Course Module
Stephen F. Austin State University
MTH 143-916 Finite Mathematics
Summer II 2020 - Remote/On-Line

Instructor
Robert (Bob) Henderson
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BA in Math & History – Trinity University, San Antonio, TX (1978)
MS in Mathematical Statistics – Southern Methodist University, Dallas, TX (1980)
PhD in Mathematical Statistics – Southern Methodist University, Dallas, TX (1982)
MBA – University of Delaware, Newark, DE (1988)
Worked in industry for 27 years: ~6 years with DuPont as internal consultant for a variety of businesses and staff groups; then ~21 years in the semiconductor business, most with a supplier of a key enabling material for semiconductor production; and later with Samsung working primarily with engineers in process control efforts. The entire 27 years included many training delivery, as well as course development activities related to basic statistics, experimental design, and process control systems. Fall 2009 was first semester working at SFA.

Office Hours – MTWR 1:00 to 3:00PM – ZOOM: Mtg# 983 3843 2478 PW: 958827, and by appointment

Course Goals
Applied Finite Mathematics is a mathematics course. That sentence alone is often sufficient to elicit groans from most students. My daughter had a boyfriend who told her he believes math is an absolutely useless subject. He is a very smart individual and was planning on going to law school. Even though I am not sure whether he followed up on this plan or not (my daughter moved on and eventually married someone else), I suspect if he did become a lawyer, he might shy away from messy courtroom cases where a problem such as the following might appear:

A taxi sideswipes a car on a winter night. There are two taxi companies in town – Blue and Green. The Green company owns 85% of the taxis on the road. A witness says she saw a Blue taxi. However, independent tests suggest that she makes a correct identification only 80% of the time. So what color was the taxi that sideswiped the car?

With the information in this obviously simplified scenario, it might be surprising to learn that the probability the taxi was Green is 59% - actually, more likely than it being Blue. It is a conclusion that would be difficult to reach based on intuition alone, and it almost demands calculation.

Consequently, while it may be rare that the material in this course will inspire a student to pursue further studies in mathematics, a goal of the course will be to help the student develop a sense of respect for the role mathematics can play in many business and life situations. It will also be a goal to help the student address, and hopefully overcome any anxiety that they might have in dealing with mathematics or numbers in general. There will be no requirement to memorize formulas. These will be available to you as they would be available in a workplace.

Of course, for these goals to be realistic, it will take some effort on the part of the student. It will help if the student is able to set any part of them that is scared, unsure, or biased against the subject of
mathematics aside for the next few weeks, and be willing to approach the subject with an open mind, a willingness to learn, and a confidence that any past bad experiences with math do not dictate their potential to do this stuff. It is likely this effort alone will be harder for many people than any of the problems in the course, but if it can be achieved, then it is a certainty that all the course problems will be much easier than they would be otherwise. It is also likely that achieving such a personal transformation in perspective will be a much more valuable life skill than any of the mathematics discussed in this course.

As far as the skills with mathematics that you might be able to take away from this course work are concerned, well … you likely will not be sufficiently skilled to use these tools to solve many of the real workplace problems that you may encounter in future employment. However, you should be able to work with someone in your organization who has acquired skills beyond what is communicated in this course to collaboratively solve problems where mathematical principles apply. You should also be able to identify situations where there is sufficient information to solve the problem at hand, when there is not, and when you might find yourself in a fortunate situation of having more than enough information and multiple viable solutions from which to choose. You should be able to evaluate your savings and investment plan (assuming you will eventually have one), and understand some of the basics of financial calculations. If we get that far, then you should also be able to determine your chances of winning the lottery, and perhaps even be able to explain why that taxi was more likely to be green than blue 😃.

Text

Computer Access/Skills
It will be helpful to have access to a spreadsheet program such as Excel, as well as some skills in using the features of such software. Many plots, analyses, and calculations can be done relatively simply via Excel, and almost every workplace will furnish a copy of this software (or something similar) to their employees. Hence, gaining some experience in using it will likely be helpful beyond this course.

Prerequisites
Students will be expected to have some basic math skills (enough to obtain an acceptable score on the Math element in the SAT or ACT), and some facility with college-level algebra will be helpful.

Course Overview
Week 1: Chapter 1, Chapter 2
Week 2: Chapter 3, Chapter 4
Week 3: Chapter 5, Chapter 6
Week 4: Chapter 7, Chapter 8
Week 5: Chapter 9, Final Exam

Course Student Learning Objectives
Upon completion of this course, the student will be able to:

1. Determine the equation of a line given sufficient information and to solve problems that involve linear equations including simple depreciation, linear or quadratic cost, revenue, and profit functions, linear or quadratic supply and demand curves.
2. Determine the point(s) of intersection of two straight lines and to solve break-even analysis, decision analysis, and market equilibrium problems.

3. Solve systems of linear equations by algebraic manipulations and/or by the inverse matrix method.

4. Solve application problems that result in systems of linear equations such as investment and management decision problems related to real estate, production scheduling, travel expenses, traffic control, etc.

5. Represent data using matrices, perform the operations of addition, subtraction, scalar multiplication and multiplication on matrices, and find the transpose of a matrix.

6. Solve application problems such as investment portfolio, banking, inventory, box office receipts, production planning, etc. using matrices.

7. Find the inverse of a square matrix using Excel, and the special method for a 2x2 matrix.

8. Graph a linear inequality and systems of linear inequalities and write a system of linear inequalities that describes a given shaded region.

9. Solve simple linear programming problems by the graphical method.

10. Work simple interest, compound interest, annuity (future value and present value), sinking funds, and amortization problems.

11. Find the intersection and the union of two sets, the complement of a set, describe sets in words, determine the number of elements of a set, and solve problems involving sets by using Venn Diagrams.

12. Determine the elements of a sample space by systematic listing and by means of a tree diagram; determine the number of elements in certain sample spaces by using the multiplication (counting) principle.

13. Determine the number of different arrangements of n objects taken r at a time when order matters and when order does not matter.

14. Determine the empirical and theoretical probabilities for events.

Departmental Course Syllabus Link:
http://www2.sfasu.edu/math/docs/syllabi/MTH143Syllabus.pdf

About Assignments
Given that this course is being conducted remotely, assignments will need to be e-mailed to me daily at hendersork@sfasu.edu. There will be a large number (generally, 25-50) of homework problems assigned from the text each day. However, usually, only a subset will actually be evaluated/graded.

Homework will be assigned on a group basis, with the groups being assigned, and periodically being reassigned through the session. There are 11 students currently enrolled in the class, so there will be three teams, one of three students, and two teams of four students each.

The grades given will be group grades, and the group receiving the highest score will receive a 20% bump in their score (2 points on a scale of 10). The group with the next highest score will receive a 10% bump, and the group with the lowest score will receive whatever score their work has earned. The problems should be in order with all work shown.

Since virtually all of the students enrolled are majoring in some form of business, this approach will allow you to practice your teamwork skills, as well as provide an incentive for you to maximize the capability of each of the group members to outperform the competing groups. While this is clearly at
an elementary level in this context, this is essentially what all businesses are attempting to do every day.

Each group need only return one set of homework to me each day. Please put the names of all group contributors on the work returned to me. Ideally, these would be in the form of WORD documents; however, if this is not possible, then we will figure out some other workable approach. Since odd numbered problem solutions are recorded in the back of the text, no credit will be given for the correct answer when no work is shown, and/or no information is supplied related to how answers were obtained. Since the grading will primarily be focused on the steps and/or approaches used to reach a final solution, neatness will count. If the steps cannot be followed, or it is unclear how a specific step is reached in a given problem solution, then points will be lost.

As students are rotated onto teams of different fellow students, it would be expected that by the end of the session, the top performers, as well as those who are struggling will be identifiable. The best 70 to 90% of the homework/quiz scores will be used in the calculation of the homework grade.

**Grading**

Final grade will be determined based on the following proportions:

- Homework: 75%
- Final Exam: 25%

The final will be comprehensive. It will be sent to you individually via e-mail at an agreed upon time on Friday, August 7, 2020. You will have 2 hours to complete it and return your responses to me (again, via e-mail). Again, with the groups assigned by me, you will be able to turn in a set of group responses to the final exam by 9AM on Saturday, August 8, 2020. Your final exam grade will be weighted 2/3 for your individual score and 1/3 for your group score.

**Attendance**

I do not plan to make you sit through any mandatory ZOOM sessions or video lectures. Since homework accounts for 3/4 of the grade, and will be assigned every day (and the policy is to not accept late homework), it will serve the student to do all the assigned problems by their indicated due times. This is nothing more than is going to be expected of you at any place of employment where they expect you to show up and do the work every day.

**Academic Integrity**

It is the responsibility of the student to abstain from cheating. Dishonesty of any kind with respect to examinations, written assignments [completed] in or out of class, alteration of records, or illegal possession of current examinations or keys to examinations shall be considered cheating. Courtesy and honesty require that any ideas or materials borrowed from another must be fully acknowledged. Offering the work of another as one’s own is plagiarism. The subject matter of ideas thus taken from another may range from a few sentences or paragraphs to entire articles copied from books, periodicals, or the writing of other students. The offering of materials assembled or collected by others in the form of projects or collections without acknowledgment is also considered plagiarism. Any student who fails to give credit for ideas or materials taken from another is guilty of plagiarism.
**Definition of Academic Dishonesty**

Academic dishonesty includes both cheating and plagiarism. Cheating includes but is not limited to (1) using or attempting to use unauthorized materials to aid in achieving a better grade on a component of a class; (2) the falsification or invention of any information, including citations, on an assigned exercise; and/or (3) helping or attempting to help another in an act of cheating or plagiarism. Plagiarism is presenting the words or ideas of another person as if they were your own. Examples of plagiarism are (1) submitting an assignment as if it were one's own work when, in fact, it is at least partly the work of another; (2) submitting a work that has been purchased or otherwise obtained from an Internet source or another source; and (3) incorporating the words or ideas of an author into one's paper without giving the author due credit. (from SFA on-line Student Handbook)

A full description of university procedures and penalties in response to cheating and plagiarism can be found in the on-line Student Handbook in the Academic Integrity section at [http://www.sfasu.edu/policies/academic_integrity.asp](http://www.sfasu.edu/policies/academic_integrity.asp).

All of the above is the official policy of the school; however, the ultimate defender of academic integrity is each individual student. In this class, it not only will be helpful to work in small groups on the problems, but is actually encouraged through the approach of group-based assignments. Sharing ideas and helping each other with approaches to understand and solve the problems is not considered cheating or plagiarism. **Copying someone else’s or another group’s results verbatim (or nearly so) is considered to be cheating (be warned that these situations are generally easy to identify, and both parties will be subject to the respective penalties).** You are encouraged to discuss the problems with others outside the classroom, but you are all considered adults, and until you provide evidence to the contrary, will be relied upon to set appropriate boundaries in how you work with others through the duration of this class.

**Withheld Grades**

Ordinarly, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms, the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average.

**Students with Disabilities**

In accordance with University policy, students with disabilities who need accommodations are expected to initiate a meeting with the professor immediately upon registering with Disability Services to discuss how accommodations included on the Special Accommodation Request form will be provided. Students with disabilities who may have special needs and have not requested support services should seek assistance through Disability Services. The Office of Disability Services (ODS) is located in the Human Services Building, room 325, and can be contacted by phone at 468-3004 / 468-1004 (TDD). Failure to request services in a timely manner may delay appropriate accommodations. For additional information, go to [http://www.sfasu.edu/disabilityservices/](http://www.sfasu.edu/disabilityservices/).

**Acceptable Student Behavior**

Classroom behavior should not interfere with the instructor’s ability to conduct the class or the ability of other students to learn from the instructional program (see the Student Conduct Code, policy D-34.1). Unacceptable or disruptive behavior will not be tolerated. Students who disrupt the
learning environment may be asked to leave class and may be subject to judicial, academic or other penalties. This prohibition applies to all instructional forums, including electronic, classroom, labs, discussion groups, field trips, etc. The instructor shall have full discretion over what behavior is appropriate/inappropriate in the classroom. Students who do not attend class regularly or who perform poorly on class projects/exams may be referred to the Early Alert Program. This program provides students with recommendations for resources or other assistance that is available to help SFA students succeed.