MATH 405 PROBABILITY AND STATISTICS FOR TEACHERS Winter 2018
TTh 4:30 – 6:20PM

Professor:	Dr. Chris Black
Office:	DES MOINES: HEC #268
Office Hours:	By arrangement
Email :	blackc@cwu.edu. Email is the most reliable way to reach me.

Text:	Required handouts, worksheets and homework tasks will be provided by the professor.
Required Materials:	Access to Canvas & Desmos; access to Excel or other spreadsheet program.

GOALS FOR COURSE:

Upon successful completion of this course, MATH 405 students will be able to:

- ... choose appropriate graphical representations of data and interpret data presented in such displays;
- ... calculate and interpret basic descriptive statistics;
- ... create and interpret lines of best fit and correlation coefficents;
- ... calculate probabilities for simple events from a variety of random experiments;
- ... correctly apply principles of counting and use them to calculate probabilities;
- ... actively participate in the classroom dialogue, both as an individual and as a member of a small group, and be an active partner during in-class work.

ABOUT THIS COURSE:

The primary purpose of this course is to prepare preservice teachers to effectively teach probability and statistics in the middle grades.

> Standards-based middle school curricula are designed to engage students in a variety of mathematical experiences, including thoughtfully planned classroom explorations that provide and reinforce fundamental skills while illuminating the power and utility of mathematics in our world. These materials integrate central concepts in algebra, geometry, data analysis, probability, & mathematics of change and focus on important unifying ideas such as proportional reasoning.
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> The mathematical content of standards-based middle grade mathematics materials is challenging and relevant to our technological wolrd. Its effective classrom implementation is dependent upon teachers having a strong and appropriate mathematical preparation.

We will devote our energies in this class to studying mathematical content as well as analyzing the Common Core State Standards for Statistics and Probability. Participants in this course will study the material both as student and as teacher.

Course Expectations:

Being successful in a mathematics class generally requires good study habits, hard work & patience while attempting problem sets, and proper time management. Each student is expected to attend every class meeting, to read and think about the assigned sections of the text prior to class, to complete homework problems and other assignments in a timely manner, and to seek the assistance of the instructor when difficulties are encountered.

Structure of this Course:

This is not a traditional lecture course. In small groups, students will work though hands-on activities designed to lead to discovery of statistical concepts, exploration of statistical principles and application of statistical techniques. Students work toward these goals through the analysis of genuine data and through interaction with each other, the instructor and with technology in the form of Desmos with a bit of help from a spreadsheet such as Excel.

We will focus on the "big ideas" of statistics, paying less attention to details that ofen divert attention from larger issues. Little emphasis is placed on numerical and symbolic manipulation; rather, the activities are designed to lead students to explore the meaning of concepts such as variability, distribution, outlier, tendency, association, randomness, sampling, sampling distribution, and experimental design. Students will invstigate these concepts through experimentation with data, often with the help of the online Desmos calculator. Students are expected to focus on communicating their understanding through verbal explanations.

Desmos (and other online resources) will be used to create visual displays, perform calculations, and conduct simulations. Technology performs the calculations and presents the visual displays necessary to analyze genuine data sets that are often large and cumbersome. Technology also allows students to conduct simulations to visualize and explore the long-term behavior of sample statistics under repeated random sampling. Roughly half of the in-class activities require the use of the Desmos so we will meet in a computer lab setting. Data sets will be available on Canvas and can be imported into Desmos for analysis.

Grading:

Written assignments:	40%
Tests:	40%
Final Exam:	20%

The table below contains the correspondence of grades and course percentages.

92.00 – 100.00	A	82.00 – 87.99	B	70.00 – 77.99	C
90.00 – 91.99	A-	80.00 – 81.99	B-	60.00 – 69.99	D
88.00 – 89.99	B+	78.00 – 79.99	C+	0.00 – 59.99	F

Absences:

Due to the collaborative nature of this hands-on course, it is imperative that you avoid missing class. If you do need to miss a class, it is your responsibility to contact a class member to find out what was missed during the class period.

A missed test may not be made up without just cause. If you have an unavoidable conflict or severe illness that requires you to miss a test, contact the professor BEFORE the scheduled time of the test. **Documentation must be provided in order to make alternate arrangements.**

Homework:

Written homework assignments from the text are due in class as assigned; generally one assignment per week. Homework tasks will mimic the tasks done in class, using authentic data and requiring the use of the Desmos. You are expected to present your work clearly, with answers in complete, grammatically correct sentences. The purpose of statistics is to *interpret* data, so your job in the homework tasks is to *communicate* your interpretation of the data. In order to communicate, you'll need to respond to the tasks verbally. Exceptions are tasks that ask you to complete a table or produce a graphical display. As our depth of understanding of statistic deepens, the depth of the analysis of the data should also deepen.

Since class meets 4 hours per week, expect to spend roughly 8 hours per week on homework for this course. Your scores on the assigned homework tasks comprise 40% of your course grade.

Tests:

There will be two tests in the course, administered as take-home tests. I reserve the right to convert these to in-class tests if I deem it necessary. Dates of the tests will be announced in class.

1. Test #1 on Unit 1 (Exploring Data: Distributions)
2. Test #2 on Unit 2 (Exploring Data: Comparisons and Relationships)

The tests will require the use of Desmos. Your scores on the two tests comprise 40% of your total course grade.

Final Exam:

The final exam is scheduled for Tuesday, 3/13, from 4:30 - 6:30 pm. This will be a comprehensive exam covering the basic concepts of the course, with a focus on material covered after Test #2 Your score on the final exam comprises 20% of your total course grade.

Honor and Respect:

Each of us should consider our placement at this institution to be a privilege. We need to have respect for one another, and for ourselves. In light of these facts, cheating in any form will not be tolerated. You are encouraged to work together on homework problems, however anything you turn in with your name on it should have been written by you alone. In a course where much of your grade is determined by your proof writing, plagiarism is a concern. The word "plagiarize" is defined by Merriam-Webster as "to steal and pass off (the ideas or words of another) as one's own: use (another's production) without crediting the source." This is a very serious offense and jeopardizes your position in a teacher preparation program.

Disability Services:

Students with disabilities wishing to use academic adjustments in their CWU classes must be registered with Disability Services (DS). Information about the DS intake process may be obtained by emailing cds@cwu.edu or calling (509) 963-2171. Qualified students with disabilities may establish academic adjustments in this class by either sending me their official on-line accommodation request or speaking with me to establish the manner in which requested adjustments will be delivered.