



Data Driven Decisionmaking (Fall 2017, APSC 490 (COLL 200))

Schedule

Tuesday and Thursday 9:30AM to 10:50AM *Phi Beta Kappa Hall 221*

Instructor

Dr. **Dan** Runfola

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Office Hours: 11-1P R

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Please let me know if you have any documented disabilities that may impact your performance in this class.

Course Description: For the increasing volume of information being produced to be useful in decision-making processes, it needs to be systematically organized and analyzed. This course will provide students with an opportunity to apply quantitative methods to a wide variety of real-world problems defined by decision makers from federal and international policy making groups. Course work will include applying a wide set of techniques (such as the analytic hierarchy process, ordered weighting averaging) which integrate human preferences and perception with quantitative information, with an emphasis on uncertainty. Students will learn about and consider the challenges associated with data reduction how to balance between the limits of human perception, the value of additional information, and temporal constraints imposed by the decision making process.

Prerequisite(s): None.

Credit Hours: 3

Materials:

A free SciClone account is needed in order to access the William and Mary High Performance Cluster (HPC). Registration can be started at <https://hpc.wm.edu/acctreq/> .

You must bring a laptop to class each day unless otherwise noted during lecture.

Course Objectives:

1. Provide students with a critical understanding of the decision making process and the use of data and intuition on short deadlines.

2. Develop students ability to communicate findings, analysis, and visualization skills for future courses (and jobs).
3. Expose students to real-world problems that are being engaged with by contemporary problem solvers and decision makers.
4. Provide an opportunity to earn credit towards the COLL 200 requirement in the Culture, Society, and the Individual domain (passing grade required).

Grade Distribution:

Assignments	70%
Final Report	30%

Letter Grade Distribution:

>= 93.00	A	73.00 - 76.99	C
90.00 - 92.99	A-	70.00 - 72.99	C-
87.00 - 89.99	B+	67.00 - 69.99	D+
83.00 - 86.99	B	63.00 - 66.99	D
80.00 - 82.99	B-	60.00 - 62.99	D-
77.00 - 79.99	C+	<= 59.99	F

Time Commitment: Excelling in college level course work typically requires on average three to four hours per credit per week. Since this is a three credit course, in addition to the time we meet as a class each week, you should expect to spend nine to twelve hours on average reading, writing, or otherwise preparing for this class on a weekly basis.

Attendance: This class does not have an attendance policy. However, it will be difficult to learn enough to pass the class without regular participation, as the majority of course content relevant to tests and assignments will be covered in class.

Discussions: Most lecture sessions will begin with a brief discussion of the assigned materials. As such, each week students will be asked to come to class prepared with two to three bullet points for discussion - these can represent questions the material raised, commentary, or critiques.

Classroom Behavior: Please remain civil during discussions to promote the open exchange of ideas and foster a culture of open dialogue. Please bear in mind that all students are entitled to their own opinion. You are expected to listen attentively to each person speaking. Please refrain from eating during class (and, if you must, make sure it isn't loud!).

Teacher-student conferences: Students performing at a C level or below are required to schedule a meeting with the instructor to discuss class performance.

Late / Poor Performance Policy: Assignments will not be accepted late, excepting in documented circumstances (i.e., an illness with a doctor's note).

Final Project: The final report will involve the application of the skills taught throughout the semester, and will represent your ability to provide an answer to a real-world question using the

data and skills at your disposal. It will include a 5 page written report (inclusive of data visualizations and tables) designed as an executive summary for a decisionmaker.

Important Dates: The add and drop deadline this semester is September 8th, and withdrawal deadline is October 27th.

Do not cheat!

Academic dishonesty is taken very seriously. Make sure to cite all of your work, and do not turn in work that is not yours! Cases of academic dishonesty will be evaluated and acted upon in accordance with William and Mary policies, which can be found at <http://www.wm.edu/offices/deanofstudents/services/studentconduct/>

Course Outline:

The course outline can be found below. The weekly content might change as it depends on the progress of the class.

Week	Content
Week 1	<ul style="list-style-type: none">• 8/31 - Introduction and Computing Environment Setup• Assignment 1 due midnight Tues Sept 12 - Defining and Simulating Uncertainty.
Week 2	<ul style="list-style-type: none">• 9/5 and 9/7 - Interactive Learning
Week 3	<ul style="list-style-type: none">• 9/12 and 9/14 - Human Perception and Uncertainty• Assignment 2 due midnight Tues Sept 26 - Retrieving Data from Non-traditional Sources
Week 4	<ul style="list-style-type: none">• 9/18 and 9/21 - Asking the Right Questions
Week 5	<ul style="list-style-type: none">• 9/26 and 9/28 - Picking the Right Data• Assignment 3 due midnight Friday October 13th - Integrating Disparate Data Sources
Week 6	<ul style="list-style-type: none">• 10/3 and 10/5 - Picking the Right Models
Week 7	<ul style="list-style-type: none">• 10/10 and 10/12 - Quantifying Uncertainty
Week 8	<ul style="list-style-type: none">• 10/17 - No Class (Fall Break)• 10/19 - Data Visualization• Assignment 4 due midnight Thursday 11/2 - Simulating a Solution

Week	Content
Week 9	<ul style="list-style-type: none"> • 10/24 and 10/26 - Distributional Assumptions and Randomization in Decision Making
Week 10	<ul style="list-style-type: none"> • 10/31 and 11/2 - Masking the Truth and Data Manipulation • Assignment 5 due midnight Thursday 11/30 - Solution Set Optimization with Decisionmaker Input
Week 11	<ul style="list-style-type: none"> • 11/7 and 11/9 - Human Perception in Decision and Policymaking
Week 12	<ul style="list-style-type: none"> • 11/14 and 11/16 - Nonparametric Modeling in Decision Making
Week 13	<ul style="list-style-type: none"> • 11/21 - Hands on Learning, 11/23 - No class (Thanksgiving Break)
Week 14	<ul style="list-style-type: none"> • 11/27 and 11/30 - Communicating with Data
Week 15	<ul style="list-style-type: none"> • 12/5 and 12/7 - Trust, Data, Decisions and Society
Final Project	<ul style="list-style-type: none"> • Due on December 17th by Midnight