Schedule

NRES 746

Fall 2021

Schedule

Note: this schedule is subject to change. Please check for updates frequently!

Week	Lecture.1	Lecture.2	Lab	Final.project.timeline	Material.Covered	Readings
Aug. 23	Course Introduction	Algorithms	Lab #1: Programming algorithms in R	Start organizing into groups and gathering dataset(s)	Review syllabus, algorithmic approach to data analysis, basic programming in R	Clark Ch. 1; Touchon and McCoy 2016
Aug. 30	Algorithms	Probability	Lab #1: Programming algorithms in R (continued)		Basic probability calculus, working with probability distributions	Bolker ch. 4; Zurell et al. 2010;
Sept. 6	No class (labor day)	Probability	Final project #1	Organize in groups around project themes and locate suitable data sets for analysis	Generating data algorithmically, mechanistic models, power analysis, goodness-of-fit testing	Bolker Ch. 1, Ch 5.; Zuur et al. 2010 (optional)
Sept. 13	The Virtual Ecologist	Likelihood	Lab #2: "Virtual Ecologist"	Work on one-page project description ("proposals")	Maximum likelihood estimation	Bolker Ch. 6; Hobbs and Hilborn 2006 (optional)
Sept. 20	Likelihood	Likelihood	Lab #2: "Virtual Ecologist" (continued)	DUE: one-page descriptions of project ideas ("proposals")	Optimization algorithms for maximum likelihood inference	Bolker Ch. 7
Sept. 27	Optimization	Optimization	Final project #2	Review proposals with instructor	General introduction to Bayesian theory and application	Bolker Ch. 6 and 7 (Bayesian section); Ellison 2004
Oct. 4	Bayesian inference	Markov Chain Monte Carlo (MCMC)	Lab #3: Maximum likelihood	Start running analyses and generating figures	Markov-Chain Monte Carlo	Bolker Ch. 7 and 8

Week	Lecture.1	Lecture.2	Lab	Final.project.timeline	Material.Covered	Readings
Oct. 11	Markov Chain Monte Carlo (MCMC)	No class (instructor is away)	Lab #3: Maximum likelihood (and digression: graphics in R, generating publication-quality figures)		Model selection	Bolker Ch. 7 and 8
Oct. 18	Model selection and multi-model inference	Model validation and performance evaluation	Final project #3		Bias-variance tradeoff, cross-validation, assessing predictive accuracy	Anderson et al. 2000; Anderson et al. 2001; Wintle et al. 2003
Oct. 25	Model validation and performance evaluation	Machine learning with random forest	Lab #4: Bayesian model fitting in JAGS		Bias-variance tradeoff, cross-validation, assessing predictive accuracy	TBD
Nov. 1	student-led lecture/demo	student-led lecture/demo	Lab #4: Bayesian model fitting in JAGS (continued)		Student-led topics	TBD
Nov. 8	student-led lecture/demo	student-led lecture/demo	Final project #4		Student-led topics	TBD
Nov. 15	student-led lecture/demo	student-led lecture/demo	Optional: Model selection and performance evaluation (including cross-validation)		Student-led topics	TBD
Nov. 22	student-led lecture/demo	No class (thanksgiving holiday)	Final project #5	Final project complete drafts due this week	Student-led topics	TBD
Nov. 29	student-led lecture/demo	student-led lecture/demo	Complete "mini-lab" assignments provided by peers		Student-led topics	TBD
Dec. 6	Class wrap-up	No class (prep day)	Final project presentations	Final presentations!	Student-led topics	
Dec. 13	NA (classes over)	NA	NA	Final projects due Dec. 15		