

DS 202 - Data Acquisition and Data Exploratory Analysis

Course Description: data acquisition: file structures, web-scraping, database access; ethical aspects of data acquisition; types of data displays; numerical and visual summaries of data; pipelines for data analysis: filtering, transformation, aggregation, visualization and (simple) modeling; good practices of displaying data; data exploration cycle; graphics as tools of data exploration; strategies and techniques for data visualizations; basics of reproducibility and repeatability; web-based interactive applets for visual presentation of data and results. Programming exercises.

Prerequisite: DS 201X

Meeting times: TR 12:40 - 2:00

Location: Gilman 2272

Instructor: Dr Heike Hofmann

Contact: hofmann@iastate.edu

Reading: Garrett Golemund and Hadley Wickham: *R for Data Science*, <http://r4ds.had.co.nz/>; Garrett Golemund: *Hands-On Programming with R*, https://www.amazon.com/dp/1449359019/ref=cm_sw_su_dp; Yihui Xie: *Dynamic Documents with R and knitr* and a selection of other reading as needed.

Course Objectives:

- Able to read and combine data from flat files, SQL database, binary netCDF, and making use of web technologies as data source.
- Clean the data, check the quality, impute missing values.
- Write efficient code, reproducible code so others are able to replicate the analysis.
- Develop software, individually and collaboratively, debug, profile and package code.
- Experiment with event driven programming to build an interactive graphic, and a GUI.
- Provide experience in pulling data together to solve a contemporary problem.

Computing: Software primarily used will be R (www.R-project.org).

Course Grades: Lab work, homework assignments. One midterm exam. One small-scale project and a final project. Final grades will be calculated based on the following weights:

Component	Weight
Homework	20.0%
Labs	20.0%
Midterm	25.0%
Mini-project	5.0%
Final Project	
— report	22.5%
— presentation	7.5%

Academic Misconduct: All acts of dishonesty in any work constitute academic misconduct. The Student Disciplinary Regulations (<http://policy.iastate.edu/policy/SDR>) will be followed in the event of academic misconduct. Depending on the act, a student could receive an F grade on the test/assignment, F grade for the course, and could be suspended or expelled from the University. Academic misconduct includes all acts of dishonesty in any academically related matter and any knowing attempt to help another student commit an act of academic dishonesty. Academic dishonesty includes, but is not limited to each of the following acts when performed in any type of academic or academically related matter, exercise, or activity:

Plagiarism: Plagiarism is the act of representing directly or indirectly another persons work as your own. It can involve presenting someones speech, wholly or partially, as your; quoting without acknowledging the true source of the quoted material; copying and handing in another persons work with your name on it; and similar infractions. Even indirect quotations, paraphrasing, etc., can be considered plagiarism unless sources are properly cited. Plagiarism will not be tolerated, and students could receive an F grade on the test/assignment or an F grade for the course. The Iowa State University policy for academic misconduct can be found in the Student Disciplinary Regulations.

Obtaining Unauthorized Information: Information is obtained dishonestly, for example, by copying graded homework assignments from another student, by working with another student on a take-home test or homework when not specifically permitted to do so by the instructor, or by looking at your notes or other written work during an examination when not specifically permitted to do so.

Tendering of Information: Students may not give or sell their work to another person who plans to submit it as his or her own work. This includes giving their work to another student to be copied, giving someone answers to exam question during the exam, taking an exam and discussing its contents with students who will be taking the same exam, or giving or selling a term paper to another student.

Misrepresentation: Students misrepresent their work by handing in the work of someone else. The following are examples: purchasing a paper from a term paper service; reproducing another persons paper (even with modifications) and submitting it as their own; having another student do their computer program or having someone else take their exam.

Bribery: Offering money or any item or service to a faculty member or any other person to gain academic advantage for yourself or another is dishonest.

Special Accommodations Please address any special needs or special accommodations with your instructor the first day of class or as soon as you become aware of your needs. Those seeking accommodations based on disabilities should obtain a Student Academic Accommodation Request (SAAR) from the Disability Resources Office.

Student Disability Resources:

1076 Student Services Building

Ames, IA 50011-2222

Phone: 515 294-7220

Fax: 515 294-2397

TTY: 515 294-6635

E-mail: disabilityresources@iastate.edu

Website: <http://www.dso.iastate.edu/dr/>