ADVANCED STATISTICAL METHODS

in Entomology and Ecology

SPRING 2018 | ENTOM 4940 | Special Topics in Entomology

Wednesdays 12:20 -1:10 | 1 credit (S/U)

Instructor: Heather Grab, PhD

Course Description | This weekly seminar-style course will introduce students to analytical methods commonly required for the types of complex datasets generated in ecological studies. Coursework will rely heavily on the R programming environment and is intended to extend knowledge gained in earlier coursework (Entom 3030, BTRY 6010, 6020). The course is aimed at graduate students who have or are planning to collect dataset to which the analyses described below can be applied.

Learning Outcomes | After completing this course students will be able to:

1| flexibly manipulate and summarize datasets

2| create publication ready graphics

3| choose statistical methods appropriate to their dataset and question

4| evaluate the application of common statistical tests when reading and reviewing the literature

Course Format | The course will consist of one one weekly meeting divided between student led presentations of various methods and application to students generated or public datasets. Successful completion of the course depends on participation in class discussions as well as leading the discussion of one method. Students will select one topic to lead discussion, developing R scripts and supplying an example dataset for in-class practice.

Weekly Schedule | subject to change depending on student interests

Jan 24 |	RStudio, projects, scripting	**Mar 14 |**	Non-linear models
Jan 31 |	Data Carpentry – reshape, indexing, summarise	**Mar 21 |**	Structural Equation Modeling
Feb 07 |	Functions and loops	**Mar 28 |**	Survival Analysis
Feb 14 |	Data Visualization (ggplot2, ggthemes)	**Apr 11 |**	Machine learning (randomForest, rpart)
Feb 21 |	Multi-model inference (Mumin)	**Apr 18 |**	Multivariate Stats I - clustering
Feb 28 |	Mixed effects models (nlme, lsmeans)	**Apr 25 |**	Multivariate Stats II – ordination, nmds
Mar 07 |	Generalized linear models and GLMER (lme4)	**May 2 |**	Null models and Permutation tests

Other possible topics | Generalized additive models, time series analysis, spatial statistics …