MATH 380 (19381-01) **MWF 8:30 – 9:20 am** **Fraser 213**
Bayesian Analysis **Fall 2018**

INSTRUCTOR: Lisa Smith **Email: smithl@geneseo.edu**
Office: 333ASouth Hall Office Phone: 245-5140

OFFICE HOURS: **MWF 10:30 am – 11:20 am or by appointment**

If you have a conflict during these times, just let me know and we can schedule an appt. Further, anytime my door is open, you are welcome to stop in – if I am not too busy, I will be glad to help.

TEXT: There is no required text, but you may want to reference your text from 361, Probability and Statistics for Engineers and Scientists, Edition 9, by Walpole, Myers, Ye; and Mathematical Statistics with Applications by Ramachandran and Tsokos as references.

NOTE: Occasionally we will use Laptops in class, but I will give you advance notice. Laptops can never be used on Quizzes or Exams and will not be used for the majority of classes.
Also, CELL PHONES must be on SILENT or OFF with NO TEXTING! Texting annoys everyone around you who is trying to learn, so please be respectful of that. (Thanks!)

TOPICS:

- Review of Common discrete and continuous probability distributions, Conditional probability and Bayes Theorem, Expectation and Variance, Multivariate Distributions, Conditional Distributions
- Methods to find Best Estimators: maximum likelihood, matching moments, percentile matching, consistency, efficiency, UMVUE
- Introduction to Bayesian Analysis: Prior and Posterior Distributions, Hierarchical models and Mixture Distributions, Bayes Likelihood functions, Bayes critical intervals
- Tests of Hypotheses: Neyman-Pearson Lemma, Likelihood Ratio Test, Fisher Information
- Simulation using Hierarchical models to estimate parameters

EVALUATION: Your final grade will be based on:

Homework	40%
2 Hourly Exams (in-class)	30%
Final Exam	30%

The **final exam** is **Wednesday, December 12, 2018 @ 8:00 am – 10:30 am** in **Fraser 213**.

Tentative **in-class exam**** dates are **Monday, September 24th and Monday, October 29th.**
****Make-up exam** will only be given if I am supplied with a verifiable medical excuse or arrangements are made prior to the scheduled exam.

Letter grades will be assigned based on the following schedule:

A 93-100%	A- 90-92%	B+ 87-89%	B 83-86%	B- 80-82%
C+ 77-79%	C 73-76%	C- 70-72%	D 60-69%	E 0-59%

NOTE: Grades on any assessment **may only be contested within 1 week** of the day the grades are posted online. After that – the grades are final!

HOMEWORK/QUIZ POLICY: Weekly homework sets will be collected and graded.

TIPS FOR SUCCESS:

- **Attendance** at all classes is crucial to your success in this course.
- Make a habit of doing all **homework** as soon as it is assigned, while the material is fresh in your mind.
- Ask **questions** whenever you have them.
- Come to my **office hours** anytime you need extra help – if you can't come during scheduled hours, we can set up a time that works for you.

ACADEMIC INTEGRITY POLICY: All work completed for this course must be your own work. While I encourage you to discuss strategies for homework problems, and study the material with each other, all solutions must be completed individually.

There is absolutely NO CELL PHONE or laptop use allowed during any exam or quiz! NO EXCEPTIONS! Using your cell phone during an exam or quiz will be considered cheating and will result in a grade of zero. For first-time offenders, any cheating will result in a grade of zero for that assignment/quiz/test/project. A second offense will result in an E in the course.

OFFICE OF DISABILITY SERVICES: If you need accommodations for any documented physical, emotional, or learning disabilities, please contact Tabitha Buggie-Hunt , Director in the Office of Disability Services, Erwin 105, or tbuggieh@geneseo.edu as soon as possible.

HOMEWORK POLICY: Homework sets will be collected occasionally for grading; advance notice will be given.

LEARNING OUTCOMES:

- Employ appropriate methods to determine best choices for point and interval estimates.
- Derive posterior distributions for multivariate hierarchical models and use Hierarchical models and simulations for Bayesian analysis of data.
- Use likelihood ration tests and Fisher information to test hypotheses.
- Use technology to run simulations and interpret the results.