Schedule

NRES 746

Fall 2019

## Schedule

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

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| --- | --- | --- | --- | --- | --- | --- |
| Week | Lecture.1 | Lecture.2 | Lab | Final.project.timeline | Material.Covered | Readings |
| Aug. 26 | Course Introduction | Algorithms | 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 |
| Sept. 2 | NA (labor day) | Probability | Programming algorithms in R (continued) |  | Basic probability calculus, working with probability distributions | Bolker ch. 4; Zurell et al. 2010; |
| Sept. 9 | The Virtual Ecologist | The Virtual Ecologist | 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. 16 | Likelihood | Likelihood | “Virtual Ecologist” lab | Work on one-page project description | Maximum likelihood estimation | Bolker Ch. 6; Hobbs and Hilborn 2006 (optional) |
| Sept. 23 | Likelihood | Optimization | “Virtual Ecologist” lab (and project work) | DUE: one-page descriptions of project ideas | Optimization algorithms for maximum likelihood inference | Bolker Ch. 7 |
| Sept. 30 | Optimization | Bayesian inference | Final project #2 | Review proposals with instructor/TA | General introduction to Bayesian theory and application | Bolker Ch. 6 and 7 (Bayesian section); Ellison 2004 |
| Oct. 7 | Bayesian inference | Markov Chain Monte Carlo (MCMC) | Maximum likelihood | Start running analyses and generating figures | Markov-Chain Monte Carlo | Bolker Ch. 7 and 8 |
| Oct. 14 | Markov Chain Monte Carlo (MCMC) | Model selection and multi-model inference | Maximum likelihood (and digression: graphics in R, generating publication-quality figures) |  | Model selection | Anderson et al. 2000; Anderson et al. 2001; Wintle et al. 2003 |
| Oct. 21 | Model selection and multi-model inference | Model validation and performance evaluation | Final project #3 |  | Bias-variance tradeoff, cross-validation, assessing predictive accuracy | TBD |
| Oct. 28 | Model validation and performance evaluation | Machine-learning? | Bayesian model fitting in JAGS |  | Bias-variance tradeoff, cross-validation, assessing predictive accuracy | TBD |
| Nov. 4 | TBD | TBD | Bayesian model fitting in JAGS |  | Student-led topics | TBD |
| Nov. 11 | NA (veteran’s day) | TBD | Final project #4 |  | Student-led topics | TBD |
| Nov. 18 | TBD | TBD | Optional: Model selection and performance evaluation (including cross-validation) |  | Student-led topics | TBD |
| Nov. 25 | TBD | TBD | Final project #5 |  | Student-led topics | TBD |
| Dec. 2 | TBD | TBD | Complete “mini-lab” assignments provided by peers | Final project complete draft due this week | Student-led topics | TBD |
| Dec. 9 | Class wrap-up | NA (prep day) | Final project presentations |  | Student-led topics |  |
| Dec. 16 | NA (classes over) | NA | NA | Final projects due |  |  |