University of New Hampshire

Dept of Mathematics & Statistics

MATH 732 / 832 (formerly 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

Credits: The course is 1 credit, and is 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).

Materials: Posted as *Modules* in ***My courses*** such as slides, scripts etc. " There are also on-line quizzes. 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)

Recordings: Recordings for most of the modules are posted in the *Media Gallery*.

Virtual Office Hours: Assistance by the instructor is available virtually upon email request.

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.