

**MATH 105**  
**Liberal-Arts Mathematics: Statistics through Baseball**  
**Fall 2009**

**Overview and Policies**

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**Office Hours**

**9:00 - 10:00 a.m. on Monday, Wednesday, and Friday**

**10:00 - 11:00 a.m. on Tuesday**

**3:30 - 4:30 p.m. on Thursday**

(I am available at other times by request.)

**The Subject**

Mathematics is...what, exactly? Is it learning multiplication tables? Solving equations? Proving theorems in geometry? Is it balancing your checkbook? Does it include deciding whether Ryan Zimmerman or Melvin Mora is "due for a hit"? Is statistics a part of mathematics? In a similar vein, what are the so-called liberal arts? More generally, what is culture (this course used to be called "Mathematics and Culture")? Is baseball a part of it, at least in America? The purpose of this course is to help you arrive at answers to questions such as these. In particular, the main issues considered will be those below.

What is mathematics?

What is culture?

What, if anything, do mathematics and culture have to do with each other? Is the relationship between the two beneficial, antagonistic, some of both, or neither?

Let us define two terms immediately. **Probability** is the mathematical theory of random phenomena. One example of a random phenomenon is the act of flipping a coin and noting whether it lands "heads" or "tails." Another is observing a "trip to the plate" by a major-league baseball player. **Statistics** is a theory of information that has inference – that is, the drawing of conclusions – as its objective. Statistics employs the concepts of probability in its theory and practice. In this course we shall study those aspects of statistics that are fundamental to the making of decisions about baseball; but they happen, as well, to be very important to sound decision-making in the wider world.

There are three fundamental skills that it will benefit you to develop as you work and play with the concepts of this course. Those skills are **recognition**, **computation**, and **interpretation**. Given a phenomenon--for example, the "experiment" of deciding whether a given batter is truly on a "hot streak"--**recognition** is the act of choosing a probabilistic **model** or replica (set, function, or technique) of the phenomenon. Thus, recognition is translating the original language of a problem into mathematics (in our case, probability). **Computation** is the act of performing the calculations required by the chosen model.

**Interpretation** is the act of translating the mathematical results back into the language in which the task or problem was originally stated. (For more information about the objectives and content of the course, see the syllabus.)

The method of coverage of the ideas and skills of the course will consist of two parts, individual study and group activity. The individual study will be accomplished by you as you work on assignments and play with ideas outside class. The group activity will consist primarily of discussions, most of the time by the entire class during class time, sometimes within smaller groups inside and outside class. Other types of group activity in which we will probably engage are observing and participating in presentations by faculty or by students, perhaps including you; viewing and discussing videos; performing statistical experiments; making a field-trip to a baseball game; and playing "baseball." On rare occasions I will, in the traditional fashion, lecture. But

**(NOTE 1) this course will, for the most part, be characterized by discussions among and presentations by students, not lectures by the professor. If you believe that you need a more traditional, lecture-oriented, format to succeed in your learning, you should avoid any section of this course taught by me.**

### Administrative Matters

**Evaluation of Your Work.** Your performance in the course falls into four categories: homework and class participation, a project, and midterm and final examinations. I will handle homework and class participation by observing your work in class, grading some of your homework, and possibly administering one or more quizzes. The total of all of this work will count as  $h\%$  of your final average, where  $h$  will be defined below.

Your homework and class participation will be graded by means of my computing your "slugging average" (see Page 8 of the course's text). Each day of class, for example, will count as one at-bat. If you miss a class, you will be making an out on that at-bat; if you attend class, you will be "hitting a single." If you make a comment from your seat during that class, you will have "doubled." If you present something at the front of the classroom or make a particularly good comment from your seat, you will be "tripling." Finally, if you do an exceptional job in front of the room or offer a stunning insight from your seat, you will have "hit a home run." Conveniently, slugging average and grade-point average are mathematically identical. For example, the lowest possible slugging average is 0.000, and the highest possible is 4.000. A slugging average of 1.000 earns you a  $D$  in the "homework and class participation" category; a 2.000 earns a  $C$ ; a 3.000, a  $B$ ; and a 4.000, an  $A$ . Decide what grade you wish to earn in homework and class participation, and then amass an appropriate slugging average.

For those who choose to take it, there will be a midterm examination. It will count as  $m\%$  of your final average, where  $m$ , like  $h$ , will be defined below.

You may conduct a project on a topic relevant to the course. Examples of projects are a paper or presentation developed from an exercise in the course text or a question raised in class; an analysis of a newspaper, magazine, journal, or web article on a pertinent topic; and a statistical experiment that you perform yourself. (A sheet of suggested topics for projects will be handed out soon.) If you choose to do a project, the following conditions will apply:

- (1) By Thursday, October 9, you will propose to me what you plan to do for your project. Your proposal will include a working title, an outline of what your project will involve, and a (tentative) decision as to whether you plan to present your project to the class (this will bring you extra credit on the project).
- (2) You must turn in your completed project no later than Thursday, November 19.

If you fail to satisfy both of these conditions, you risk earning a score of 0 on your project, which counts as  $p\%$  of your final average.

The final examination will count as  $e\%$  of your final average. The numbers  $h$ ,  $m$ ,  $p$ , and  $e$  must be integers (counting numbers or 0) satisfying the following conditions:

each of  $h$  and  $p$  is at least 30 and at most 70; each of  $m$  and  $e$  is at least 0 and at most 20;

and

$$h + m + p + e = 100.$$

You have two "windows of opportunity" regarding your choice of the grade-weights  $h$ ,  $m$ ,  $p$ , and  $e$ . The first window opens on the first day of class and closes one week later. After that time, I shall myself choose the values of  $h$ ,  $m$ ,  $p$ , and  $e$  for anyone who has not informed me of his or her choices. The second (and final) window of opportunity, this one for changing your weights, opens on the date of midterm and closes one week later. You will not be allowed to change your weights after the second window has closed.

**(NOTE 2) OTHER THAN THE FINAL EXAMINATION, NO WORK OF ANY SORT MAY BE TURNED IN FOR A GRADE AFTER THURSDAY, NOVEMBER 19.**

The grading-scale for the course is the usual one:

90 - 100, A;  
 80 - 89, B;  
 70 - 79, C;  
 60 - 69, D;  
 < 60, F.

**Course policies. (1) The Integrity of Your Work.** The Salisbury University Promise, which most of you have publicly taken, says the following:

As a Salisbury University student--

- I will connect what I learn to how I live.
- I will demonstrate personal and academic integrity.
- I will respect diverse groups and individuals.
- I will strive to bring honor to myself and the University.

I shall hold you to that promise. By presenting or turning in a piece of work, you will be pledging that you have neither given nor received any unauthorized help on the work. My response to a violation of the pledge might include, but will not necessarily be limited to, the following:

- Receipt of a score of 0 on any offending work;
- Receipt of a grade of  $F$  for the course;
- Being reported to an appropriate authority, such as the Provost.

**(2) Attendance.** Just as a major-league baseball player is expected to show up at the ballpark 162 times during the regular season, prepared to give his best effort, so regular attendance of class is an important part of this course. Nevertheless, because I believe that university students should make their own decisions, attendance at the class meetings of this course is optional, subject to the following conditions:

- The student and not the professor is responsible for the consequences of an absence. This means, for example, that I will not be obligated to repeat for an absentee material that has already been covered.
- Assigned work that is late will not be accepted unless I can be convinced, preferably in advance, of the necessity of and justification for granting an extension.

**Regarding Learning Styles and Difficulties.** There are many styles of learning. Some people learn better with their eyes, some with their ears. Others have still other effective ways in which to acquire knowledge. If you have a learning style that does not seem to accommodate well to my method of teaching (but see the note on Page 1!) – in particular, if you have a learning disability – please let me know. If, for example, taking notes in class hampers your learning, we can find a good note-taker for you.

### Some Thoughts at the Beginning of a Semester

I want to help you learn. I will help you with any legitimate need. I will not help you with anything that you need to do for yourself. I want this course to be an enjoyable experience for all of us, and I will do all I can to make it so.

I am making certain assumptions about you. You are here because you want to be, if only to satisfy a requirement. You want to learn the material of this course, at least to the point of earning a passing grade. You are willing to work and study. *You are prepared to do, throughout the semester, an average of six hours per week of conscientious work outside class.* (If you do not possess all of these characteristics and you are unable or unwilling to develop them, then you should consider dropping this class.)

If at any time you would like to discuss this course, this university, or any other aspect of your life, I would be happy to do so with you.

E. Lee May, Jr., Ph. D.  
Professor of Mathematics