Math 105 Instructor Syllabus

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 Review Quiz in Thurs disc.

2 1.3, 1.4 1.3: Try to restrict testing of truth tables to three statements

3 1.5, 2.1 1.5, 2.1 (Winter) Martin Luther King Jr. Day Monday

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

revised 7/30/12

Course Coordinator: Mike Price (mprice@uoregon.edu)
Review for Exam  
Midterm Exam (Chapters 1, 2)

<table>
<thead>
<tr>
<th>6</th>
<th>3.1, 3.2</th>
<th><strong>3.1:</strong> 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</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>3.3, 3.4</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>3.5, 3.6</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>3.7</td>
<td><strong>3.7:</strong> At least discuss independence; genetics is a worthwhile topic too, however.</td>
</tr>
</tbody>
</table>

(Fall) Thanksgiving holiday Thursday/Friday.

10 Catch-up, review  
This week is most responsibly dedicated to (1) finishing up course content, if necessary or (2) doing targeted in-class review,

(Spring) Memorial Day holiday Monday

11 Final exam during scheduled time (or see note)  
([http://registrar.uoregon.edu/calendars/final_exam#2012-2013](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](http://registrar.uoregon.edu/calendars/academic#fall2012)):
- Monday of 2nd week  
  Last day to drop without a “W” (but only 75% tuition refund)
- Wednesday of 2nd week  
  Last day to add a class
- Sunday after 7th week  
  Last day to drop --- period!