lecture #7	Chapter 5	Computing CI for mean difference Using Xcel to calculate M and SD Ind. Samples t review	<b>Recitation 4</b> <b>W/E 10/8</b>
Tues 10/5 Lecture #8	Chapter 11	Nominal data and the chi-square test	
Thurs 10/7 Lecture #9	Chapter 11	Nominal data and the chi-square test and review	<b>Recitation 5</b> <b>W/E 10/15</b>
<b>TUES</b> <b>10/12</b>	<b>HOURLY EXAM</b> <b>1</b> <b>COMPUTATIONAL</b>	<b>RECITATION SECTIONS DO NOT</b> <b>MEET THIS WEEK</b>	<b>ON SAKAI</b> <b>1:00 – 2:20 PM</b>
<b>THUR</b> <b>10/14</b>	<b>HOURLY EXAM</b> <b>1</b> <b>CONCEPTUAL</b>	<b>RECITATION SECTIONS DO NOT</b> <b>MEET THIS WEEK</b>	<b>ON SAKAI</b> <b>1:00 – 2:20 PM</b>
Tues 10/19  Lecture #10	Chapter 6	The Correlation Coefficient: Pearson's r  Fisher's Z test for difference between two Pearson's r values	<b>Recitation 6</b> <b>W/E 10/22</b>
Thurs 10/21  Lecture #11	Chapter 7	Repeated-measures (within-subjects) t-tests.	
Tues 10/26  Lecture #12	Chapter 8	The 1-way Analysis of Variance – Testing for mean differences among more than 2 groups. Post-hoc testing (Tukey test).	<b>Recitation 7</b> <b>W/E 10/29</b>

Thurs 10/28  Lecture #13	Chapter 9	Factorial ANOVA – Testing for the effects of more than 1 independent variable on a dependent variable. Main effects and interactions.	
Tues 11/2  Lecture #14	Chapter 9(Factorial ANOVA) Continued.	Factorial ANOVA – Continued	<b>Recitation 8 W/E 11/5</b>
Thurs 11/4  Lecture #15	Review for hourly exam 2	.	
<b>TUES 11/9</b>	<b>HOURLY EXAM 2 COMPUTATIONAL</b>	<b>RECITATION SECTIONS DO NOT MEET THIS WEEK</b>	<b>ON SAKAI 1:00 – 2:20 PM</b>
<b>THUR 11/11</b>	<b>HOURLY EXAM 2 CONCEPTUAL</b>	<b>RECITATION SECTIONS DO NOT MEET THIS WEEK</b>	<b>ON SAKAI 1:00 – 2:20 PM</b>
Tues 11/16  Lecture #17	Chapter 10	Linear Regression Analysis: Predicting values on a criterion using a predictor and the regression equation.	<b>Recitation 9 W/E 11/19</b>
Thurs 11/18	Chapter 10	<b>NO DESIGNATED LECTURE</b>	
Tues 11/23		. NO CLASS – THANKSGIVING WEEK	<b>No recitations this week</b>
Thurs 11/25		.. NO CLASS – THANKSGIVING WEEK	<b>No recitations this week</b>

Tues 11/30  Lecture #18	Chapter 10	Multiple Regression Analysis: Predicting values on a criterion using a set of many predictor variables (CONCEPTS ONLY – NO COMPUTATION OF MULTIPLE R STATISTIC WILL BE TAUGHT OR TESTED)	
Thurs 12/2	Chapter 10		<b>Recitation 10</b>
Tues 12/7		NO LECTURE – PRACTICE COMPUTATIONAL PROBLEMS AND CONCEPTUAL QUIZZES	
Thurs 12/9		NO LECTURE – PRACTICE COMPUTATIONAL PROBLEMS AND CONCEPTUAL QUIZZES	
<b>TBA</b>	<b>FINAL EXAM</b>	This is a comprehensive final assessing all concepts and procedures that have been covered throughout the entire semester. Includes both conceptual (40 pts) and computational (60 pts) components	

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**Academic Accommodations:** Should you require academic accommodations, you must file a request with the Office of Disability Services (Office of Disability Services-New Brunswick, Lucy Stone Hall, Suite A145, Livingston Campus, (ods.rutgers.edu, 848-202-3111, email: dsoffice@echo.rutgers.edu).). It is your responsibility to self-identify with the Office of Disability Services and to provide me with the appropriate documentation from that office **at least one week prior** to any request for specific testing accommodations.