

## Course Syllabus

### 1617 Frequentist Statistics

SOW-BKI107-SEM2-V

Lecture Hall: CC 4

Practicals Rooms: TvA 6.00.03 Studielandschap; TvA 6.-1.02 Scriptiewerkplaats

Instructor: Dr. Alexander Wahl (Alex)

Email: [a.wahl@psych.ru.nl](mailto:a.wahl@psych.ru.nl)

Office: Spinoza B 01.40

Office Hours: Mondays, 15:15 to 17:15

Student Assistants: Zina Al-jibouri, Nino van Halem, Lea Nugteren, Anne van Peer, Pieter Wolfert

### Required Textbook:

*Discovering Statistics Using R*. Andy Field, Jeremy Miles, & Zoë Field (2012). London: Sage Publications Ltd. (available via CognAC studystore)

### Course Description:

Upon satisfactory completion of this course, the student will be able to describe and analyze quantitative data using a diverse set of tools within a frequentist statistical paradigm. These tools will range from various descriptive statistics and data visualization techniques, to a powerful collection of significance tests for the analysis of both numeric and categorical data. Examples and practice assignments will draw on data from various disciplines, so students will gain confidence in handling quantitative data regardless of source domain. Ultimately, the goal will be not just be to train students to formulaically deploy particular tests on particular kinds of data, but to think critically and reason about data, and to understand how particular techniques produce the results that they do. Throughout this course, the R programming language will be taught/used, which is one of the most powerful languages (and sought-after skills!) for modern statistical computing.

### Course Components:

#### 1. Lectures & Reading

- Students should prepare for and attend every lecture. Preparation involves reading the chapter(s) assigned for that unit.
- Talking during lecture is highly distracting for me. If particular individuals are consistently disruptive, your participation grade for the course will be reduced.

#### 2. Practical

- Students should attend every practical session, which are designed to provide students with hands-on experience with techniques learned during the week's lecture. Preparation for the practical includes attending that lecture as well as completing the reading assignment.
- The lowest practical grade will be dropped. This means you can miss one practical without penalty.

- Throughout the semester, students will work in pairs, with each pair sharing a student workstation during practical sessions (and each pair working together throughout the practical activity). You may choose your own partner for the semester, or one will be assigned for you.
  - During practicals, student pairs are expected to complete that week's practical activity. Towards the end of the session, TAs will verify that you have made progress on the activity. Your grade for practicals is based on participation, not on whether you correctly completed the activity.
  - Practical are not to be spent working on the week's homework assignment
3. Homework Assignments
- Most units will be accompanied by a homework assignment. These are to be completed in pairs (same pairings as in the practical sessions).
  - Typically, students will have 1 week to complete an assignment. The assignment will be made available on Blackboard after the lecture, and then it will need to be completed (and submitted via Blackboard) before the following lecture on Thursday morning. Note that, after Unit 8, this scheduling will be altered a bit—we will discuss this more when we get there.
  - Submissions will comprise R scripts that you have completed and sometimes image files of plots created in R.
  - Note that it will not be possible to submit assignment late.
  - Please note that, while you are expected to complete assignments in pairs, simply copying another student's (or another group's) work is considered plagiarism and will not be tolerated. We have instituted multiple measures to detect evidence of plagiarism in the homework assignments.
4. Final Exam
- The final exam will be in-class and completed individually with pen and paper.
  - It will focus primarily on theoretical aspects of the material covered in the class, but you may also be asked to answer questions about how particular techniques are implemented in R and how to interpret statistical results.
5. Final Assignment
- There will be a larger final assignment to be completed individually at home
  - The students will have several days to work on this assignment
  - As with the homework assignments, the submission will be an R script/accompanying plots

#### Grading Breakdown:

15%	Participation (working on activities in practicals and any quizzes)
35%	Homework Assignments
30%	Final Exam
20%	Final Assignment

#### Course Schedule:

- Unit 1: Introduction & Basics of Quantitative Research
  - Lecture: Feb 2 at 10:45
- Unit 2: Introduction to Vectors and Factors in R
  - Lecture: Feb 9 at 10:45

- Practical: Feb 10 at 10:45
- Unit 3: Introduction to Statistical Models and Introduction to Dataframes in R
  - Lecture: Feb 16 at 10:45
  - Practical: Feb 17 at 10:45
- Unit 4: Data Visualization
  - Lecture: Feb 23 at 10:45
  - Practical: Feb 24 at 10:45
- Unit 5: Assumptions
  - Lecture: March 2 at 10:45
  - Practical: March 3 at 10:45
- Unit 6: Correlation
  - Lecture: March 9 at 10:45
  - Practical: March 10 at 10:45
- Unit 7: Linear Regression
  - Lecture: March 16 at 10:45
  - Practical: March 17 at 10:45
- Unit 8: Multiple Regression
  - Lecture: March 23 at 10:45
  - Practical: March 24 at 10:45
- Mini-unit/Tutorial: Logistic Regression
  - Practical: March 31 at 10:45
- Unit 9: T-test
  - Lecture: April 10 at 13:45
  - Practical: April 21 at 10:45
- Unit 10: ANOVA
  - Lecture: May 1 at 13:45
- Unit 11: Categorical and Continuous Predictor Structures
  - Lecture: May 8 at 13:45
  - Practical: May 12 at 10:45
- Final Exam
  - May 15 at 13:45

#### Blackboard:

Students can log onto Blackboard at [blackboard.ru.nl](https://blackboard.ru.nl), a course management platform widely used at RU. After login, you should have access to the page for this course, where you will find course information and course materials available for download. These will include documents such as this syllabus, PowerPoint slides from lecture, and data files and code files used for your homework assignments. You will also use Blackboard to submit homework assignments as well as the final assignment. I will also use Blackboard to send out emails to you regarding the course.

#### R and Rstudio:

Throughout this course, we will be using the R programming language (in class, in practicals, and in homework assignments). As AI students, I understand that you already have some experience with programming—R's syntax exhibits strong parallels to many other languages (e.g., Java and Matlab), so you should be able to pick it up relatively easily through the practice you will receive in practicals and in homework assignments. RStudio is a very nice

interactive development environment for R that we will be using. The computers in the practical rooms are equipped with R and RStudio, as are many of the student workstations throughout campus; however, I recommend you install R and RStudio on your own personal computers so that you can work on homework assignments at home.

#### Student Assistants (TAs):

There are 5 student assistants for this course. They will be responsible for administering the practicals as well as grading your work. Once everyone has a partner for the semester, you will all be assigned on Blackboard to a TA who will grade your work. Note that during the practicals all TAs will be present, and you may ask for assistance from any one.

#### Resit Option:

If you fail the course, a resit option is possible. However, this course will not be offered next year, but rather the following year (2018-2019). As a result, any resit next year will have to be completed primarily through self-study (with possible administration from a teacher or student assistant for taking the exam/completing the assignments).

#### A Note on Language:

My knowledge of Dutch is very basic (I can read a little bit, but communicating verbally is unfortunately not possible). All communication with me needs to be in English (email or face-to-face). Furthermore, despite the fact that the student assistants are native speakers of Dutch, it is the policy of the department that communication with them should be in English as well, since the Bachelor's program in AI is an English language program, and many of your student colleagues may be international students who do not speak Dutch.

#### Students with Disabilities & Distressed Students:

In the AI department:

Nav Muts, walk-in appointments on Wed. and Thurs. 12:30-13:30  
+31 (0)24-3616163

At the university level, or when urgent:

Student Affairs Office & Counselors can be reached at +31 (0)24-3612345 or [balie@dsc.ru.nl](mailto:balie@dsc.ru.nl)