

**CORE-UA 107: QUANTITATIVE REASONING:
PROBABILITY, STATISTICS, AND DECISION MAKING
SYLLABUS - FALL 2015**

Instructor: Drew C. Youngren, Clinical Assistant Professor of Mathematics

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Office: Warren Weaver Hall, Rm 721

Office Hours: TBD

Lecture:

- Section 001: 19 University Pl, Rm 102 - MW 2:00pm–3:15pm

Recitation: In addition to the lecture (Section 001), you must also register for one of the recitation sections below.

- Section 004 - Silver Center, Rm 507 - T 11:00am–12:15pm - Changyang Ryoo
- Section 005 - Bobst, Rm LL151 - T 12:30pm–1:45pm - Changyang Ryoo
- Section 006 - Meyer, Rm 621 - T 2:00pm–3:15pm - Mihai Nica
- Section 007 - 25 W 4th St, Rm C-8 - T 3:30pm–4:45pm - Mihai Nica

Course description: Quantitative Reasoning: Probability, Statistics, and Decision Making (PSDM) is a course that explores a number of topics in mathematics with an emphasis on how they are used in the modern world to make “good”—and when possible “best”—decisions. The topics are (in roughly chronological order):

- Statistics
- Probability
- Graph Theory
- Optimization
- Game Theory

The approach will be twofold. First, we look to improve mathematical literacy, understanding and critiquing the use of mathematical methods in different contexts, and second we practice said methods directly. An analogy for these would be film criticism vs. film production. The two will be blended throughout the semester.

Textbook:

- Garfunkel, Solomon et al. *For All Practical Purposes: Mathematical Literacy in Today’s World*. 9th Edition.

Grading: The final grade will be computed with the following weights:

Homework	15%
Journals/Forum	10%
Quizzes/Recitation	25%
Midterm Exam	20%
Final Exam	30%

A note on grades of W and I.

You may drop the course in the first three weeks (by Monday, February 10) without it appearing on your transcript. After that, and through the ninth week, you may withdraw and receive a grade of ‘W’ on your transcript. No withdrawals are granted after the ninth week.

A grade of ‘Incomplete’ (I) is granted only in the rare circumstances that an emergency prevents a student in good standing from finishing the course in its last few weeks. As per the CAS Bulletin:

“Students who are ill or have a serious personal problem should see, call, or write to an adviser in the College Advising Center, College of Arts and Science, New York University, Silver Center, 100 Washington Square East, Room 905, New York, NY 10003-6688; 212-998-8130.”

NYU Classes: The chief means of communication for this course will be the course Classes site, accessed through newclasses.nyu.edu. Students are expected to check this for up-to-date assignments—including material separate from the text—and announcements.

Homework: Weekly problem sets with a mix of exercises from the text and supplementary problems will be collected. These include more in-depth problems requiring greater abstraction, understanding and/or synthesis of various concepts. In many ways, these constitute the heart of the course; rigor in their completion often yields the greatest understanding.

Quizzes: Short quizzes will be given (almost) weekly in recitation. These will generally cover material on the previous week’s homework.

When calculating the homework and quiz grades for the semester, the lowest score in each of these areas will be dropped. **N.B.** It is advised that students reserve these “passes” for unexpected absences. In fairness to all students and graders, **late homework will not be accepted.**

Journals/Forums: Writing about mathematics is a skill worth developing on its own, but has been shown¹ to also improve mathematical thinking. As such there will be two journal assignments involving analysis and/or critique of mathematics used in the context of an article, study, court case, or such situation. These will be modeled during the class. Rubrics and guidelines to follow.

Midterm Exam: There will be one in-class exams during the semester on Wednesday, October 21.

Final Exam: The final exam will take place on the last day of class, Monday, December 14.

Policy on out-of-sequence exams and missed quizzes

We are only able to accommodate a limited number of out-of-sequence exams due to limited availability of rooms and proctors. For this reason, we may approve out-of-sequence exams in the following cases:

- A documented medical excuse.
- A University sponsored event such as an athletic tournament, a play, or a musical performance. Athletic practices and rehearsals do not fall into this category. Please have your coach, conductor, or other faculty advisor contact your instructor.
- A religious holiday.
- Extreme hardship such as a family emergency.

We will **not** be able to accommodate out-of-sequence exams, quizzes, and finals for purposes of more convenient travel, including already purchased tickets. Please note again the date of the final and plan your summer travel accordingly.

Scheduled out-of-sequence exams and quizzes (those not arising from emergencies) must be taken before the actual exam. Makeups must occur within one week of the regularly scheduled exam or quiz, otherwise a zero score will be given.

If you require additional accommodations as determined by the Center for Student Disabilities, please let your instructor know as soon as possible.

Technology: Technology can play an important role in the learning of mathematics, and as such, graphing and scientific calculators are permitted for class and homework, though they will not be required. The use of spreadsheets and more advanced tools may be implemented as the semester progresses.

Academic Honesty: Guidelines regarding cheating and plagiarism are laid out in the [College of Arts and Sciences guidelines](#) and will be adhered to strictly. Collaboration is permitted, in fact encouraged, for home and class assignments; however, all submitted assignments must be written up independently and represent the student’s own work and understanding.

¹e.g., <http://www.edutopia.org/blog/writing-executive-function-brain-research-judy-willis>

Below is a proposed schedule for covering topics and assignments during the semester. All are subject to change as the semester progresses.

Day	M/W	Sections	Topic	Due	Recitation	Note
1	9/2/2015	§5.1–2	Intro/Histograms			
2	9/9/2015	§5.4–6	Center and Variance	HW1		
3	9/14/2015	§5.7–9	Normal Distributions		9/15/2015	Q1
4	9/16/2015	§6.1–2	Bivariate Data	HW2		
5	9/21/2015	§6.3–5	Correlation and Regression		9/22/2015	Q2
6	9/23/2015	§7.1–3	Sampling, Good and Bad	HW3		
7	9/28/2015	§7.4,7–8	Inference and Confidence		9/29/2015	Q3
8	9/30/2015	§7.5–6	Experiments and Studies	HW4		
9	10/5/2015	§8.1	Intro to Probability		10/6/2015	Q4
10	10/7/2015	§8.2	Discrete Probability	HW5		
11	10/13/2015	§8.3	More Discrete Probability			Journal #1
12	10/14/2015		Counting	HW6		
13	10/19/2015	§8.4	Continuous Probability		10/20/2015	Review
14	10/21/2015	MIDTERM EXAM (through 8.3)				
15	10/26/2015	§8.5–6	Continuous Probabilities		10/27/2015	Q5
16	10/28/2015	§1.1	Intro to Graph Theory/Euler Circuits	HW7		
17	11/2/2015	§1.2–3	Eulerian Circuits		11/3/2015	Q6
18	11/4/2015	§2.1–3	Hamiltonian Circuits/TSP	HW8		
19	11/9/2015	§2.4–5	Minimal Spanning Trees		11/10/2015	Q7
20	11/11/2015	§3.5	Coloring	HW9		
21	11/16/2015	§4.1–3	Linear Programming		11/17/2015	Q8
22	11/18/2015	§15.1	Intro to Game Theory	HW10		
23	11/23/2015	§15.2	Partial/Mixed Strategies		11/24/2015	Journal #2
24	11/30/2015	§15.3	Partial Conflict		12/1/2015	Q9
25	12/2/2015	§15.4	Larger Games	HW11		
26	12/7/2015	§15.5	Applications of Game Theory		12/8/2015	Q10
27	12/9/2015		Review/Flex	HW12		
28	12/14/2015	FINAL EXAM				