BOB JONES UNIVERSITY
BUILD FAITH. CHALLENGE POTENTIAL. FOLLOW CHRIST.

Ma 220 ~ Mathematical Problem Solving
2021 Fall Semester

Instructor:	Mr. Charles Lacey
Office:	Al 74
Office Hours:	Daily 9:20 – 10:00 am; by appointment at calendly.com/clacey-bju/scheduler
Email:	clacey@bju.edu
Textbooks:	*Applied Mathematics for the Managerial, Life, and Social Sciences*, 7th edition by Soo Tan. ISBN # 978-1-305-10790-8
Tools:	Excel

Catalog Description:

Discussion of quantitative problem-solving techniques through a variety of mathematical methods such as optimization, introductory statistics, financial mathematics, and introductory calculus.

Prerequisites: Math ACT 20+ or placement into Ma 103.

Course Context: This course supports the following goals of the BJU Core:

BJUC4: Understand the physical world as God's creation, as a stewardship given to man and as the physical expression of His glory.

This course supports the following goals of the Division of Mathematical Sciences:

DM2: Use critical-thinking/analytical skills.
DM3: Understand mathematical/computing problems and design solutions with the aid of appropriate tools.
DM4: Apply an understanding of how mathematics/computing can be used in service to Christ as tools to the examination of the world He created.
DM5: Construct a foundation upon which they, after graduation, can continue the development of their God-given abilities and the learning necessary for work and life.

Course Goals:

CG1: Demonstrate the ability to decipher mathematical notation and use basic mathematical tools
CG2: Develop the appropriate mathematical solution to applied problems
CG3: Interpret the mathematical solution in the context of the given problem

Course Objectives: The student will be able to

1. Model data using standard mathematical functions and use the standard compound interest model. CG1-3 (Assessed by Ch 2-4 test, Finance Modeling Project)
2. Develop and solve optimization models. CG1-3 (Assessed by Ch 5-6 test, Optimization Project)
3. Use basic counting and probability rules to answer basic probability questions. CG1-3 (Assessed by Ch 7-8 test, Probability Project)
4. Use basic differentiation techniques to address questions of change. CG1-3 (Assessed by Ch 9-11 test)
5. Communicate both the stated problem and its solution in a clear and efficient manner. CG1-3 (Assessed on all tests and projects)

Course Requirements and Evaluation:

You will be expected to:
1. Read the text before class each day (be sure to take note of any new definitions, I will be assuming you know these during the lecture).
2. Bring Excel to class every day (we will use it in class).
3. Work problems in class along with me (do not just copy what I write on the board).
4. Seek help/clarification as soon as you are struggling (both in class and out of class).
5. Work the corresponding homework after each lecture (do NOT let it pile up before the exam).

Course work will be composed of at least the following elements:
1. Unit tests covering those topics discussed in class ~ three tests worth 100 points each.
2. Take-home assignments ~ 2 assignments worth approximately 20 points each.
3. Homework sets based on the course lecture ~ four sets worth 10 points each.
4. Announced and unannounced quizzes. ~ various point values ~ 160 pts total.
5. Three projects, more information is available on Canvas ~ worth approximately 50 points each.
   a. Finance Modeling
   b. Optimization
   c. Probability
6. A cumulative final exam ~ worth 150 points.

Grading Scale: Standard ten-point grading scale with approximately 840 points in the class.

General Policies: Keeping current on all work is the best way to understand the material and hence earn a good grade. Students who make up work after the fact often perform more poorly than students who keep up (and who often do well).

1. Compliance with student handbook policies is expected during class.

2. No assignment will be accepted after the due date without prior permission from the instructor. Work may always be completed early (see your professor if you wish to take a test early).

   Exceptions may be granted by your professor in emergencies. Contact your professor asap to notify them of the emergency.

3. University attendance policy is in effect (see https://home.bju.edu/bju-policies/ for details).

   Scheduled tests/quizzes should be taken before your *planned absence*; please contact your professor to make arrangements for doing so. You are personally responsible to get notes from your classmates and discuss the missed material with them. You should not expect your professor to privately re-teach you the material you missed. If an unannounced quiz/assessment is taken during the class that you miss, you will NOT be allowed to make it up, and you WILL receive a zero on the assignment.

   Missing a test because you feel you are not prepared to take it is **not** acceptable. Work missed, for this reason, will not be made up and you will receive a zero on the assignment. For *absences due to incapacitating illness or emergency*, you should contact the instructor as soon as you realize you will not be in class in order to make arrangements for making up any missed work.

4. You may work on homework with other students but you must turn in your own problems. In working on homework problems together you will often accomplish more than you would have working alone, but never claim someone else's work as your own (so make sure you understand everything you write down).

5. University academic integrity policy is in effect (see https://home.bju.edu/media/bju-home/documents/policies/integrity.pdf for more details).

   Homework: While you are encouraged to work together on the homework assignments, you may not copy someone else's solution. Also, you may not simply copy solutions from the internet or a solutions manual. Your homework should represent your work and your understanding of the work.

   Projects: You are encouraged to discuss the general ideas of data analysis as discussed in this course with your classmates, but are **not** permitted to "work together" on your project. Your projects must represent your own ideas and your own work.

   Tests: In today's age of technology, cheating includes getting unapproved help from a source on the internet and/or using an Excel file to provide you with additional information during a test. The presence of any unauthorized material on your desk or open on your computer (including but not limited to notes, email, chat windows, help websites, etc.) while taking a test, will be construed as cheating and will be dealt with as such. Cheating on a test will result in a zero on the test plus any penalties imposed by the Academic Integrity Committee.

   If you have a question about any source you are considering using, please gain your professor's approval before using it. You are always permitted to ask your professor for help. Any help they choose to provide is acceptable.

6. Homework as posted (see Canvas) will be turned in at the beginning of the class period when you come to take a test or quiz. Your work should be on 8½×11 paper stapled in the upper left corner. Label all the exercises by **number and chapter section**. Do not use a folder or a paperclip. The effort you put into the homework will generally be reflected in the number of points you get out of 10 and certainly will be reflected in your performance on the exam.

Ma 220 Tentative Schedule

Each day you are to work the homework problems based on the section(s) covered in class that day, and you are to read the section(s) that will be covered in class the next day (pay special attention to definitions).

Schedule			
Date	**Day**	**Class**	**Assignment**
Aug. 26	Th	Course Intro	Read Chapters 1, 2.1-2.2
Aug. 31	T	Discuss 2.1-2.2	Chapter 1 Take-home Due Read 2.3-2.5
Sept. 2	Th	Discuss 2.5	
Sept. 7	T	Discuss 2.5 and Excel Solver Function	Read 2.6
Sept. 9	Th	Quiz over 2.1- 2.5 and Solver Discuss 2.6 and Max/Min in solver	HW 2.1-2.5 Due
Sept. 14	T	Quiz 2.6 (Know how to use Max/Min in Solver) Section 2.7, 2.8 Excel Graphs	Read 4.1
Sept. 16	Th	Quiz on Excel Spreadsheet Discuss Chapter 3, 4.1	Read 4.2
Sept. 21	T	Quiz 4.1 Basic Formulas for Simple Interest, Compound Interest and Continual Compound Interest, Discuss 4.2	Read 4.3
Sept. 23	Th	Discuss 4.2, 4.3	
Sept. 28	T	Test Chapter 4.1-4.2, Handout Take-home on 4.3	Read Chapter 5.1-5.2
Sept. 30	Th	Catch-up on 4.3, Discuss Chapter 5	HW 4.1-4.3 Due Read 6.1
Oct. 5	T	Discuss Chapter 5, 6.1	Take-home on 4. 3 Due Read 6.2
Oct. 7	Th	Discuss 6.2	Project Due - Finance Modeling Read 6.3-6.4
Oct. 12	T	Discuss 6.3, 6.4	
Oct. 14	Th	Discuss 6.3-6.4	
Oct. 18-19	**M-T**	**Fall Break**	
Oct. 21	Th	Review and Catch-up	
Oct. 26	T	Test Chapter 6	HW 6.1-6.4 Due Read 7.1-7.3
Oct. 28	Th	Discuss 7.2-7.3	Project Due - Optimization Read 7.4
Nov. 2	T	Quiz 7.1-7.3 Discuss 7.4	Read 7.5-7.7
Nov. 4	Th	Quiz 7.4 Discuss 7.5, 7.6, 7.7	Read 8.1-8.3
Nov. 9	T	Discuss 8.1 – 8.3	Read 8.4-8.6
Nov. 11	Th	Quiz 8.2-8.3 Discuss 8.4-8.6	
Nov. 16	T	Review and Catchup	
Nov. 18	Th	Test Ch 7-8	HW 7.1-8.6 Due Read 9.1-9.3
Nov. 22-26	**M-F**	**Thanksgiving Break**	
Nov. 30	T	Discuss 9.1 - 9.3, 9.8	Project Due - Probability
Dec. 2	Th	Chapter 10 as time permits	
Dec. 7	T	Quiz Chapter 9-10	
Dec. 9	Th	Review	
Dec. 14		Final Exam – Tuesday, Dec 14th at 8am-9:10am	