

Department of Mathematical and Statistical Sciences

Marquette University

Fall 2021

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

Topic: Bayesian Statistical Learning

Time: TuTh 2:00 pm - 3:15 pm

Place: Cudahy 143

Instructor: Daniel B. Rowe, Ph.D.

Office Hours: TuTh 3:15 pm – 4:45 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 (30%) when called upon, a midterm (30%) and a final (40%). The midterm may include both in-class and take home portions. The final may be take-home or a final term project.

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.

COVID Attendance Policy

It is your responsibility as a Marquette University student to protect the health and safety of our community in this course. You must wear a mask while in class. If you do not wear one or it is not properly worn to cover your nose, you will be asked to leave or security will escort you out. The University has mandated vaccination for all students for the academic year 2021-2022. COVID Cheq will still be used, but those fully vaccinated that provide documentation will no longer receive the daily symptom screening survey. Instead, they will receive a daily email providing a green check. You may be required to show your automated green check to show clearance for entry into campus buildings. If you are experiencing symptoms related to COVID-19, you must follow the link in the automated email to report symptoms.

Visit Marquette's [What to do if you are exposed to COVID-19 or test positive website](#) for university guidelines on the best course of action.

If you miss classes due to symptoms, exposure, COVID-19 diagnosis, quarantine, and/or isolation, contact me immediately to determine best how to make up graded in-class assignments.