MATH 405 | PROBABILITY AND STATISTICS FOR TEACHERS | Fall 2021
DES MOINES CENTER MTh 9:30 - 11:10AM

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. Access to Zoom in case campus shuts down or you are unable to attend class in person.

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.
>
> The mathematical content of standards-based middle grade mathematics materials is challenging and relevant to our technological world. 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.

Adaptations for Fall 2021:

With all that is going on in the world in this pandemic, we are all doing the best we can. If you encounter challenges in this course, please contact me ASAP so we can seek a resolution together. Due to the ongoing COVID-19 pandemic, the following policies are in effect:

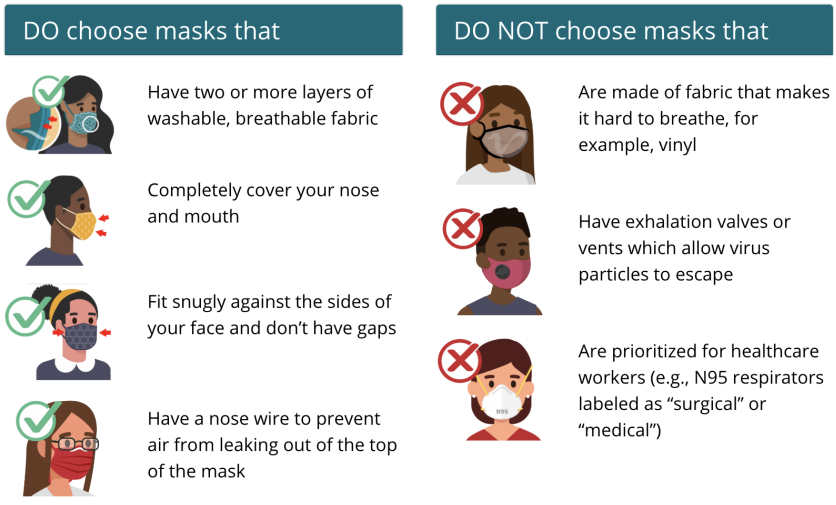
- To the extent that it is possible, please stay in touch with me if COVID-19 affects your ability to do the work in this course.
- **If you are exposed to, show symptoms of, are diagnosed with COVID-19, please do not attend class in person.**
  - → If you are well enough to participate in class remotely, let me know in advance and we'll set up a Zoom link to allow you to work through the lesson with us.
  - → Otherwise, let me know in advance and I can use Zoom to record the session and post it to Canvas. The Desmos activities are available at any time for you to play along with the recording. Note that I will not be recording class without specifically being asked to do so.
- There is no late penalty for any homework assignment. There is a due date on the schedule, but any work can be completed for full credit until the day of the final exam.
- Any test or assignment can be rescheduled as needed – just ask! When possible, ask before the day of the scheduled event, but due to the extraordinary circumstances we're living under right now, all requests will be honored. Let me know what adjustments you need so I can make the necessary arrangements.

Long-term planning is uncertain right now, so be sure that you stay connected to the class via Canvas announcements and email in case things change.

COVID-19 Safety Information:

Due to the ongoing COVID-19 pandemic, students in this class are required to wear masks that cover both the nose and the mouth. If you attend class without an appropriate mask you will be asked to leave and obtain a mask before returning. The mask must be worn over your mouth and nose for the duration of the class session and while inside of University buildings.

The CDC offers this information on choosing an appropriate mask:



Standard face shields, single-layer neck gaiters, single layer masks, masks with one-way vent valves, and handkerchiefs are not considered appropriate masks.

https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/about-face-coverings.html

Structure of this Course:

This is not a traditional lecture course. Students will work though 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 probability. Students will invstigate these concepts through experimentation with data, often with the help of the online Desmos interface. 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. Most of the in-class activities require the use of Desmos. Data sets will be available on Canvas and can be imported into Desmos for analysis.

Class is currently slated to meet in person with required masking and social distancing. The course will be delivered through the Desmos activity builder platform, which will allow us to switch to remote delivery if required. We will be also using the Discussion forum on Canvas, and your participation in these discussions will determine part of your course grade. See the details below.

Grading:

Homework:	200 points
Connections Analyses:	100 points
Discussions:	50 points
Video Case Studies :	50 points
Take-Home Tests:	200 points
Take-Home Final:	50 points
Final Desmos analysis and presentation:	40 points

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

89.50 – 100.00%	some type of A	59.50 – 69.499%	D
79.50 – 89.499%	some flavor of B	0.00 – 59.499%	F
69.50 – 79.499%	some kind of C		

Homework:

Written homework assignments from the text are due in class as assigned on the course schedule; the intent is that one topic is due each Thursday. Homework tasks will mimic the tasks done in class, using authentic data and often requiring the use of Desmos or other technology. 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 statistics deepens, the depth of the analysis should also deepen.

For each of the 10 topics in the text, three homework tasks will be assigned and collected. Two of those three assigned tasks will be selected randomly and graded. Each homework task is worth 10 points, making each weekly assignment worth a total of 20 points. While class is meeting in person, homework will be collected on paper in class.

Connections Assignments:

After each Topic, you will work through a set of 2 or 3 statistics lessons from the Eureka Math curriculum. The short 10-point Connections assignments are designed for you to think critically about these lessons and how to effectively teach statistics to middle school students following the guidelines of the GAISE report and the Common Core State Standards. These 10 assignments are collectively worth 100 points. These assignments should be typed and submitted via Canvas.

Discussion Groups:

The class will be divided into groups of roughly equal size to facilitate discussion on the Canvas discussion board. After each Topic, read the assigned Eureka Math lessons, work through the connections assignment (described above), and participate in your group's discussion threads. Pose your own question or comment, and respond to your team members' questions and comments. Participation in each weekly discussion thread is worth 5 points.

Video Case Studies:

Every other week, we will watch assigned 10-15 minute videos from the Atlas video library of middle-grades statistics lessons. Each of these assigned videos has a case study of questions for you to answer about the teaching you've observed in the video. These bi-weekly assignments are worth 15 points each, for a total of 75 points. These assignments should be typed and submitted via Canvas.

Take-Home Tests:

There will be two tests in the course, administered as take-home tests. **Take-home tests are to be done individually**. Dates of the tests have been tentatively marked on the course schedule.

- Take-home test #1 on Topics 1-4
- Take-home test #2 on Topics 5-8

Tests will require the use of Desmos. The take-home tests are worth 100 points each. Completed tests will be submitted on paper in class.

Final:

The final assessment for the course has two components.

1. A 50-point take-home test covering Topics 9 & 10 (Probability)
   This test will be submitted on paper during the final class session.
2. An analysis of existing Desmos activities and an in-class presentation during finals week. This analysis will be submitted electronically through Canvas.

Academic Honesty:

Consult university policies (CWUP 5-90-040(22), CWUR 2-90-040(22), and WAC 106-125-020) for student conduct, cheating, plagiarism, and other academic expectations. CWU's policies and recommendations for academic misconduct will be followed, leading to disciplinary action up to and including failing the course. See https://apps.leg.wa.gov/WAC/default.aspx?cite=106-125 and https://www.cwu.edu/resources-reports/cwur-2-90-040-academic-and-general-regulations#Grade%20Appeals

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Disability Services:

Central Washington University is committed to creating a learning environment that meets the needs of its diverse student body. Students with disabilities should contact Disability Services to discuss a range of options to removing barriers, including accommodations: Hogue Hall 126, 509.963.2214, DS@cwu.edu, www.cwu.edu/disability-services.

Physical, Mental, and Emotional Health and Support:
Stress and other life circumstances that may be out of your control can make learning and focusing difficult. If you find stress or other mental health concerns make academics difficult, Central has resources to support you. I encourage you to reach out as soon as you notice you're struggling.

- **Mental health crisis support** outside of normal business hours: Call 1-800-273-8255 or Text HOME to 741741
- **WildcatCare365:** No-charge, immediate, and unlimited access to medical and professional mental health support visits at any time of the day. Requires an app to be downloaded to a smart phone. https://timely.md/schools/index.html?school=wildcatcare365
- **Student Health Services:** Medical appointments. Call 509-963-1881. www.cwu.edu/health-services/
- **Student Counseling Services:** Crisis appointments are available. Call 509-963-1391. www.cwu.edu/medical-counseling/counseling-clinic
- **Wellness Center:** Confidential sexual assault and other victim advocacy. Call 509-963-3213 or visit www.cwu.edu/wecare, www.cwu.edu/wellness/path

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Accommodation for Religious Observances:
In compliance with RCW 28B.137.010, Central Washington University makes every effort to deal reasonably and fairly with students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. Students must present written notice to their instructor within the first two weeks of class listing the specific dates on which accommodations are required. Contact the Dean of Student Success at (509) 963-1515 for further information.

Statement on Diversity:
CWU expects every member of the university community to contribute to an inclusive and respectful culture for all in its classrooms, work environments, and at campus events. As a student in this course, you are expected to treat your professors, fellow students, and other people affiliated with your work at CWU with respect, regardless of their sex, race and color, religion and creed, national origin, sexual orientation, gender identity and gender expression, disability and use of assistive devices or a service animal, and veteran or military status.

Expectations for Student Conduct:
Students in this class are expected to interact with students and the professor professionally. Instances of disruptive conduct, obstructive conduct, or harassment (see definitions below from the Washington Administrative Code) will be referred to the Dean of Student Success.

Per WAC 106-125-020, the term "disruptive" or "obstructive" conduct means conduct, not protected by law, that interferes with, impedes, or otherwise unreasonably hinders the normal teaching, learning, research,l administrative, or other functions, procedures, services, programs, or activities of the university. The term includes disorderly conduct, breach of the peace, violation of local or university noise policies, lewd or obscene conduct, obstruction of pedestrian or vehicular traffic, tampering with student election processes, or interfering with the orderly conduct of university investigations or disciplinary proceedings, including interfering with or retaliating against any witness, party, or other participant.

The term "harassment" means unwelcome and offensive conduct, including verbal, nonverbal, or physical conduct, that is directed at a person because of such person's protected status and that is sufficiently serious as to deny or limit the ability of a student to participate in or benefit from the university's educational program, or that creates an intimidating, hostile, or offensive environment for any campus community member(s). Protected status includes a person's actual or perceived race, color, national origin, gender, disability, or other status protected by law.