

Text: *Mathematics: A Practical Odyssey* by Johnson and Mowry, seventh edition or *University Math I and II* (custom edition available at the bookstore)

Calculator: A scientific calculator should be required for the class. Students will be making probability calculations, including with combinatorics, so factorial, nCk and nPk functions are useful.

Course Goals: A student successfully completing the course should, in a general sense, have...

- ✓ a facility with using mathematical logic, including precise uses of the phrases “or” (inclusive), “and”, and “implies” used in applied contexts,
- ✓ an understanding of sets as containers and set operations in context,
- ✓ an understanding of the large of large numbers and its effect on predictive science,
- ✓ a familiarity with the rules and applications of probability in common games of chance,
- ✓ an ability to use methods of combinatorics in probability computations,
- ✓ facility with expected value as a decision-making criterion,

The student can model the mathematical topics described among the learning outcomes in words, then solve or simplify the relevant equations and/or expressions, and finally write a summary statement of the solution.

Learning Outcomes: A successful student can...

- ✓ use symbolic logic and is able to translate back and forth between it and statements in English,
- ✓ construct and interpret compound statements involving disjunctions, conjunctions, and conditionals.
- ✓ use a truth table to completely analyze the truth values of a compound statement,
- ✓ employ terminology related to conditionals such as “necessary” and “sufficient” conditions
- ✓ analyze an argument using appropriate logic (with or without a truth table),
- ✓ use a Venn diagram to solve a counting problem with or without the explicit use of sets,
- ✓ identify and differentiate the sample space, an event, and an outcome given a context,
- ✓ calculate combination and permutation values in combinatorics and probability,
- ✓ calculate expected value and use it in probabilistic decision making,
- ✓ use conditional probability and decision trees in probability computations,
- ✓ determine if two events are independent and interpret the result,
- ✓ calculate probabilities using a presence or lack of independence,
- ✓ use formulas that may be provided on assessments; student learning focuses on using such formulas appropriately. Consequently, exam questions may contain instructions such as "Describe", "Explain", and "Discuss", in addition to simply "Compute".

WEEK	SECTIONS TO COVER	Notes
1	1.1, 1.2 <i>Review Quiz in Thurs disc.</i>	
2	1.3, 1.4	1.3: Try to restrict testing of truth tables to three statements
3	1.5, 2.1 <i>(Winter) Martin Luther King Jr. Day Monday</i>	
4	2.2, 2.3	
5	2.4	2.4: The flow chart on page 111 is formulaic, but can give students a great deal of context for how the various counting methods fit together

Review for Exam
Midterm Exam (Chapters 1, 2)

6	3.1, 3.2	3.1: The section is poorly titled, but is worth doing to familiarize students with common games of chance and as a very basic introduction to probability calculations
7	3.3, 3.4	
8	3.5, 3.6	
9	3.7	3.7: At least discuss independence; genetics is a worthwhile topic too, however.

(Fall) *Thanksgiving holiday Thursday/Friday.*

10	<i>Catch-up, review</i>	This week is most responsibly dedicated to (1) finishing up course content, if necessary or (2) doing targeted in-class review,
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(Spring) *Memorial Day holiday Monday*

11 Final exam during scheduled time (or see note)

http://registrar.uoregon.edu/calendars/final_exam#2012-2013

Additional Notes:

- The course is less modular than Math 106 and 107. Math 105 has a steady narrative of gaining tools necessary for the application of probability. Because it has a reasonable narrative, a cumulative final exam makes sense during the registrar's scheduled time.
- Two exams and a cumulative final would suit the course in theory, but there is no clear opportunity for a second midterm exam. If you find a division point that makes sense to you, consider giving a second midterm.
- I let students have a note card on their exams. I'm not so concerned with them memorizing the formulas for set theory or probability; I'd like to see them applied and interpreted successfully.
- Consider having homework due twice per week, it works out to almost exactly one section per turn-in that way.
- Math 243 covers course content similar to Chapter 4 in this textbook. This content is optional, but should not be introduced to the exclusion of thorough, applied practice with logic, sets, and probability.

Other Important Dates (<http://registrar.uoregon.edu/calendars/academic#fall2012>):

Monday of 2nd week
Wednesday of 2nd week
Sunday after 7th week

Last day to drop without a "W" (but only 75% tuition refund)
Last day to add a class
Last day to drop --- period!