

Department of Mathematical and Statistical Sciences

Marquette University

Fall 2019

Course: MATH 4931/MSSC 5931. Topics in Mathematics or Statistics. 3 cr. hrs.

Topic: Bayesian Statistical Learning

Time: TuTh 5:00 pm - 6:15 pm

Place: Cudahy Hall 120

Instructor: Daniel B. Rowe, Ph.D.

Office Hours: TuTh 4:00 pm – 5:00 pm

Office: CU 313

E-mail: daniel.rowe@marquette.edu

Required text:

None. Course material will be presented via lecture slides or handouts.

Grading:

Grades will be based upon homework that you present in class.

MATH 4931/MSSC 5931:

Students in MSSC 5931 will have additional assignments.

Topics:

Events and probabilities of events.

Conditional probability and Bayes' rule.

Common discrete and continuous likelihood and prior distributions.

Maximum likelihood parameter estimation.

The bivariate normal, bivariate Student-t, and normal-inverse gamma distributions.

Conditional and marginal distributions.

Subjective assessment of prior information.

Conjugate and non-conjugate prior distributions.

Maximum a posteriori and marginal mean estimation.

Bayesian estimation of the binomial probability of success.

Bayesian estimation of the mean of a normal distribution.

Bayesian estimation of the least squares regression coefficients.

Bayesian LASSO regression

Bayesian classification.

Markov chain Monte Carlo numerical integration.

All topics and assignments will have a computational aspect.

Additional topics if time permitting.