Introduction to R for Environmental Sciences
ENR 8890, Section 03 (Ecosystem Science Seminar)
2 credit hours
Wednesdays from 1:45 – 3:45 PM, Fall 2014
123 Williams Hall in Wooster, video-linked to 333 Kottman Hall in Columbus

Instructors: Drs. Steve Culman (culman.2@osu.edu), Kris Jaeger (jaeger.48@osu.edu) and Kai Zhao (zhao.1423@osu.edu) and Bob Gates (gates.77@osu.edu)

Course Description: This is a practical, hands-on course intended to give students a broad overview and introduction to R, a language and environment for statistical computing and graphics. This course will only provide a brief overview of some statistical analyses in R, but will complement the *Quantitative Methods for Environment and Natural Resources* course (ENR 8780), which covers many common statistical analyses in environmental science.

Requirements: Students should be familiar with basic concepts of data management, manipulation and analyses. Students will need to bring a laptop with the current version of R loaded. At the end of the semester, students will present a task/solution using their own data or data they will soon collect.

Schedule: Each 2 hour class will typically start with a lecture to briefly outline concepts and ideas. Computer lab time will follow, giving students ample opportunity to run functions and explore output.

Grades: Grading will be based on attendance, class participation and the final presentation given at the end of the semester.

Week (Date)	Topics	Instructor
Week 1 (Sept 3)	**Intro to R environment** Installing R, packages, CRAN Importing and exporting data Defining classes of R objects Where to get help (resources) Viewing data, indexing dataframes, subsetting dataframes, dealing with NAs	Jaeger & Culman

Week 2 (Sept 10)	Treatment of dates and time-series data Merging and matching data	Jaeger
Week 3 (Sept 17)	**Manipulating data in R** The reshape package	Culman
Week 4 (Sept 24)	The plyr package: split-apply-combine strategy	Culman
Week 5 (Oct 1)	**Graphing in R** Intro to plot, lattice, ggplot2 Getting started with qplot	Jaeger
Week 6 (Oct 8)	ggplot2: geoms, layers, aesthetics	Culman
Week 7 (Oct 15)	More advanced ggplot2 functions	Culman
Week 8 (Oct 22)	**R programming** Basic program structures (e.g., if-else, loops) and functions	Zhao
Week 9 (Oct 29)	Manipulating and analyzing spatial data – read, visualize, analyze, and export common geospatial data, including both vector and raster	Zhao
Week 10 (Nov 5)	Brief overview of selected statistical analyses – Distributions, F-tests, T-tests, ANOVA, non-parametric alternatives, linear models	Gates
Week 11 (Nov 12)	Student-lead special topics focused on their data	Student-teams
Week 12 (Nov 19)	No Classes – Thanksgiving Break	
Week 13 (Nov 26)	Student-lead special topics focused on their data	Student-teams
Week 14 (Dec 3)	Student-lead special topics focused on their data	Student-teams