Purpose: This course introduces some modern concepts of statistical data analysis through real life problems. This course is a combination of theoretical and analytical procedures. Several statistical tools will be introduced or discussed to deal with real life problems. This course is a fairly challenging course. There is no perfect material available to learn this kind of course, but we will expend time to understand and explore the immense world of data!

Course Description: Case studies are used to provide in-depth exposure to the practice of statistics. Topics include: machine learning and statistical analysis (beyond Math 351), statistical software, interpreting and reporting results. Prerequisites: Math 351 or 401.


Grading: Your final course grade will be computed as follows:

- Attendance 10%
- Homework 25%
- Exam 1 20%
- Exam 2 20%
- Final Exam 25%

Letter grades will be no stricter than the following:

- $A > 93 > A^- > 90 > B^+ > 87 > B > 83 > B^- > 80 > C^+ > 77 > C > 73 > C^- > 70 > D^+ > 67 > D > 63 > D^- > 60 > F$

Attendance: Attendance will be taken during every class period. If a student is not present for at least 40 minutes of a 50 minute class then the student cannot claim attendance for that class period. Attendance is mandatory, and I will take attendance regularly. You are allowed 3 unexcused absences - you don’t need to ask permission or explain. This includes personal, medical, and job-related absences. Every subsequent unexcused absence (regardless of cause) will diminish your final grade by 2%. Only a note from the Dean of Students office will excuse an absence, and only if I agree with their recommendation.

Homework: Homework will be assigned and collected often. Late homework will NOT be accepted because homework solutions are posted online. Code should be handed in with the handwritten portion of the homework and stapled together neatly. You may discuss homework problems with other students in the class up until the time you begin your write-up, but your write-up must be your own and must reflect your understanding and effort.
**Exam Policy:** Exams will be derived from the material covered in class and related sections covered in the book. If you anticipate missing class during an exam day, you should contact your professor one week prior to the exam date. **Make-up exams will not be given for any reason.**

**Outline of Planned Topics:**

1. Introduction
2. Optimization
3. Linear Regression
4. Classification
5. Dimensionality Reduction
6. Neural Networks
7. Deep Learning
8. Recurrent Neural Networks

**Important Dates:**

- Homework set 1 due: Feb. 2 at 3:00 pm
- Homework set 2 due: Feb. 16 at 3:00 pm
- Homework set 3 due: March 1 at 3:00 pm
- Homework set 4 due: March 22 at 3:00 pm
- Homework set 5 due: April 5 at 3:00 pm
- Homework set 6 due: April 19 at 3:00 pm
- Homework set 7 due: April 26 at 3:00 pm

- Exam 1: March 4
- Exam 2: April 8

- Final Exam (section 01): May 6 from 9-noon (location:tbd)
- Final Exam (section 02): May 10 from 9-noon (location:tbd)

*The above syllabus may be revised at the discretion of the instructor. Changes will be announced in class. It is recommended that students come to class every day so that they may be aware of any changes.*