Instructor Name: Timothy H. Keitt

Course Name: Geospatial Data Analysis in R

Course Description:

The R language has excellent support for loading, analyzing and plotting geospatial data. The course will teach you how to use R as a Geographical Information System. In addition to a good general-purpose introduction to R, we will learn about the most important add-on packages supporting geospatial data analysis and management. Using these packages, we will cover how to load nearly any format GIS data file into R and directly access the underlying numerical representation of the data. Basic vector and raster GIS operations, such as resampling, projection and spatial queries, will be introduced. The course is based around a series of hands-on tutorials that will guide students through each step of the analysis. Completion of the course will allow students to begin using R as a data analysis tool for spatial and non-spatial problems.

Day 1:
Objective: Getting comfortable with R
(Advanced students will skip ahead.)
Course overview
Working in RStudio
Evaluating expressions
Writing small scripts and functions
Understanding R generic functions
Looping and flow control
Working with data tables
Plotting data

Day 2:
Objective: Learn to load, analyze and visualize vector data
Brief introduction to vector data concepts
Overview of vector data packages and capabilities
Loading vector data in various formats
Plotting vector data
Reprojecting vector data
Geometric operators and predicates
Interpolation
Day 3:
Objective: Learn to load, analyze and visualize raster data
Brief introduction to raster data concepts
Overview of raster data packages and capabilities
Loading raster data in various formats
Plotting raster data
Converting to vector format
Reprojecting raster data
Subset and resample raster data

Day 4:
Objective: Combine raster and vector data, analyze own data
Brief introduction to intersecting vector and raster data
Additional types of geospatial data analysis and relevant packages
Using vector data to sample raster data
Rasterizing vector data
Plotting overlays
Additional practice problems or student-driven projects