

MATH 311 - STATISTICS & PROBABILITY IN ELEMENTARY MATH

Spring 2010

Section 1, MW 1100-1150, EBA 258

Section 3, TTh 0930-1020, EBA 258

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The course:

OVERVIEW: In your past mathematics courses, the emphasis has likely been on how-to-do certain mathematics. Math 311 is designed to make you think about problems. As a teacher, you should not only be able to solve problems but also be able to explain why your methods of solution make sense. Hence, this course involves giving explanations, in addition to final answers. This course is not a presentation of topics taught at specific grade levels, nor a methods-of-teaching course. You will have methods courses during your credential program. Your aim here should be to gain a deep understanding of the topics while sharpening your ability to think mathematically.

DESCRIPTION: Math 311 is a conceptual study of **probability and statistics**. You will be expected to carry out statistical procedures and effectively represent data. The primary goal of the course is to provide you with the necessary background to teach the many statistical concepts now found in the elementary school curriculum. This course is also designed to give you the necessary background you need to properly interpret everyday statistics, as well as the background you will need as a professional educator (*e.g.* interpreting *percentiles* and *z-scores*).

STRATEGIES: Every theory of learning assumes that the student is engaged. Engagement means more than just copying from the chalkboard. Learning comes through your active mental involvement, and your willingness to reflect on the ideas you encounter; it does not happen automatically. It is very important that you attend class regularly, study the ideas, keep up with the homework, and ask questions or seek help when there's something you don't understand. Strive for better understanding, rather than just memorizing and imitating what you see.

Text: Reconceptualizing Mathematics, **First Edition**, Sowder, et al.

Prerequisites: Math 210, Math 211 and the LS Math Proficiency Assessment

Grading:

1. Two Exams (85 points each)	170 points
2. Six Quizzes (20 points each): lowest dropped / <u>no</u> make-ups	100 points
3. Final (comprehensive)	<u>130 points</u>
TOTAL	400 points

Letter grades will	At least 312 points ($\geq 78\%$) → C+
be assigned as follows:	At least 288 points ($\geq 72\%$) → C
	At least 360 points ($\geq 90\%$) → A-
	At least 280 points ($\geq 70\%$) → C-
	At least 352 points ($\geq 88\%$) → B+
	At least 272 points ($\geq 68\%$) → D+
	At least 328 points ($\geq 82\%$) → B
	At least 248 points ($\geq 62\%$) → D
	At least 320 points ($\geq 80\%$) → B-
	At least 240 points ($\geq 60\%$) → D-

Note: In a *border-line* case, your attendance and participation may affect your grade.

Why Probability and Statistics?

Sometimes pre-service elementary school teachers wonder why they should study probability and statistics, since they may have no memory of studying these topics when they were in elementary school. But the fact is that nowadays state and national curriculum recommendations usually include topics in probability and statistics because of their importance for being an informed citizen. Why is buying a lottery ticket a bad idea? How do insurance companies decide on the premiums to charge? What information does a *measure of central tendency* tell you? What do polling results like $51\% \pm 3\%$ really mean?

Probability and statistics are topics that appear in almost all elementary mathematics textbooks. The latest California "standards" provide guidelines as to what a mathematics curriculum in this state should cover. The standards are organized around five "strands" – (1) Number Sense; (2) Algebra and Functions; (3) Measurement and Geometry; (4) Statistics, Data Analysis, and Probability; and (5) Mathematical Reasoning. Each grade (K-7) has standards in each strand.

Teachers also need statistical knowledge when preparing grades, reading educational research or performance summaries, and interpreting standardized test reports (especially for parents). Hence, many of the topics in Math 311 are relevant to a teacher, either because they are part of the state curriculum or because they are needed to perform certain administrative duties.