

# LINB29H3 Quantitative Methods in Linguistics

Winter 2021

University of Toronto Scarborough

**Instructor:** Dr. Curt Anderson (he/him/his)  
**Class time:** online synchronous; Tuesdays 12:00–15:00 Toronto time  
**Classroom:** online via Zoom  
**Office hours:** Thursdays 16:00–17:00  
and by appointment  
**Course webpage:** Quercus (<http://q.utoronto.ca>)  
**Email:** [curt.anderson@utoronto.ca](mailto:curt.anderson@utoronto.ca)

## 1 Course Overview and Objectives

An introduction to experimental design and statistical analysis for linguists. Topics include both univariate and multivariate approaches to data analysis for acoustic phonetics, speech perception, psycholinguistics, language acquisition, language disorders, and sociolinguistics.

In particular, in this course we'll discuss (to varying degrees):

- The fundamentals of experimental design with emphasis on linguistic research
- Hypothesis testing and issues of population sampling
- Descriptive versus inferential statistics
- Basic statistical methods for different kinds of linguistic data
- How to use the R programming language to analyze data
- Why using quantitative methods in linguistic research is useful
- Different types of statistical tests (parametric tests such as t-test and ANOVA, and non-parametric tests such as chi-square)

## 2 Relation to Other Courses

**Prerequisite:** LINA02H3  
**Exclusions:** LIN305H, (PLIC65H3), PSYB07H3, STAB23H3  
**Recommended Preparation:** LINB19H3  
**Breadth Requirements:** Quantitative Reasoning

## 3 Readings, Textbook, and Equipment

I'll occasionally assign readings from the following textbook. The University of Toronto has access to an electronic copy of this book via the library webpage, and I've put a link to the book on Quercus, so there is no need to purchase it.

- Gries, Stefan Th. 2009. *Statistics for Linguistics with R: A Practical Introduction*. Berlin: De Gruyter Mouton.

You will also need to be able to run scripts in the R programming language in some form or another. Preferably, this will be a computer that can run the RStudio software package, available at <https://www.rstudio.com/>:

[//rstudio.com/products/rstudio/download/#download](https://rstudio.com/products/rstudio/download/#download). This is a free, open source interface for the R programming language, and makes it easier to program in R. RStudio runs on Windows 7/8/10, macOS 10.13+ (High Sierra), and several popular Linux distributions.

## 4 Requirements

The requirements for this course are as follows:

Assessment	Weight
Short assignments (6)	20%
Long assignments (3)	30%
Lab	25%
Final project	20%
Short quizzes	5%

There is no final exam or midterm for the course. Assignments will come in two flavors. Short assignments will test and reinforce new R skills or statistical methods we've learned in class. Long assignments are more involved and require you to engage more deeply with concepts. The lab will require you to analyze some linguistic data, and short quizzes test some small piece of knowledge about statistics or R from class. Finally, the final project will be done in groups, and involve the creation of a hypothesis and analysis of linguistic data from a large data set. This will be discussed more once the term has progressed.

**Grading scheme:** The grading scheme used in this class is the standard UTSC grading scheme.

**Due dates:** All assignments are due at Friday, 11:59pm Toronto time, in the week that they are due, except for the final project, which will be due on the final day of classes at UTSC.

**Late assignments:** In general, late assignments will not be accepted, except under special circumstances. If you anticipate not making a deadline, please talk to me as soon as possible so that we can figure out the next step and get you back on track in the course.

## 5 Course Policies

**On the R programming language:** A great deal of this course will be learning to use aspects of the R programming language (henceforth: R). Learning a programming language requires practicing with that language; you cannot learn R without typing in examples yourself. You should expect to spend some time working with examples in order to gain familiarity with R. If this is the first time you have learned a programming language, this will be doubly important, since programming (as a skill) requires an explicitness and attention to detail you might not have needed to deploy before. This is not meant to scare you, but simply to warn you that some aspects of the course may be deceptively more involved than they look at first.

**Netiquette:** Although we are meeting online, the same general standards of behavior you would find in a physical classroom apply: be considerate of me and your colleagues, be respectful when discussing others' views, be aware of how your colleagues might have different lived experiences than yourself, don't interrupt when others are speaking, and dress appropriately. However, there are additional rules of behavior online to be aware of. A few pointers:

- Try to attend class sessions from a quiet space with a minimum of background distractions (though I realize this may not always be possible). Mute yourself when not speaking.

- Be aware of any private or inappropriate material that might be visible if you share your screen.
- Humor and sarcasm don't always come across as easily online, especially in text form.
- ALL CAPS and excessive exclamation points!!!! can come across as anger.
- But, feel free to use emoticons in text! They help a lot in communicating online.
- Be charitable to others, and forgive and forget. Normal social cues break down online, and you may have misunderstood someone, or they might not have realized they did something rude.

**Email:** Make sure you check your University of Toronto email regularly. Any class announcements will be sent to your university email address. I check my email regularly, but if I don't get back to you within 36 hours (excluding weekends), feel free to send a reminder. In the "subject" line of emails to me, put the course number plus a short descriptor of what the email is about (e.g, LINB29 Problem downloading data), and sign off with your full name at the end of the email. I teach many students this semester, and these two things will help me stay organized with this course and get a reply back to you faster.

**Recording of lectures:** Our class sessions will be recorded and posted on Quercus with minimal editing. Please do not share these recorded lectures with people not participating in the course. At the end of the term, these recordings will be deleted.

**Preference on names and pronouns:** If you want me to refer to you with a particular name or pronouns, please let me know at a time that works best for you. If I make a mistake, please don't hesitate to correct me in a way that's non-confrontational and respectful.

**Cameras optional:** It's up to you whether you want to turn your camera on. There are many reasons why you might not want to turn on your camera, some potentially very personal, and so you're under no obligation to turn your camera on during our synchronous class periods, my office hours, or private meetings with me.

**Accessibility:** Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach me and/or the AccessAbility Services Office as soon as possible. AccessAbility Services staff (located in Rm AA142, Arts and Administration Building) are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations 416-287-7560 or email [ability@utsc.utoronto.ca](mailto:ability@utsc.utoronto.ca). The sooner you let us know your needs the quicker we can assist you in achieving your learning goals in this course.

**Academic misconduct:** The University treats cases of cheating and plagiarism very seriously. The University of Toronto's Code of Behaviour on Academic Matters<sup>1</sup> outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences. Potential offences in papers and assignments include using someone else's ideas or words without appropriate acknowledgement, submitting your own work in more than one course without the permission of the instructor, making up sources or facts, obtaining or providing unauthorized assistance on any assignment. On tests and exams cheating includes using or possessing unauthorized aids, looking at someone else's answers during an exam or test, misrepresenting your identity, or falsifying or altering any documentation required by the University, including (but not limited to) doctors notes.

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<sup>1</sup><http://www.governingcouncil.utoronto.ca/policies/behaveac.htm>

## 6 Schedule

This is a tentative overview of the topics we'll address, in roughly the order we'll address them, along with what assignment will be due in that week. Depending on how quickly or slowly we go through some topics, this particular sequence might change as the semester progresses.

LECTURE SCHEDULE	
Jan 12th Introduction Quantitative research in linguistics Introduction to R	<b>Week 1</b>
19th Univariate statistics Issues in sampling	<b>Week 2</b>  Short Assignment 1
26th Confidence intervals F-test	<b>Week 3</b>  Short Assignment 2
Feb 2nd Parametric vs Non-Parametric tests t-test	<b>Week 4</b>  Short Assignment 3
9th Non-parametric tests	<b>Week 5</b>  Long Assignment 1
16th Reading week (no lecture)	
23rd Principles of experimental design	<b>Week 6</b>  Short Assignment 4
Mar 2nd Class time reserved for working on lab	<b>Week 7</b>  Lab
9th Multivariate Statistics Correlations	<b>Week 8</b>  Long Assignment 2
16th ANOVA	<b>Week 9</b>  Short Assignment 5

LECTURE SCHEDULE	
23rd Chi-square	<b>Week 10</b> Long Assignment 3
30th In-class final project time	<b>Week 11</b> Short Assignment 6
Apr 6th Conclusion: Putting it all together	<b>Week 12</b> Final Project