January 14,2020

University of New Hampshire, DURHAM, NH: Dept of Mathematics & Statistics

MATH 759 / 859   Offered every semester and every term

Introduction to the R Software (1 credit)

Instructor: Ernst Linder,   elinder@unh.edu   N321B Kingsbury Hall

The course is 1 credit, and offered as credit/fail.

Time and Room: This course 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, …)
   - graphs with ggplot

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.