MSA 8190
Statistical Foundations for Analytics
Sample Syllabus

1 Instructor Information

- **Instructor:** Dr. Mohammad "**Javad**" Feizollahi
- **Office:** Room No. 331, Buckhead Center
  Room No. 1626, 55 Park Place (Downtown)
- **Office Hours:** Tuesdays 5:00 PM - 6:00 PM
  Thursday 11:00AM-12:00 PM
  Due to the COVID-19 situation, office hours will be held virtually via Webex. Students need to make appointments beforehand via email. You only need to send an email to the instructor and specify your availability to get an appointment set up.
- **Webex:** `https://gsumeetings.webex.com/meet/mfeizollahi`
- **Email:** mfeizollahi@gsu.edu

2 Teaching Assistant Information

- **TA 1:** Gail Dennis-White (gdenniswhite1@student.gsu.edu)
  Webex: `https://gsumeetings.webex.com/meet/gdenniswhite1`
- **TA 2:** Yishan Xu (yxu28@student.gsu.edu)
  Webex: `https://gsumeetings.webex.com/meet/yxu28`
- **Problem Solving Labs:**

Option	Day	Time	TA
1	Tuesdays	2:00-3:30 PM	Yishan Xu
2	Wednesdays	4:00-5:30 PM	Gail Dennis-White
3	Thursdays	4:00-5:30 PM	Gail Dennis-White
4	Fridays	2:00-3:30 PM	Yishan Xu

3 Class Information

- **Location:** Room 1108, 55 Park Place (Downtown)
- **Time:** Mondays 6:00-8:30PM
- **Website:** iCollege – `http://icollege.gsu.edu`
  - Please enable notifications for this course to receive announcements, updates, etc.
  - To connect to the online class sessions, in the iCollege page of the course, click on the "Webex" tab. Then, from the "virtual meetings" tab click on the "Join" button.
- **Prerequisite:** Basic calculus and computer programming skills
- **Software:** R and MS Excel

  You can download and install R for free from the following website:

  `http://www.cran.r-project.org`

4 Course Description

This course is an introductory course on statistical thinking, modeling, analysis, and decision making. It covers a variety of topics including probability distributions review, descriptive statistics, point and interval estimation, hypothesis testing, linear and logistic regression analysis, and analysis of variance.

5 Course Outcomes

By the end of the semester you will be able to:

1. Compute probabilities, percentiles, expected values, and variances for different probability distributions
2. Summarize and interpret a data set using descriptive statistics;
3. Estimate parameters of a distribution based on a random sample;
4. Construct confidence intervals for parameters of a distribution;
5. Make a decision about a population based on a random sample;
6. Determine a probability distribution for a population based on a random sample.
7. Predict a response variable based on one or more predictor variables;
8. Identify important factors influencing a response variable;

6 Lecture Notes and Textbooks

Lecture notes will be posted on iCollege. Nevertheless, it is strongly advised that you take notes during lecture as there may be ideas presented in the class which are not included in the posted notes. Useful references will be given for certain concepts and further reading. Handouts as well as computer programs will also be posted there.

6.1 Main Reference:

- Montgomery, Douglas C., and George C. Runger. "Applied statistics and probability for engineers." 6th Edition, John Wiley & Sons, 2014.

6.2 Other References:

- James, Gareth, Daniela Witten, Trevor Hastie, and Robert Tibshirani. "An introduction to statistical learning. " New York: Springer, 2013. (Available online at here for free!)
- Cohen, Yosef, and Jeremiah Y. Cohen. "Statistics and Data with R: An applied approach through examples." John Wiley & Sons, 2008.
- DeGroot, Morris H., and Mark J. Schervish. "Probability and statistics." 4th Edition, Pearson, 2011.
- Bain, Lee J., and Max Engelhardt. "Introduction to probability and mathematical statistics." 2nd Edition, Brooks/Cole, 1992.
- Casella, George, and Roger L. Berger. "Statistical inference." 2nd Edition, Pacific Grove, CA: Duxbury, 2002.

7 COVID-19 Updates and Guidelines

GSU updates and guidelines related to the COVID-19 (such as class format, face covering, social distancing, etc) can be found in `https://ahead.gsu.edu`. All students are required to read these guideline and abide them.

8 Attendance Policy

It is strongly suggested that students do not miss class as most students will have difficulties completing the assignments without attending the lectures.

Due to the COVID-19 situation, this class includes a blended (B) and an online (O) format. In the (B) format up to 13 students will be (dynamically) scheduled to attend in-person each session. Other students should call in to connect to the synchronous simulcast classes. For the (O) section, students will call in to connect all sessions. These students will not be considered for the in-person classes. All classes will also be recorded and both (O) and (B) students can watch and review the videos if they miss any session or have difficulty in connecting to the synchronous sessions.

9 Grading

Percentages of course works in students' final scores are as follow:

Course Works	**Percentages**
Homework (10 sets of problems, each 2%)	20%
Quizzes (4 quizzes, each 5%)	20%
Exams (2 exams, each 30%)	60%

The final grade conversion is based on the following table:

A+	A	A-	B+	B	B-	C+	C	C-	D	F
≥ 97	≥ 93	≥ 90	≥ 87	≥ 83	≥ 80	≥ 77	≥ 73	≥ 70	≥ 60	<50

10 Homework

- Homework will be assigned approximately once every week or two weeks.
- Every HW will contain 5 or 6 questions to solve. For some questions you will need to do the computations in MS Excel and R.
- You should start working on each homework early, that way you will have time to ask questions in class before the homework is due.
- Late homework will be accepted only in case of unavoidable occurrences, such as illness or death in the family.
- You are encouraged to discuss homework and learn from each other, but each person must submit his/her own work.
- Students copying from their classmates or from previous years' assignments, or from any source will receive a zero score. In addition, the student who let others copy from her/his assignment will receive a zero score. There are no exceptions to this rule! Further consequences are possible.
- Any queries on homework, quiz or exam grades must be submitted in writing via email to the instructor, together with the scan of the homework in question.

11 Quiz and Exam Rules

- All exams and quizzes are closed-book and closed-notes, unless you are explicitly told.
- On a quiz or exam, you need and are allowed to use a calculator that can only function as a calculator, and nothing else.
- You may bring a wristwatch that can function as a watch and nothing else.

- You may not use any other electronic equipment (unless you are explicitly told that you are allowed). In particular, no electronic equipment that allows you to communicate with others, either inside or outside the exam room, or make web queries, or store notes, may be within your reach during a quiz or an exam, not even if you use it to check the time.
- You will be asked to leave your bags with all your materials that are not allowed during exams in the front of the class room during exams.
- You will not be permitted to go to the restroom, or exit and reenter the classroom for any reason, during a quiz or exam. No exceptions, so be sure to go before class. If you have a medical reason why this rule is a problem for you, then you have to bring a letter from your doctor in advance.
- Cheating on quizzes and exams will not be tolerated in this course. You may not:
  - Attempt to look at someone else's exam (even for a second).
  - Copy from someone else's exam,
  - Let someone else copy from your exam. (Cover your exam!)
  - Bring or look at any information during the exam (e.g. on your person).
  - Wear caps or headphones/earbuds of any kind.
  - Use unacceptable electronic equipment.
  - Undertake any other activity that can be construed as giving/receiving or attempting to give/receive help during the exam.

  If you violate any of these rules, then you will receive an F in the course.

12 Classroom Rules

- Students exhibiting disruptive behavior, including talking, sleeping, talking on cell phones or disturbing other students will be asked to leave.
- No mobile phone use in the class. That means no talking, texting, checking email, surfing the internet, or any other mobile phone use in the class.
- You may bring your laptops, tablets, or other electronic devices to class. However, no checking email or surfing the internet during class unless you are explicitly allowed to do so. If you need to check email or surf the internet during class time, then you may leave the class room and do so outside the class room.
- There will be a 10-minute break in the middle of class.

13 Academic Honor Code

All course participants (myself, teaching assistant, and students) are expected and required to abide by the Georgia State University Honor Code. See the University's policy on Academic Honesty (Section 409,http://www2.gsu.edu/ wwwfhb/sec409.html) for details. Please familiarize yourself with the code, and use it to guide your conduct. Specifically, you must do your own work in all homework (unless the homework is specifically designated as a group homework), quizzes and exams. Any form of academic dishonesty, such as plagiarism, can result in a serious deduction from your final grade or even a grade of F in the course.

14 Tentative Lectures Schedule

The topics covered and the dates they are to be covered are subject to change.

Date	**Topic**	**Reading**	**Events**
08/24	Introduction & Probability Review	Ch. 1 & 2	
08/31	Discrete Distributions	Ch. 3	HW1
09/07	**No Class**		**Labor Day**
09/14	Continuous Distributions	Ch. 4	HW2 - Quiz 1
09/21	Joint Distributions	Ch. 5	HW3
09/28	Sampling and Data Description	Ch. 6	HW4 - Quiz 2
10/05	Point Estimation	Ch. 7	HW5
10/12	Single Sample Hypothesis Testing	Ch. 8 & 9	HW6
10/19	**Midterm Exam**		**Midterm Exam**
10/26	Two Samples Hypothesis Testing	Ch. 10	HW7
11/02	Simple Linear Regression	Ch. 11	HW8
11/09	Simple Linear Regression (cont.)	Ch. 11	Quiz 3
11/16	Multiple Linear Regression	Ch. 12	
11/23	**No Class**		**Fall Break**
11/30	Analysis of Variance	Ch. 13	HW9 - Quiz 4
12/07	Classification & Logistic Regression	Ch. 4 (ISLR)	HW10
12/14	**Final Exam**		**Final Exam**