

Math 101.A01

Spring 2015

**INSTRUCTOR:** Steve Stein, PhD

Upon request- in person or on Collaborate

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**Course Summary:** Math in the modern world is mathematics for students who want a better understanding of the real-life mathematics that all people face. It is especially designed for those who have struggled with mathematics in the past. The course stresses the application of mathematics to personal and social issues, rather than stressing the abstract ideas found in many mathematics courses. This course will include projects as part of the course content. The desired outcome of the inclusion of projects is to prepare students to function in real-life situations and to integrate quantitative reasoning as part of that process.

At CWU, Math in the Modern World is often selected to satisfy a General Education requirement for graduation. The course is designed to develop a student's ability to reason quantitatively in order to achieve success in their future careers and personal lives. Basic course goals include:

- Becoming familiar with techniques from many branches of mathematics.
- Developing the ability to analyze quantitative information critically.
- Investigating real-world problems creatively.
- Understanding the connections between various mathematical methods.
- Using technology to help solve problems, experiment, interpret results and verify conclusions.
- Determining the reasonableness of solutions.
- Appreciating that the procedure for solving a problem is as important as the answer.
- Communicating knowledge in both everyday and mathematical language.

### Special points of interest:

- Do not email assignments to me!!! **All assignments** must be submitted on Canvas or Mathxl.
- **All assignments** must be submitted on Canvas or Mathxl.
- Students must register for MathXL (see instructions attached in Canvas) .
- The class will become routine as each of the sections covered will progress in similar fashion. First, a lecture using PowerPoint slides will be covered by the instructor. Typically, this will be followed the next day by an overview of a worksheet designed to prepare students for completing the homework. Once the worksheet for the section is completed the homework is “assigned” and needs to be completed prior to the beginning of the next section’s homework. Often a “section quiz” will be given upon completion of homework.
- Sometime during the Unit a group project will be assigned. This project will be discussed in the lecture and typically a class period (the time allotted to the day’s lesson) will be set aside for the project. It is imperative that students work diligently to complete the project with their group. The project should not be considered complete until after each group member reviews the work and agrees with the material. Real world application means we can work well with others and contribute to the completion of assigned work! **DO NOT email your project** to the instructor! Please upload the document to Blackboard
- Daily homework is assigned and is to be completed online via Mymathlab.
- I will be happy to do homework problems during the lecture. You must get the problems to me early enough so that I can include them in the instruction for that day.
- Be prepared for graded quizzes for each section we cover in this course. These will also be completed online through Mymathlab. Problems will be similar to homework and worksheet problems. Your quizzes are timed, so fluency is important.
- In addition to quizzes on Mymathlab, students will be required to meet with the instructor in a “virtual meeting” and likely be given a brief quiz. Students must schedule and meet with the instructor and also have the ability to discuss (microphone and speakers) with the instructor!
- There will be three section tests and a final exam. The final will include additional information from the last section (chapters 8 & 9).
- I am again making some adjustments to this online course. I try to be receptive to students’ comments on SEOI’s and am making adjustments accordingly.
- Grades will be based on a composite score from homework, quizzes, Unit tests, and Projects—students generally get high

scores on the homework (multiple attempts are allowed), whereas the quiz/test scores are often significantly lower!.

### **Necessities:**

- View the recordings, complete the assigned homework, and complete the timed section quizzes and tests.
- Be sure to read the requirements carefully for the Projects as you complete them. It is important that group members fulfill responsibilities and attend meetings!
- Textbook: *Mathematics A Quantitative Reasoning Approach, 6<sup>th</sup> Edition (Bennett & Briggs)* along with the Mymathlab access kit.
- Scientific calculator: should have graphing capabilities (I will usually use a TI-83+)
- Students are required to meet with the professor every other week of the term. Students will lose points for the class if the appointment is not made or kept and a “brief” oral quiz will take place (graded) as well.
- Communicate with the instructor using email, calling, or by visiting during office hours. The Teaching Assistant will usually be available via email to answer questions, but she is not a substitute for communicating with the instructor!

### Section 1: Chapters three and five—Making Sense of Numbers (Tuition, salaries, and student enrollment at CWU).

Quiz: There are four primary topics for this section. First, you must be able to find the Percentage Change of two items (this means you need to know the absolute and relative changes). Second, be able to determine a price index of two items and also understand and be able to use the CPI to adjust a price or understand inflation. Third, from a set of raw scores, create a graphic from data in order to describe it. And fourth, if given a set of data, you should be able to interpret it and analyze the data.

Project: Compile and analyze actual data from CWU and make a determination based on the analysis. Conclusions must be substantiated and supported from the analysis.

### Section 2: Applications to Finance (Credit card project)

Quiz: There are several formulas related to finance (savings and loans) that we will utilize. You must understand the differences between these and know when to use each. Formulas will be studied regarding simple interest, compound interest, savings, and loans. Each formula has a particular role and use.

Specifically, you must be able to determine the difference between simple interest and compound interest earned, be able to

show the amount of principal and interest that goes toward monthly payment, calculate either one time or monthly payments needed for an investment, and finally, show the amount of payment needed to pay off a loan in a determined amount of time.

Project: We will have two projects for this section:

First: Consider a scenario where you are provided with an annual income and several expenses. Using appropriate formulas, determine if you are able to purchase a house and if so, what is the amount of house you could afford.

Second: Consider three different credit card scenarios in order to recommend to a fictitious client which card they should accept.

### Section 3: Voting

Quiz: There are several techniques discussed in relation to voting techniques. Be familiar with each and able to demonstrate the proper use of each one. Also, it is valuable to understand what constitutes a fair vs. unfair election. Be able to state whether an election is fair and support your position. In addition, demonstrate proper procedures related to the different apportionment methods and evaluate the order strength or weakness of the procedure.

Project: A brief essay. Consider voting techniques, fairness of voting and apportionment to discuss what you see as the important issues related to these things in terms of mathematical applications.

### Section 4: Linear and Exponential Growth and Modeling (Bunny rabbit project)

Quiz: Students must be able to determine linear or exponential growth from data sets. In addition, students need to create a mathematical equation (with use of a calculator) that models the function and also be able to find a graph of the function (again, with use of the calculator.)

Project: Consider a situation where rabbits reproduce in a perfect environment and predict the population after 24 months. Next, determine a mathematical equation that will model the growth. Finally, predict the population after 30 and 60 months of growth based on the mathematical model you developed. In addition, provide a brief narrative describing the weakness of the scenario.

Math 130 Finite Math (pre-requisite for Statistics and fulfills the CWU reasoning requirement)

March 31 to June 5 (\* Memorial day May 25, final due June 10)

| <b>Module</b>     | <b>Sections</b>                                   | <b>Assignments/submissions</b>  | <b>Exercises</b>  | <b>Notes</b>   | <b>Recordings</b>  |
|-------------------|---|---|---|--|--|
| <b>Week</b>       |   |   |   |  |  |
| <b><u>One</u></b> | Ch 6- counting and probability                    | <input type="checkbox"/> Math auto <sup>1</sup> _____<br><input type="checkbox"/> Online meeting _____<br><input type="checkbox"/> Read and acknowledge project “discussion” _____<br><input type="checkbox"/> Prep for project _____<br><input type="checkbox"/> Project 1 <sup>2</sup> _____<br><input type="checkbox"/> Worksheets <sup>3</sup> _____<br><input type="checkbox"/> Homework <sup>4</sup> _____<br><input type="checkbox"/> Test _____ | <b>Worksheet chapter 6</b><br>6.1<br>6.2<br>6.4<br>6.5  | 1- you must have signed up for a “collaborate meeting before submitting you math bio.<br>2- For full credit all projects must be completed in groups<br>3- Upload these in a single file (pdf).<br>4- Upload these in a single file (pdf)— this will not be graded if these instructions are not followed. | Intro<br>6.1 & Wksht<br>6.2 & Wksht<br>6.3<br>6.4 & Wksht<br>6.5 & Wksht                             |
| Weeks- 1, 2, & 3  |   |   | <b>Homework chapter 6</b><br>3-6, 11<br>16, 18-20, 22, 23, 25, 28, 30, 31, 35<br>39,44, 56-61,67-73,80-84<br>88-98,100-109,131,135-137<br>138,139,144-172 |  |  |
| <b><u>Two</u></b> | Ch 7- more sophisticated counting and probability | <input type="checkbox"/> Collaborate quiz <sup>5</sup> _____<br><input type="checkbox"/> Project 2 _____<br><input type="checkbox"/> Worksheets _____<br><input type="checkbox"/> Homework _____<br><input type="checkbox"/> Mid-term _____   | <b>Worksheet chapter 7</b><br>7.1 practice<br>7.1-7.2<br>7.4<br>7.5   | 5-<br>6- This is a quiz that you will take in Collaborate while I am present. It is open notes.<br>7-  | 7.1, 7.1 pr<br>7.2 & wksht 7,1 & 7.2<br>7.3<br>7.4 & whsht 7.4<br>7.5<br>7.6<br>Project<br>Test prep |
| Weeks- 3, 4, & 5  |   |   | <b>Homework chapter 7</b><br>1,2,7,8,11,13,15-18,21-27,40-48,65,66  |  |  |

|                        |                                       |  |   |  |  |
|------------------------|---------------------------------------|--|---|--|--|
|                        |                                       |  | 69, 72, 74, 78,80<br>95-132<br>146,148-153,157,159-163<br>167-169,175,176,184-187<br>194,195,197,200-202  |  |  |
| <b><u>Three</u></b>    | Ch 8-<br>Probability<br>distributions | <input type="checkbox"/> Collaborate quiz _____<br>(possible)<br><input type="checkbox"/> Project 3 _____<br><input type="checkbox"/> Worksheets _____<br><input type="checkbox"/> Homework _____<br><input type="checkbox"/> test 3 _____ | <b>Worksheet chapter 8</b><br>8.1 & 8.2<br>8.3<br>8.4<br>8.6 & 8.7  |  | 8.1<br>8.2 & wksht 8.1 & 8.2<br>8.3 & wksht 8.3<br>8.4 & wksht 8.4<br>8.5 & 8.6<br>8.7 & wksht 8.6 & 8.7<br>Project prep |
| Weeks- 5,<br>6, 7, & 8 |                                       |  | <b>Homework chapter 8</b><br>1-6, 17, 18, 21, 22, 24, 30, 31<br><br>35-38,45-47,52<br><br>55-58,63,65-70<br>76-80,86-88,91-<br>93,96,99,101,106,107,111,116-<br>118,122-130,138,145-148<br>170-177,184-188<br><br>189-207,212-218,227-229 |  |  |
| <b><u>Four</u></b>     | Ch 9- Statistics                      | <input type="checkbox"/> Collaborate quiz _____<br><input type="checkbox"/> Project 4 _____<br><input type="checkbox"/> Worksheets _____<br><input type="checkbox"/> Homework _____  | <b>Worksheet chapter 9</b><br>9.1<br>9.2<br>9.4<br>9.5<br>9.5b  |  | 9.1 & wksht 9.1<br>9.2 & wksht 9.2<br>9.3<br>9.4 & wksht 9.4<br>9.5 (optional)<br>9.6 & project prep                     |

|                 |            |                       |   |  |            |
|-----------------|------------|-----------------------|---|--|------------|
| Weeks- 8,9 & 10 |            |                       | Homework chapter 9<br>1-5,20-22<br>23,26,28<br><br>32-34,45-50<br><br>51-55,64-70<br><br>*71-74,77,80-84,88-90<br>91-94,108-114,121-124<br><br>* only do if specifically told to complete |  |            |
| <b>Five</b>     | Final prep | Final _____ (June 10) |   |  | Final prep |
| Weeks--10       |            |                       |   |  |            |

**Textbook:** *Finite Mathematics, introductory probability & statistics* (Owen & Cutlip) any edition

|  |   |
|--|---|
| <p>1. Counting and probabilities</p> <ul style="list-style-type: none"> <li>a. Sorting and counting of data, samples, or populations</li> <li>b. Defining sample spaces and events</li> <li>c. Set notation, the additive law, and the complement</li> <li>d. Conditional probability</li> <li>e. Bayes' theorem</li> <li>f. Using the complement (reliability of systems).</li> </ul> | <p>2. Variables and probability distributions</p> <ul style="list-style-type: none"> <li>a. Describing random variables</li> <li>b. Measuring dispersion</li> <li>c. Binomial distribution</li> <li>d. Normal distribution</li> </ul> |
| <p>3. Introduction to Statistics</p> <ul style="list-style-type: none"> <li>a. Graphical methods</li> <li>b. Measures of Central Tendency</li> </ul>   | <p>4. Using statistical tables</p> <ul style="list-style-type: none"> <li>a. Binomial probability distributions</li> </ul>  |

c. Measures of dispersion

d. Confidence intervals

b. Standard normal distribution table