Schedule

NRES 746

Fall 2023

## Schedule

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

| Week | Lecture 1 | Lab | Lecture 2 | Material Covered | Readings |
| --- | --- | --- | --- | --- | --- |
| Aug. 28 | Course Introduction | Lab #1: Programming algorithms in R | Algorithms | Review syllabus, algorithmic approach to data analysis, basic programming in R | Clark Ch. 1; Touchon and McCoy 2016 |
| Sept. 4 | No class (labor day) | Lab #1: Programming algorithms in R (continued) | Algorithms | Basic probability calculus, working with probability distributions | Bolker ch. 4 |
| Sept. 11 | Probability | Lab #2: “Virtual Ecologist” | Probability | Generating data algorithmically, mechanistic models, power analysis, goodness-of-fit testing | Bolker Ch. 1, Ch 5.; Zuur et al. 2010 (optional) |
| Sept. 18 | The Virtual Ecologist | Lab #2: “Virtual Ecologist” (continued) | Likelihood | Maximum likelihood estimation | Bolker Ch. 6; Hobbs and Hilborn 2006 (optional) |
| Sept. 25 | No class (instructor is away) | No lab (instructor is away) | No class (instructor is away) | (no classes this week) | (no classes this week) |
| Oct. 2 | Likelihood | Lab #3: Maximum likelihood | Likelihood | Optimization algorithms for maximum likelihood inference | Bolker Ch. 7 |
| Oct. 9 | Optimization | Lab #3: Maximum likelihood | Optimization | General introduction to Bayesian theory and application | Bolker Ch. 6 and 7 (Bayesian section); Ellison 2004 |
| Oct. 16 | Bayesian inference | Lab #4: Bayesian model fitting in JAGS | Markov Chain Monte Carlo (MCMC) | Markov-Chain Monte Carlo | Bolker Ch. 7 and 8 |
| Oct. 23 | Markov Chain Monte Carlo (MCMC) | Lab #4: Bayesian model fitting in JAGS (continued) | Model selection and multi-model inference | Model selection | Bolker Ch. 7 and 8 |
| Oct. 30 | Model validation and performance evaluation | Lab #5: Model selection and performance evaluation (including cross-validation) | Intro to student-led topics | Bias-variance tradeoff, cross-validation, assessing predictive accuracy | Anderson et al. 2000; Anderson et al. 2001 |
| Nov. 6 | student-led lecture/demo | student-led “mini labs” | student-led lecture/demo | Student-led (TBD) | Student-assigned reading (TBD) |
| Nov. 13 | student-led lecture/demo | student-led “mini labs” | student-led lecture/demo | Student-led (TBD) | Student-assigned reading (TBD) |
| Nov. 20 | student-led lecture/demo | student-led “mini labs” | student-led lecture/demo | Student-led (TBD) | Student-assigned reading (TBD) |
| Nov. 27 | student-led lecture/demo | student-led “mini labs” | No class (thanksgiving holiday) | Student-led (TBD) | Student-assigned reading (TBD) |
| Dec. 4 | student-led lecture/demo | student-led “mini labs” | student-led lecture/demo | Student-led (TBD) | Student-assigned reading (TBD) |
| Dec. 11 | Class wrap-up | TBD | No class (prep day) |  | Student-assigned reading (TBD) |
| Dec. 18 | NA (classes over) |  |  |  |  |