# The Chinese University of Hong Kong
## Department of Linguistics and Modern Languages
## First Term, 2022-23

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| **Course Title:** LING 6970 Special Topics in Linguistics: Statistics | |

**Description:**
This course presents an introduction to research designs and data analyses that are commonly used in experimental linguistic research. The course will emphasize on practical skills in data handling and analyses, in particularly using R. The course first introduces students to experimental designs as a prerequisite to statistics. Then it progresses from data distribution and descriptive statistics to gradually more complicated statistical techniques that are commonly used to analyze linguistic data (e.g., correlation, t-test, non-parametric tests, ANOVA, regression). With a focus on both conceptual understanding and practical skills in statistics, the course offers both lectures and also practical sessions where students have hands-on experience using R to analyze actual language data.

**Content, highlighting fundamental concepts**

| Topic | Contents/fundamental concepts |
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| Research design in experimental linguistics | Correlational design, cause-effect design, cross-sectional design, within/between-subject design |
| R as a statistical platform | R for handling data, R for statistical analyses, R for making graphs |
| Descriptive statistics | Mean, mode, median, z-score, standard deviation |
| Correlation | The relation between two datasets |
| t-test | How to use parametric test to compare two means |
| Non-parametric tests | How to use non-parametric tests to compare means |
| ANOVA | How to compare multiple groups |
| Regression | How to model a set of observations using independent predictors |

**Learning outcomes**

- Students will learn how to interpret statistical results in experimental reports on language and related areas.
- Students will have a good understanding of experimental designs and their implications for statistical analyses.
- Students will develop critical quantitative thinking in their empirical research.
- Students will have conceptual understanding of common statistical techniques in language research and the actual skills to apply them to collected data.
- Students will be able to use R to conduct simple data analyses.

**Learning activities**

| Lecture (hr) in /out class | | Interactive tutorial (hr) in /out class | | Lab (hr) in /out class | | Discussion of case (hr) in /out class | | Field-trip (hr) in /out class | | Projects (hr) in /out class | | Web-based teaching (hr) in /out class | | Other (hr) in /out class | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | | 0.75 | | | | | 1 | | | | 0.5 | | 1 | | |
| M | NA | M | NA | NA | NA | NA | M | NA | NA | NA | M | NA | O | NA | NA |

M: Mandatory activity in the course
O: Optional activity
NA: Not applicable

**Assessment scheme**

| Task nature | Description | Weight |
|---|---|---|
| Participation | Participation in lectures/tutorials, discussion, and presentation | 10% |
| Assignment | Weekly assignment | 25% |
| Group project | Report of an experiment | 25% |
| Exam | In-class data analyses and reports | 40% |
| | | Total: 100% |

**Learning resources for students**

*Introductory textbooks*
Levshina, N. (2015). *How to do linguistics with R. Data Exploration and Statistical Analysis*. Amsterdam-Philadelphia.

*More advanced textbooks*
Field, A., Miles, J., Field, Z. (2012). *Discovering statistics using R*. Sage Publications. [Reference book]
De Vries, A., & Meys, J. (2015). *R for Dummies*. John Wiley & Sons.
Crawley, M. J. (2012). *The R book*. John Wiley & Sons. [Reference book for R]
Kerns, G. J. (2010). *Introduction to probability and statistics using R*. Downloadable from https://cran.r-project.org/web/packages/IPSUR/vignettes/IPSUR.pdf. [Textbook for R and statistics]

**Feedback for evaluation**

Students are encouraged to give feedback or comments on course contents and teaching materials throughout the course. Students can contact either the lecturer or tutor directly. See contact details below. Mandatory term-end evaluation for teacher's reflection will also be conducted.

**Grade Descriptors**

| Grade | Descriptors |
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| A | • Excellent understanding of common statistical tests and always apply them appropriately in answering a wide range of research questions<br>• Excellent ability to visualize, analyze, and summarize many different types of data using R with very high presentation standards<br>• Excellent ability to interpret and evaluate quantitative findings in linguistics with an extremely high degree of accuracy and aptness |
| A- | • Good understanding of common statistical tests and almost always apply them appropriately in answering a wide range of research questions<br>• Good ability to visualize, analyze, and summarize many different types of data using R with high presentation standards<br>• Good ability to interpret and evaluate quantitative findings in linguistics with a high degree of accuracy and aptness |
| B | • Fair understanding of common statistical tests and often apply them appropriately in answering some research questions<br>• Fair ability to visualize, analyze, and summarize some types of data using R with satisfactory presentation standards<br>• Fair ability to interpret and evaluate quantitative findings in linguistics with a satisfactory degree of accuracy and aptness |
| C | • Poor understanding of common statistical tests and only sometimes apply them appropriately in answering some research questions<br>• Poor ability to visualize, analyze, and summarize some types of data using R with poor presentation standards<br>• Poor ability to interpret and evaluate quantitative findings in linguistics with only some degree of accuracy and aptness |

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| D | • Very poor understanding of common statistical tests and rarely apply them appropriately in answering research questions<br>• Very poor ability to visualize, analyze, and summarize limited types of data using R with poor presentation standards<br>• Very poor ability to interpret and evaluate quantitative findings in linguistics with a barely satisfactory degree of accuracy and aptness |
| F | • Almost no understanding of common statistical tests and almost never apply them appropriately in answering research questions<br>• Almost no ability to visualize, analyze, and summarize very limited types of data using R with extremely poor presentation standards<br>• Almost no ability to interpret and evaluate quantitative findings in linguistics inaccurately and inaptly |

**Course schedule**

| Week | Date | Content |
|---|---|---|
| 1 | 7-Sep | Introduction and R |
| 2 | 14-Sep | Descriptive statistics |
| 3 | 21-Sep | T-tests 1 |
| 4 | 28-Sep | T-tests 2 (*Qualtrics*) |
| 5 | 5-Oct | ANOVA 1 |
| 6 | 12-Oct | ANOVA 2 (*Qualtrics*) |
| 7 | 19-Oct | Non-parametric tests |
| 8 | 26-Oct | Chi-square test |
| 9 | 2-Nov | Correlation |
| 10 | 9-Nov | Linear regression 1 (*Report due*) |
| 11 | 16-Nov | Linear regression 2 |
| 12 | 23-Nov | Revision (*Report feedback*) |
| 13 | 30-Nov | **Exam** |

**Teachers' or TA's contact details**

| Professor/Lecturer/Instructor: | |
|---|---|
| Name: | Prof. Zhenguang Cai |
| Office Location: | Leung Kau Kui Building G5 |
| Telephone: | 3943 7909 |
| Email: | zhenguangcai@cuhk.edu.hk |
| Teaching Venue: | Wed 14:00 – 15:00, or by appointment |
| Website: | http://www.cuhk.edu.hk/lin/people/ |
| Other information: | |

| Teaching Assistant/Tutor: | |
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| Name: | |
| Office Location: | |
| Telephone: | |
| Email: | |
| Teaching Venue: | |
| Website: | |

| Other information: | |
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**A facility for posting course announcements**

| All teaching materials will be uploaded (either before or after lecture) onto Blackboard (https://blackboard.cuhk.edu.hk) or via email. |
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**Academic honesty and plagiarism**

| Attention is drawn to University policy and regulations on honesty in academic work, and to the disciplinary guidelines and procedures applicable to breaches of such policy and regulations. Details may be found at http://www.cuhk.edu.hk/policy/academichonesty/. With each assignment, students will be required to submit a statement that they are aware of these policies, regulations, guidelines and procedures. |
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