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|  | **Topic** | **Morning Topic (Theory and Mechanisms) & review homework**  **1.5 hour** | **Late Morning - Case-Studies** | **Afternoon lab & exercises**  **3 hours** |
| **Monday** | Course introduction; Review probability theory | Introductions, course goals, overview of Bayesian data analysis | Random variables, independence, conditional probability, Bayes’ theorem | Integration of distributions: analytic and Monte Carlo |
| **Tuesday** | Introduction to Bayesian modeling and Markov chain Monte Carlo with JAGS | Likelihoods, priors, posteriors. Conjugacy and simple examples. | Markov chains and MCMC, thinning and warmup, convergence | Introduction to JAGS software. Demonstrate Simple Poisson model. |
| **Wednesday** | Robust Bayesian workflow | Default, informative, vaguely informative priors, prior predictive distribution | Case study of logistic regression. Posterior predictive distributions | Work through case examples of robust workflow |
| **Thursday** | Hierarchical Bayesian models | Theory of hierarchical models | Application of hierarchical models in JAGS | Application of |
| **Friday** | Stan: the new frontier in Bayesian modelling | Introduction to Hamiltonian Monte Carlo and the no-U-turn sampler | Introduction to Stan | Case studies in Stan. Course review. |