

NRES-498/898
Data Analysis using R
Fall 2014

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Course Description: This course is about learning the fundamental computing skills necessary for effective data analysis using the R programming. In this course, you will learn to program in R and reading and writing data, writing functions, making informative graphs, and applying modern statistical and visualization methods for your research need.

Prerequisites: Students taking this course should be familiar with computer usage.

Grading Policy:

Mid Semester: 20%

Assignments: 20%

Final Project: 30% (Team of 2 or 1)

Final Exam: 30%

You are required to turn in all projects/scripts electronically in required format.

Students enrolled in this class will:

- Gain the Data Analysis Knowledge
- Learn data input / output using R
- Learn to subset, remove missing values from, and clean tabular data
- Capable to write custom functions in R to implement new functionality and making use of control structures such as loops and conditionals
- Develop skills about geographical and time series data analysis and visualization
- Learn the skills in scatterplot/boxplot/histogram/image plot
- Able to produce publication quality graphics
- Advanced data analytics

Demonstration scripts are based on data from the Natural Resources / Climate / Finance / Business / Internet.

Statistical software: The statistical computing software package R (R version 3.1.1) will be used for data analysis in this class.

Schedule

Week	Topic
Week1	Syllabus, Introduction to R
Week2	Data Types and Data Manipulation in R
Week3	Data Input/Output, Subset, remove missing values from, and clean tabular data
Week4	Function, Control Structures, and Loops in R
Week5	Chart/Plots in R
Week6	Regression Analysis using R
Week7	Probability Distributions using R
Week8	Time Series Data Analysis
Week9	Geospatial Data Analysis Using R
Week10	Data Mining -1: Social Network Data
Week11	Data Mining -2: Clustering, Classification and Prediction using R
Week12	Advanced Data Visualization using R
Week13	Project Presentations
Week14	Project Presentations

UNL Americans with Disabilities Act statement

Students with disabilities are encouraged to contact me (the instructor or teaching assistant) for a confidential discussion of their individual needs for academic accommodation. It is the policy of the University of Nebraska-Lincoln to provide flexible and individualized accommodations to students with documented disabilities that may affect their ability to fully participate in course activities or to meet course requirements. To receive accommodation services, students must be registered with the Services for Students with Disabilities (SSD) office, 132 Canfield Administration, 472-3787 voice or TTY. Academic integrity statement

Academic Dishonesty, Policy Appeals, and Grade Appeals Policy

Students are expected to adhere to guidelines concerning academic dishonesty outlined in Section 4.2 of University's Student Code of Conduct (<http://stuaufs.unl.edu/ja/code/>). (Optional) Instructor - Outline penalties possible for instances of dishonesty such as cheating and plagiarism here. Students are encouraged to contact the instructor for clarification of these guidelines if they have questions or concerns. The SNR policy on Academic Dishonesty is available at <http://snr.unl.edu/employeeinfo/information/employeehandbook-single.asp?infocode=S162>.

Grade and Policy Appeals, and Incidents of Academic Dishonesty in School of Natural Resources courses are to be handled in the following framework:

Student Appeals of a School of Natural Resources Policy or Policy Decision:

A student wishing to appeal an ENVR, GEOG, NRES, WATS or SNR policy or policy decision must first discuss with his or her academic adviser the policy or decision in question. If a satisfactory solution is not achieved with the adviser, the student may request a decision from the SNR Undergraduate Committee (undergraduate student) or Graduate Committee (graduate student) and then the SNR Director (in that order). If a satisfactory solution is not achieved at the School level, the student may appeal his or her case through the appropriate College Dean's Office, using that body's appeal process.

Students appealing a policy decision must do so within one semester (Fall or Spring) following the decision.

Student Appeals of School of Natural Resources Course Grades:

In the event of a dispute involving ENVR, GEOG, NRES, or WATS course grades, the student must first appeal to his or her instructor and, failing resolution with the instructor, to the SNR Undergraduate Committee (undergraduate level course) or Graduate Committee (graduate level course), and then to the SNR Director in writing (in that order). If a satisfactory solution is not achieved at the School level, the student may appeal his or her case through the appropriate College Grade Appeals Committee using that body's process.

If a grade is appealed to the appropriate SNR Committee, the instructor must provide a written justification for the awarding of the grade. The student shall provide an account of the grounds for the grade appeal and evidence that the student has sought to resolve the case in consultation with the instructor.

Students appealing a course grade must do so within one semester (Fall or Spring) following the grade.

Academic Dishonesty:

Academic dishonesty can involve, but is not limited to, cheating; fabrication or falsification of information; plagiarism; destroying, defacing, stealing, or making inaccessible library or other academic resource material; complicity in the academic dishonesty of others; falsifying grade reports; or misrepresenting illness, injury, accident, etc., to avoid or delay an examination, or the timely submission of academic work.

Consequences of academic dishonesty in ENVR, GEOG, NRES, or WATS courses, depending on the degree of severity as interpreted by an instructor, may range from a warning to assigning an F for the course. The instructor might also choose to assign a zero or partial credit for a specific assignment, quiz, examination or laboratory report in which dishonesty was involved. Before imposing an academic sanction the instructor shall first attempt to discuss the matter with the student. In all cases, including sanctions not involving a lowered grade (e.g. retaking an exam) the instructor must document the instance(s) of student activity that constitutes academic dishonesty. Documentation must be kept by the instructor for a minimum of two years and must be made available to appropriate School, college, and UNL authorities if cases of academic dishonesty result in disciplinary hearings or appeals at those levels.

When an academic sanction is imposed that causes a student to receive a lowered course grade, the instructor shall make a report in writing of the facts of the case, and of the academic sanction imposed against the student, to the SNR Director and, if necessary, to the UNL Director of Student Judicial Affairs. The student shall be provided with a copy of this report. Further, the instructor may recommend to CASNR, CAS, or UNL disciplinary proceedings against the student for violation of the Student Code of Conduct if the instructor, in the exercise of his or her professional judgment, believes that such action is warranted.

If the student believes that the allegations of the instructor regarding Academic Dishonesty, or the proposed penalty to be imposed, are unjust or not warranted, the student should contact their academic adviser and the SNR Director to discuss the matter. This process must be initiated within one month of the class grade assignment. If a student facing a sanction due to academic dishonesty in an SNR course wishes to appeal the sanction, the following process must be followed. First is an appeal to the chief instructor of the course. Failing this appeal, next is an appeal (in writing) to the SNR Undergraduate Committee (undergraduate student) or Graduate Committee (graduate student), then to the SNR Director (in that order). If a satisfactory solution is not achieved at the School level, the student may then appeal through the appropriate CASNR, CAS, Graduate Studies, or UNL appeal process, subject to the process and requirements of those bodies.

Approved by SNR Undergraduate and Graduate Curriculum Committees - 09/13/2013

Approved by SNR Faculty - 10/03/2013