

MATH 759 / 859

Offered every semester and every term

Topics: Introduction to the R Software (1 credit)

- Instructor:** Ernst Linder, elinder@unh.edu N321B Kingsbury Hall
- Time and Room:** This class is offered on-line. No campus visits necessary. There will be about 6 weeks of materials (3 compressed weeks in J-term)(Modules on *My courses*) that will include videos, on-line quizzes, written resources, template scripts, etc. You are required to review these materials
- Assignments:** A few on-line quizzes (assignments). In order to earn the credit for the course you must have completed these assignments with a passing score of 60 (out of 100)
- Virtual Office Hours:** There will be office hours during which the instructor will be available either in person at his office, or virtually on-line.
- Content:** This is an introduction suitable for students who have never used R, or have never formally learned the basics of R.
- To get started:** R is an open source software. To get started, download R from CRAN <https://cran.r-project.org/>
Also download Rstudio from: <https://www.rstudio.com/>

Topics:

- 1) **Overview**
 - Storing objects, workspace, workspace management, saving multiple workspaces
 - R Studio
 - Packages / Libraries:
 - Basics about Scripts
 - Some easy nuggets: R: *My handy calculator*.
- 2) **R Markup/ markdown for Publishing: RStudio as the Dashboard for Everything**
Additional Introductory features: Object oriented language;
 - Class and Type (numeric, character, factor, logical); vectorized features.
- 3) **More “Data” Objects (all elements in R are objects..)**
 - vector, matrix, array, data frames, lists
 - Subsetting and basic operations and functions

- 4) **Graphs in R** (*the original purpose of the S language was for producing statistical graphs...*)
 - One-variable graphs
 - Graph setup, annotations, embellishments, saving and exporting graphs
 - Two – variables and one-way arrangement
 - Multiple graphs, scatterplot matrices
 - Conditioning Graphs – panel plots (trellis)
 - 3 – d graphs (contour, surface, ...)
- 5) **Some advanced features**
 - Advanced subsetting; do/for/while loops, if conditioning
 - creating your own functions
 - interpreting the help files
- 6) **R and Statistical Modeling**
 - Regression analysis
 - Generalized linear models
 - Advanced regression: smoothing, mixed effects models
- 7) **R and Big Data, R for Analytics**
 - Multi-core computation, launching Hadoop with R,
 - Packages for large data implementations
 - Additional topics may be requested.