

Abilene Christian University

Fall 2011



MATW 120.04: Quantitative Reasoning Workshop

MW 2:00 – 2:50, TR 1:30 – 2:50

Foster Science Building 204

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This syllabus also functions as the syllabus for the MATW 020.04 section.

Required Text(s): The course text is required¹ and may be purchased in the campus book store, or ordered online at the student's discretion. Please bring this text with you to each class meeting.

Course Material(s): A calculator is required for this course. At a minimum, students should have access to a calculator for use on tests, quizzes, and homework. Calculators will not be loaned out during class and cannot be exchanged between students during tests or quizzes.

We will use the SpaceTime iPhone app as our computing platform this semester. The SpaceTime app is available for download from the iTunes App Store at a cost of \$19.99. This represents a substantial savings over the TI-84 normally required for this course. **This app is required!** The TI-8x series of calculator will not be supported this semester in this class and will not be allowed on exams or in class quizzes. Tutorials for using the SpaceTime app can be found at www.acu.edu/~jee99a and at the SpaceTime website, <http://www.spacetime.us>. A free Windows/Mac version of the app is available for download at this site. You will need to bring your iPhone or iPod Touch with you to each class meeting. These devices cannot be exchanged between students during tests or quizzes. The SpaceTime app can be found in the iTunes store at <http://itunes.apple.com/us/app/spacetime-scientific-computing/id293619493?mt=8>.

Students will also need to download the ResponseWare app from Turning Technologies. This app will allow us to conduct in class polling sessions from our devices. This app is free to students. The ResponseWare app can be found in the iTunes store at <http://itunes.apple.com/us/app/responseware/id300028504?mt=8>. All apps and calculators should be obtained before the beginning of the second week of class.

You should also take the time to update your iPhone software to the most recent version. As of the writing of this syllabus the current iPhone software version is 4.3.5.

¹ Pirnot, Thomas L., *Mathematics All Around*, Addison Wesley, 4th edition, 2010, ISBN: 0-321-56797-8.

Course Description: In MATH 120 and MATW 120, students use algebraic, graphical, and numerical reasoning to recognize patterns and structure, to model information, and to solve real-life problems. Students develop and use mathematical models to solve problems involving function relationships, chance, statistics, and finance. A graphing calculator is used to link modeling techniques and purely mathematical concepts. In addition, students analyze real-life problems within the context of a Christian world view. The ACU course catalog describes MATH 120 as follows:

MATH 120 Quantitative Reasoning (3-0-3), fall, spring, statistics and data analysis, mathematics of finance, probability, models including ratios and proportions, linear exponential, calculator intensive. Prerequisite: MATH SAT score of 500; MATH ACT score of 20; or COMPASS placement into MATH 120. For non-science, non-business majors. Will satisfy the Mathematics University Core requirements.

Although it is important to remember the basic material for a test, you will find that **memorizing without understanding** is not very useful. Throughout the text, we will use many diagrams, analogies, and examples to help you understand mathematical terminology, formulas, equations, and solution methods. If you work at understanding the intuitive meaning behind mathematical concepts, those ideas will become more engrained in your memory.

Mission Statement: This course supports ACU's mission statement of preparing students for Christian service and leadership throughout the world by providing students with a foundational understanding of mathematical principles such as problem solving and decision making, as well as exposing students to the role of mathematics in a Christian worldview.

Departmental Mission: The mission of the Department of Mathematics is to educate students to be quantitative and analytical thinkers in preparation for Christian service and leadership throughout the world.

Graded Components: The graded course components are listed below with descriptions.

90-100	80-89	70-79	60-69	Below 60
A	B	C	D	F

Component	#	Percent of Grade
Exams	3	50%
Daily Grades	12	20%
Reflection Papers	2	10%
Final Exam	1	20%

Exams: There will be three exams given over the course of the semester. Each of these exams is indicated in the course schedule in this syllabus. Exams will be administered in two sections. The first section will be administered on either Monday or Wednesday of the testing week and will cover basic problems involving the calculator. The first section will be entirely composed of multiple choice questions. No partial credit will be given on this section. The second section will be administered in the next class meeting following the first section. The second section will contain more in-depth modeling type questions where all work must be shown for full credit. Partial credit can be awarded on this part of the exam. Together these content exams comprise 50% of the course grade.

Final Exam: The final exam for this course is comprehensive and departmental. It will be composed entirely of multiple choice questions chosen by the department. The final exam is scheduled for **10:00-11:45 Thursday, December 15**. The final exam cannot be given early and will only be given after the scheduled date under extraordinary circumstances at the discretion of the instructor. The final exam is worth 20% of your grade.

Daily Grades: At the beginning of some Monday/Wednesday class sessions there will be a short quiz over the previous lecture's content. Quizzes will be announced on the course blog. Quizzes serve to enforce attendance as well as assess your knowledge of the material. Other daily grades may be given for completing assigned surveys, exceptional in-class work, or other items at the instructor's discretion.

Reflection Papers: Over the course of the semester there will be two reflection papers assigned. The topics for discussion are listed below. More information on these assignments will be made available at the appropriate time. Each paper is worth 5% of the course grade.

Topic 1: Reasoning with Uncertainty (Due on the date of Exam 2A)

Topic 2: What the Stats Tell Us About Christianity (Due on the date of Exam 3A)

Attendance Policy: Your regular attendance is both necessary and expected. You are responsible for all material covered while absent and will be expected to take regularly scheduled exams at their designated times except under extraordinary circumstances at the discretion of the instructor. You will be notified each time you are absent. Tardiness of more than 15 minutes is considered an absence and will be recorded as such. Should your number of absences exceed 25% of the scheduled course dates you can be dropped from the course at the instructor's discretion. Please make every effort to attend class prepared and ready to participate.

There are some situations for which a student absence will be excused. It is the student's responsibility to document such absences so they are removed from your record. Among the reasons absences are considered excused are the following:

1. Participation in a university sponsored activity. If you miss class for a university sponsored activity, I must have seven (7) days advanced written notice and you must make arrangements to complete your assignments before leaving. The sponsor of the activity is responsible for giving you a signed form on time. If I do not have the appropriate form in advance, the absence will be considered unexcused. This is university policy.
2. Death or major illness in your immediate family. Immediate family includes parents, siblings, grandparents, spouse, child, and other as deemed appropriate by the instructor.
3. Illness of a dependent family member.
4. Injury or illness that is too severe or contagious for you to attend class.
 - a. Injury or illness of three or more consecutive days. For injury or illness that requires you to be absent from classes for three consecutive days, you should obtain a medical confirmation note from your medical provider. A health care professional may provide written confirmation only if he/she is involved in your medical care. The medical confirmation note must contain the date and time of the illness and medical professional's confirmation of needed absence.
 - b. Injury or illness less than three consecutive class days. These will be evaluated on a per case basis at the discretion of the instructor. These must be brought to the instructor's attention through email or written note of explanation within a week of the last date of absence in order to be considered.
 - c. An absence for any other non-acute illness or medical service does not constitute an excused absence.
5. Mandatory admission interviews for professional or graduate schools which cannot be rescheduled. Receiving advising from another department or registering for classes should never be done during class time and do not constitute an excused absence.

Should an excused absence cause you to miss a test, the instructor will provide an opportunity for the test to be taken at a time that works for all parties involved. If an absence is excused and you miss a daily assignment or quiz, I will replace the grade on the assignment with the average of the previous assignment and the next assignment. This will not require the student to turn in such assignments, but it should be noted that the student is responsible for all material covered during the absence.

Make Up Policy: Because quizzes serve to enforce attendance they cannot be taken at another time except with prior permission from your instructor. **After an assignment has been graded and handed back in class, it will not be accepted for a grade under any circumstance.** In the case of an university excused absence, it is the students' responsibility to make arrangements with the instructor regarding due dates. Exams cannot be made up if missed except under extraordinary circumstances at the discretion of the instructor.

Academic Integrity Policy: The university policy regarding academic integrity is available online at <http://www.acu.edu/campusoffices/provost>. Students found guilty of an act of academic dishonesty will be subject to the following discretionary actions in this course.

First Occurrence: A first violation will result in no credit for that particular assignment (even if it is an exam). No makeup will be allowed. The appropriate campus office(s) will be notified of the incident, and a notice of the incident will accompany your university records.

Second Occurrence: A second violation will result in your withdrawal from the course with a grade of F. A recommendation for suspension from the university will be made by the department.

Due to the usage of mobile devices on tests and quizzes, academic honesty will be closely monitored this semester. It is never permissible to use your mobile device to text, copy, or photograph any portion of the class work including but not limited to tests, quizzes, homework assignments, etc... Students found doing so will be guilty of an act of academic honesty and are subject to the above actions. Should you wish to use your device for one of these purposes please clear this with your instructor first.

Electronic Devices Policy: Please keep all phones on silent and turn off or silence beepers, pagers, alarms, .mp3 players etc... Headphones, listening to music, texting and other uses of these devices, not intended for class purposes are strictly prohibited during class. Frequent disruptions or failure to abide by this policy will be viewed as disruptive behavior and are subject to being dismissed from the class and counted absent. If the disruptions continue you will be dropped from the course.

Disability Accommodations: If you have a documented disability and wish to discuss academic accommodations, please feel free to contact me. The ACU Student Disability Services Office (a part of Alpha Academic Services) facilitates disability accommodations in cooperation with instructors. In order to receive accommodations, you must be registered with Disability Services and you must complete a specific request for each class in which you need accommodations. Contact Disability Services at 674-2667 for further information or to set up an appointment.

Course Competencies: The course competencies, written in student performance terms, for this course are outlined in the table below. The competencies represent the skills a student should expect to master over the course of the semester.

Competency	Measurement Instrument	Measurement Standard
The student uses financial concepts to solve financial problems, to analyze financial situations, and to make financial decisions.	Exams Quizzes Assigned Readings In-Class Activities	<ol style="list-style-type: none"> 1. The student will solve a variety of financial problems involving simple and compound interest. 2. The student will solve annuity problems such as loans/mortgages, saving for retirement, and refinancing.
The student uses counting methods to calculate probabilities and interprets probabilities in real-world applications.	Exams Quizzes Assigned Readings In-Class Activities	<ol style="list-style-type: none"> 1. The student will apply the most appropriate counting techniques and calculate probabilities requiring counting techniques. 2. The student will interpret theoretical and empirical probabilities. 3. The student will calculate and interpret compound probabilities and use the results to interpret expected value.
The student uses graphs, measures of central tendency and spread, margin of error and confidence intervals, and concepts of the normal distribution to analyze data.	Exams Quizzes Assigned Readings In-Class Activities	<ol style="list-style-type: none"> 1. The student constructs frequency tables and various graphs to interpret data. 2. The student will compute measures of central tendency and spread as well as margin of error and confidence interval to interpret results of experiments.
The student uses techniques of mathematical modeling to analyze real world problems.	Exams Quizzes Assigned Readings In-Class Activities	<ol style="list-style-type: none"> 1. The student gathers data or information about a particular problem and sets up linear and exponential models describing the data. 2. The student uses models to predict or answer questions about real world problems.

Course Schedule: The lecture topics for this semester are listed below. Tentative dates for the course exams are included as well.

Monday/Tuesday		Wednesday/Thursday	
8/29	Syllabus, 2.1-2.3 Sets and Counting	8/31	13.1 – 13.2 Counting Rules
9/5	13.3 Permutations and Combinations	9/7	14.1 Probability and Odds
9/12	14.2 Complements and Unions	9/14	14.3 Conditional Probability
9/19	14.4 Expected Value	9/21	Review
9/26	Exam 1A, 1B	9/28	15.1 Data Collection, Sampling
10/3	15.2 Five Number Summary	10/5	15.3 Standard Deviation
10/10	15.4 Normal Distributions and Z-Scores	10/12	15.4 Normal CDF
10/17	7.2 Linear Models	10/19	15.5 Linear Correlations
10/24	Review	10/26	Exam 2A, 2B
10/31	9.1 Percent Change, Yield	11/2	9.2 Simple Interest
11/7	7.4 Exponential Models	11/9	9.3 Compound Interest
11/14	9.4 Annuities	11/16	9.5 Loans
11/21	9.5 Amortization	11/23	Thanksgiving Holidays
11/28	Review	11/30	Exam 3A, 3B
12/5	Final Exam Review	12/7	Final Exam Review

Suggested Homework Problems: The following is a list of homework problems from the textbook. Each problem is tied to one or more course objectives and should be considered practice for exams and quizzes. For some students, being well prepared will mean working many more problems than those listed below as this is a minimal list.

Test 1

- 13.2 #9, 11, 13, 15, 17, 19, 21, 29
- 13.3 #35, 37, 41, 44, 47, 51, 55
- 14.1 #15, 21, 23, 25, 29, 31, 35, 45
- 14.2 #9, 11, 13, 15, 19, 21, 23, 29, 33
- 14.3 #5, 9, 13, 15, 23, 25, 27, 29, 45, 47
- 14.4 #11, 19, 21, 23, 25, 27
- 14.5 #15, 17, 19, 21, 23, 27

Test 2

- 15.1 #1, 13, 14, 17, 19, 21, 29, 41
- 15.2 #7, 13, 17, 21, 23, 25, 31, 43, 45, 57
- 15.3 #7, 15, 19, 21, 23, 27, 33, 37
- 15.4 #5, 9, 17, 27, 35, 57, 61, 63, 68, 71, 75, 87
- 15.5 #3, 4, 5, 7, 13, 15, 17, 20
- 7.2 #19, 21, 23, 25, 27, 31, 33, 41

Test 3

- 9.1 #37, 41, 51, 53, 55, 61, 79, 80
- 9.2 #7, 11, 19, 27, 31, 35, 39, 49, 53, 61, 73, 75
- 9.4 #1, 3, 11, 17, 19, 35, 37, 39, 41, 51, 61, 62, 63
- 9.5 #11, 15, 17, 19, 21, 25, 27, 29, 31, 37, 49
- 7.4 #5, 19, 25, 47, 49, 51, 53, 55, 57, 59

Office Hours: Below is my schedule for the fall 2011 semester. The times marked “Office Hours” represent the times I will make myself available to work with you on homework, understanding lectures, or for any other questions you might have. Please take advantage of these opportunities. If you find that none of these times work for you, feel free to email me at john.ehrke@acu.edu or call me at 674-2162 to set up an alternate appointment. No appointment is needed if you attend regularly scheduled office hours. This schedule is posted on the front of my office door as well.

Fall 2011	Monday	Tuesday	Wednesday	Thursday	Friday
8:00 – 8:30	MATH 361.01 FSB 239		MATH 361.01 FSB 239		MATH 361.01 FSB 239
8:30 – 9:00	MATH 361.01 FSB 239		MATH 361.01 FSB 239		MATH 361.01 FSB 239
9:00 – 9:30	MATH 186.01 FSB 239		MATH 186.01 FSB 239		MATH 186.01 FSB 239
9:30 – 10:00	MATH 186.01 FSB 239	MATW 120.03 FSB 204	MATH 186.01 FSB 239	MATW 120.03 FSB 204	MATH 186.01 FSB 239
10:00 – 10:30	MATW 020.03 FSB 204	MATW 120.03 FSB 204	MATW 020.03 FSB 204	MATW 120.03 FSB 204	Office Hours
10:30 – 11:00	MATW 020.03 FSB 204	MATW 120.03 FSB 204	MATW 020.03 FSB 204	MATW 120.03 FSB 204	Office Hours
11:00 – 11:30	Lunch - Meetings				
11:30 – 12:00					
12:00 – 12:30					
12:30 – 1:00					
1:00 – 1:30					Office Hours
1:30 – 2:00		MATW 120.04 FSB 204		MATW 120.04 FSB 204	Office Hours
2:00 – 2:30	MATW 020.04 FSB 204	MATW 120.04 FSB 204	MATW 020.04 FSB 204	MATW 120.04 FSB 204	Office Hours
2:30 – 3:00	MATW 020.04 FSB 204	MATW 120.04 FSB 204	MATW 020.04 FSB 204	MATW 120.04 FSB 204	Office Hours
3:00 – 3:30	Office Hours	Office Hours	Office Hours	Office Hours	
3:30 – 4:00	Office Hours	Office Hours	Office Hours	Office Hours	