

**NCSU DEPARTMENT OF MATHEMATICS**

MA 114 Summer 2019

**MA 114:** Introduction to Finite Mathematics with Applications

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**Office:** SAS 2108

**Textbook**

Finite Mathematics by Waner and Costenoble, 6th edition. The eBook is available in WebAssign.

**Course Description**

Elementary matrix algebra including arithmetic operations, inverses, and systems of equations; introduction to linear programming including simplex method; sets and counting techniques, elementary probability including conditional probability; Markov chains; applications in the behavioral, managerial and biological sciences. Computer use for completion of assignments.

**Grades**

This course uses standard NCSU letter grading, with no rounding.

90 ≤ A- < 93	93 ≤ A < 97	97 ≤ A+ ≤ 100
80 ≤ B- < 83	83 ≤ B < 87	87 ≤ B+ < 90
70 ≤ C- < 73	73 ≤ C < 77	77 ≤ C+ < 80
60 ≤ D- < 63	63 ≤ D < 67	67 ≤ D+ < 70
0 ≤ F < 60		

Grade Component	Weight	Details
WebAssign Homework	20%	Homework will be done through WebAssign and will be due frequently.
In-Class Tests	60%	There will be three in-class tests, each worth 20% of your grade.
Final Exam	20%	The final exam will be given on TBD.

The emphasis in this course should be on using the mathematical ideas introduced in contexts that might be relevant for students interested in business or marketing, especially. There are some complicated procedures covered like row reduction, inverting matrices, and the simplex method. Use your judgment about how many (if any) examples you or the students do by hand. Feel free to point them to computational tools they can use instead and put the

emphasis on taking a word problems and turning it into a math problem a computer can solve. Then also emphasize how to take the computer's answer and verify it and interpret it in the context of the problem.

Some websites that may be helpful to you:

<https://www.zweigmedia.com/tcpage.php?book=finit&lang=en&ed=6>

<http://finitemathonline.blogspot.com/>

<https://open.umn.edu/opentextbooks/textbooks/applied-finite-mathematics>

## Schedule

We will be following the approximate schedule below with each topic taking roughly one day of class in the summer.

Section 3.1 (Systems of Two Equations in Two Unknowns) Also introduce how systems of equations can be represented as matrices from Section 3.2. This motivates the matrix computations that come next. We'll return to row reduction after that.

With the following matrix computations, we recommend having them do some by hand but then showing them computational tools they can use such as spreadsheets, or apps available at <https://www.zweigmedia.com/tcpage.php?book=finit&lang=en&ed=6> That website also has tutorials and problems students can use for extra practice.

Section 4.1 (Matrix Addition and Scalar Multiplication)

Section 4.2 (Matrix Multiplication)

Section 3.2 (Using Matrices to Solve Systems of Equations) Emphasize that row reduction steps are the same as algebra steps you may have done in Section 3.1.

Section 3.3 (Applications of Systems of Linear Equations)

Test 1

Section 4.3 (Matrix Inversion)

Section 4.5 (Input-Output Models)

Again, we recommend doing some graphing by hand but then using available online tools like Desmos or from the link above.

Section 5.1 (Graphing Linear Inequalities)

Section 5.2 (Solving Linear Programming Problems Graphically)

Section 5.3 and 5.4 (The Simplex Method) Explain that the simplex method is a way to 'walk from corner to corner' in a region. We recommend framing this lesson around 3 styles of problems:

1. Given a word problem, turn it into something that can be solved via the simplex method.
2. Given the computer output from, what is the solution telling you in the context of the problem. Can you check that it is correct?
3. Take a nonstandard problem and adapt it into a standard problem

## Test 2

Section 6.1 (Sets and Set Operations)

Section 6.2 (Cardinality)

Section 6.3 (Decision Algorithms)

Section 6.4 (Permutations and Combinations)

Section 7.1 (Sample Spaces and Events)

Section 7.2 (Relative Frequency)

Section 7.3 (Probability and Probability Models)

## Test 3

Section 7.4 (Probability and Counting Techniques)

Section 7.5 (Conditional Probability and Independence)

Section 7.6 (Bayes' Theorem and Applications)

Section 7.7 (Markov Chains)

Feel free to use or adapt any of the material below for your class syllabus.

### Course Website

We will be using the Moodle learning management system (<http://wolfware.ncsu.edu>) for this course. You will log in using your Unity ID and password. (Refer to online information at <http://oit.ncsu.edu/unityid> or contact (919) 515-HELP or HELP@ncsu.edu for assistance with your Unity ID). After the beginning of the semester, you will see a link to our course site. Once in the site, you can Bookmark or add the site as a Favorite in your web browser so that you can return directly to that page.

### Course Communications

Modes of communication in use for this course include email, office hours, and Moodle.

- Moodle discussion forums will be used to facilitate class discussion. Check these forums often and please feel free to reply to your fellow students' posts.
- I will do my best to respond to weekday e-mails and posts within 24 hours. Email messages or posts left after 4 pm Friday will be responded to by Monday evening.
- If you would like to speak with an instructor in person and you can't make it to the posted office hours, please email me to schedule a time that is convenient. Include several time slots

that would work for you in your email.

Please be aware that ALL email communications for this course will be sent to your NCSU unity email. If you do not regularly use your ncsu.edu account, there are settings within Gmail that allow you to forward your e-mail to another account. For more information, please see <http://google.ncsu.edu/what-best-way-forward-my-nc-state-gmail-non-nc-state-e-mail-addresses>.

If you have a question that the whole class may benefit from hearing the answer to, please post on the “Course Content Q&A” forum. I will check this forum often to respond to open questions. You should also check frequently to answer or ask questions.

If you have a question that is very specific to the work you have done (i.e. if you nearly finished your work but got stuck towards the end), you can email your instructor with your question. Including a scan or photo of your work can help. If an instructor receives an email with a question more appropriate to the forum, she may copy and paste the question there without identifying the student who sent it.

### **Academic Integrity**

Students are required to comply with the university policy on academic integrity found in the Code of Student Conduct found at <http://policies.ncsu.edu/policy/pol-11-35-01>

The [NCSU Student Code of Conduct](#) covers all work done in this course. Any suspected violations will be promptly reported. Academic dishonesty will result in an automatic failing grade for the course.

### **Course Evaluations**

A formal evaluation is conducted by the University at the end of the semester and the goal is to achieve 100% class participation in this survey. Online class evaluations will be available for students to complete during the last two weeks of class. Students will receive an email message directing them to a website where they can login using their Unity ID and complete evaluations. All evaluations are confidential; instructors will never know how any one student responded to any question, and students will never know the ratings for any particular instructor.

### **Accommodations for Disabilities**

Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, student must register with the Disability Services Office (<http://www.ncsu.edu/dso>), 919-515-7653. For more information on NC State's policy on working with students with disabilities, please see the Academic Accommodations for Students with Disabilities Regulation at <http://policies.ncsu.edu/regulation/reg-02-20-01>.

### **Non-Discrimination Policy**

NC State University provides equality of opportunity in education and employment for all

students and employees. Accordingly, NC State affirms its commitment to maintain a work environment for all employees and an academic environment for all students that is free from all forms of discrimination. Discrimination based on race, color, religion, creed, sex, national origin, age, disability, veteran status, or sexual orientation is a violation of state and federal law and/or NC State University policy and will not be tolerated. Harassment of any person (either in the form of quid pro quo or creation of a hostile environment) based on race, color, religion, creed, sex, national origin, age, disability, veteran status, or sexual orientation also is a violation of state and federal law and/or NC State University policy and will not be tolerated. Retaliation against any person who complains about discrimination is also prohibited. NC State's policies and regulations covering discrimination, harassment, and retaliation may be accessed at <http://policies.ncsu.edu/policy/pol-04-25-05> or [http://www.ncsu.edu/equal\\_op/](http://www.ncsu.edu/equal_op/). Any person who feels that he or she has been the subject of prohibited discrimination, harassment, or retaliation should contact the Office for Equal Opportunity (OEO) at 919-515-3148.

### **Copyrighted Materials**

The course website contains copyrighted materials and was developed for instructional purposes to be used by students at North Carolina State University. Students currently registered in this course are permitted to print or make copies of parts of this site for their own personal use in conjunction with completing the course. Text, audio files, images or design of this website may not otherwise be distributed or modified in any manner without the prior written permission of the instructor.