



Geographic Data Analysis

Geog 4/595: Winter 2018, 2:00-3:50 MW, 206 Condon Hall

Topic: Visualization and Data Analysis

Instructor: Pat Bartlein, 154 Condon, 6-4967, bartlein@uoregon.edu

Course overview: Phenomena describable by multiple variables arise in many subfields of physical and human geography and related disciplines. The focus of this course is on the analysis and display of multivariate geographical data by traditional multivariate methods and by newer methods of scientific visualization. The **R** data-analysis and computing environment will be used. (Ideally, students should have access to a personal computer with sufficient rights and availability to install and run **R**, but the software is usually available in various campus computer labs (e.g.SSIL).

Tentative topics:

- the nature of geographical data
 - univariate, bivariate and multivariate plots
 - descriptive statistics
 - maps and geospatial analyses in R
 - data wrangling and matrix algebra
 - reference distributions, statistical inference
 - regression analysis, nonparametric regression
 - principal components and factor analysis
 - discriminant analysis and MANOVA
 - cluster analysis
 - high-resolution and high-dimension data
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Format and grading: All: Lectures, two take-home exams, and eight exercises, both exams and all exercises must be completed to receive a passing grade for the course. Grads: an analysis of real data.

Readings

Online Readings: (available on CRAN at <http://cran.us.r-project.org/other-docs.html>)

Kuhnert, P. and W. Venables, 2005, *An Introduction to R: Software for Statistical Modelling & Computing*. CSIRO Australia (.pdf)

Owen, W.J., 2011, *The R Guide*. Dept. of Mathematics and Computer Science, University of Richmond. (.pdf)

Rossiter, D.G., 2012, *Introduction to the R Project for Statistical Computing for use at ITC*. International Institute for Geo-information Science & Earth Observation (ITC)

Hijmans, R., 2016, *Spatial Data Analysis and Modeling with R* rspatial.org

Reserve Readings:

Cleveland, W.S., 1993, *Visualizing Data*, Hobart Press, 360 p.

Rogerson, P.A., 2010, *Statistical Methods for Geography*, Sage, 236 p. (online at UO Library)

Fotheringham, A.S., et al, 2000, *Quantitative Geography*, Sage, 270 p.) (online at UO Library)

Link to last year's course materials: <http://geog.uoregon.edu/bartlein/courses/geog495/index.html>

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