

<p>Instructor: Prof. Lori A. Perine E-mail: lperine@umd.edu Office: III-5113 Office Hours: Thursdays 9:30 – 10:30 a.m. and by appointment</p>	<p>Semester: Spring 2019 Class Section: Section ESG1 Location: Shady Grove III-2225 Days/Time: Tue/Thu. 8:00 – 9:15 a.m.</p>
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A critical determinant of success for individuals and organizations is making good decisions. But why is it that we don't always make rational and logical choices? How can we improve the quality of our judgments and choices?

This course examines the role and use of data science to support decision making. There are two main goals. The first will be to introduce to perspectives on decision making, especially the psychology of decision making under uncertainty and the drivers of organizational decision making. The second is to introduce you to quantitative tools and methods for data-informed decision making.

LEARNING OBJECTIVES

After completing this course you will be able to:

- Describe the advantages of basing decisions on data rather than purely on intuition
- Articulate the types of organizational objectives that benefit from data-driven decision making
- State and refine questions for data analysis to support decision-making
- Select and apply appropriate quantitative methods for data exploration and analysis
- Use R and/or spreadsheets for data analytics
- Interpret results to make defensible, data-driven decisions

The pre-requisites for this course are: MATH 115 Precalculus, AND STAT 100 Elementary Statistics and Probability, AND PSYCH 100 Introduction to Psychology, AND INST 314 Statistics for Information Science.

REQUIRED RESOURCES

The following resources are necessary for you to successfully complete this course:

- The course website, www.elms.umd.edu
- Two e-books:
 1. Roger D. Peng & Elizabeth Matsui, *The Art of Data Science*, Lean Publishing. Available here: <https://leanpub.com/artofdatascience>
 2. Roger D. Peng, Elizabeth Matsui, & Corinne Keet, *The Data Science Salon*, Lean Publishing, Available here: <https://leanpub.com/thedatasciencesalon>



- **Required Software** necessary for you to successfully complete the homework, exams, and projects for this course.
 1. Microsoft Excel or Open Office Calc. Microsoft Excel is available for Macintosh through the university's TERPware website (<https://terpware.umd.edu>).
 2. R programming language and software is free and available online (<https://www.r-project.org/>). You may want to use R Studio; R studio is an integrated development environment for R (<http://web.cs.ucla.edu/~gulzar/rstudio/>).
- **Required R Tutorials:** Marin Stats Lectures, available on YouTube. The full list of tutorials is posted on ELMS/CANVAS

Readings:

Detailed reading assignments will be made available weekly on ELMS/CANVAS, with either URLs to link to online resources or an uploaded copy of the reading. Recommendations for optional reading will be included. Completing the required reading *prior to class* is essential for full participation in classroom discussions.

Optional resources:

1. Hastie, Reid, and Dawes, Robyn M. *Rational Choice in an Uncertain World*, Sage Publishing, 2nd edition. This book, used in other sections of INST 354, provides a more in-depth survey of the psychology and models for decision making. You may wish to consult this book to deepen your understanding of the concepts covered in the first module of the course.
2. The “Online Stat Book” developed primarily by Rice University. It provides a multimedia course of study and is available here: <http://onlinestatbook.com/2/index.html>

COURSE ASSESSMENTS

Participation (20%) Participation is a vital component of this course. There will be two main components of your participation grade.

1. Posting one question in response to the week's readings to the course website every week (**due by 11:59 p.m. on Monday**).
2. Pre-writing – This is 5 – 10 minutes of writing at or prior to the start of class to answer a discussion question. We will do this each Tuesday of the semester (unless there is a quiz on that day). Occasionally, you will be asked to complete pre-writing online prior to the start of class.

In addition to these two components, you may be asked to complete other small assignments in preparation for class sessions. You will receive points for ontime submission and the degree to which you have completed both the letter and intent of the assignment. Your willingness to engage in class discussions, ask questions, and contribute to group activities will all be taken into consideration for your participation grade.

Case Studies (16%) There will be two case studies. Each case study will be graded on a scale of 0- 15. You may work with your colleagues to figure out the underlying concepts and problem-solving processes, but are expected to work individually to answer the specific problems that are assigned. Completed assignments will be submitted via ELMS/CANVAS. They are to be submitted by 5:00 p.m. on the day of the class that they are due. Due dates are indicated under the Course Schedule. Case studies will be graded and returned a week later.

Quizzes (24%) There will be four short quizzes during lecture time. Your lowest quiz grade will be dropped and the remaining 3 will count for your final grade. **THERE WILL BE NO MAKEUP QUIZZES.** Quiz dates are indicated on the Course Schedule. If you miss a quiz, it will count as the dropped grade.

Group Project (40%) In small groups of 3 -4 people, you will prepare a data-related analytic project. You will be able to work on this during class time. Over the course of the project, you will identify an interesting dataset, develop a research question, form an analysis plan, and carry out the analysis, and report the results. There will be a few assignments specific to the group project, a progress report (i.e. update), a formal presentation, and a final paper of 8 -10 pages. Additional details about the group project will be discussed in class.

Grading

Grades will be assigned based on the total percent earned, using the following rubric. Grades will be rounded to the nearest 10th of a percent. Please come and talk to me early if you think that there might be a problem.

A	90.0-100% (A+ 97-100) (A- 90.0-92.9%)
B	80.0-89.9% (B+ 87.0-89.9%); (B- 80.0-82.9%)
C	70.0-79.9% (C+ 77.0-79.9%); (C- 70.0-72.9%)
D	60.0-69.9% (D+ 67.0-69.9%);(D- 60.0-62.9%)
F	0-59.9%

Campus Policies

It is our shared responsibility to know and abide by the University of Maryland's policies that relate to all courses, which include topics such as academic integrity, student and instructor conduct, accessibility and accommodations, attendance and excused absences, grades and appeals, copyright and intellectual property. These and other policies relevant to undergraduate courses are found here: <http://ugst.umd.edu/courserelatedpolicies.html>.

Academic Integrity

Cases of academic misconduct will be referred to the Office of Student Conduct irrespective of scope or circumstances, as required by university rules and regulations. Thus, it is important that you complete your own work on the assignments and exams. Please visit <http://osc.umd.edu/OSC/Default.aspx> for more information about academic integrity.



Accommodations/Disabilities

Please come and see me as soon as possible if you think you might need any special accommodations for disabilities. In addition, please contact the Disability Support Services (301-314-7682 or <http://www.counseling.umd.edu/DSS/>). Disability Support Services will work with us to help create appropriate academic accommodations for any qualified students with disabilities. If you experience psychological distress during the course of the semester you can get professional help at the Counseling Center (301-314-7651 or <http://www.counseling.umd.edu/>).

TENTATIVE COURSE SCHEDULE

This schedule is for planning purposes and may change. See Elms/Canvas for current information and deadlines

WEEK	DATE	TUESDAY	DATE	THURSDAY
1	Jan. 29	Course Introduction Student Introduction “Team Expertise & Roles”	Jan. 31	What is Data Science?
2	Feb. 5	Models for Data-Driven Decision Making	Feb. 7	Models for Data-Driven Decision Making
3	Feb. 12	Normative vs Descriptive Decision Making	Feb. 14	Decision Making & Uncertainty (cont)
4	Feb. 19	Quiz 1 Decision Making & Uncertainty (cont)	Feb. 21	Data Salon Session 1 ADS Ch. 1 and 2 R tutorials 1-8
5	Feb. 25	Models for Data-Driven Decision-Making	Feb. 27	Data Salon Session 2 ADS Ch. 3 R tutorials 9-10
6	Mar. 5	Quantitative Methods for Data-Driven Decision Making: Inference	Mar. 7	Data Salon Session 3 ADS Ch. 6 R tutorials 11-12 Case Study #1
7	Mar. 12	Quantitative Methods for Data-Driven Decision Making: Inference (cont) Quiz 2	Mar. 14	Project Progress Reports
8	Mar. 19	SPRING BREAK	Mar. 21	SPRING BREAK
9	Mar. 25	Quantitative Methods for Data-Driven Decision Making: Regression	Mar. 27	Data Salon Session 4 ADS Chapter 4.1-4.7
10	Apr 2	Quantitative Methods for Data-Driven Decision Making: Optimization and Linear Programming Quiz 3	Apr. 4	Data Salon Session 5 ADS Chapter 4.8-4.10
11	Apr 9	Quantitative Methods for Data-Driven Decision Making: Sensitivity Analysis	Apr. 11	Data Salon Session 6 ADS Chapter 5; Ch. 7.1- 7.2



12	Apr. 16	Quantitative Methods for Data-Driven Decision Making: Sensitivity Analysis	Apr. 18	Data Salon Session 7 ADS Chapter 7.3-7.4
13	Apr. 23	Quantitative Methods for Data-Driven Decision Making: Data Mining	Apr. 25	Project Time Case Study 2
14	Apr. 30	Data Salon Session 8 Chapter 9 Quiz 4	May 2	Data Salon Session 9 ADS chapters 10-11
15	May 7	Interpreting Your Results	May 9	Formal Presentations
16	May 14	Last Day of Classes Formal Presentations Final Paper Due		