

NCSU DEPARTMENT OF MATHEMATICS

MA 114 Summer 2020

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

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**Office:** SAS 2108

You can copy/paste any parts of this in putting together your own syllabus, as desired. I recommend using the syllabus tool ([https://apps.delta.ncsu.edu/syllabus\\_tool/](https://apps.delta.ncsu.edu/syllabus_tool/)) to ensure you have all the required info and language.

Feel free to get in touch with me anytime with questions or concerns about your class. I'm happy to talk through issues with students or material.

**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.

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

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=finite&lang=en&ed=6>

<http://finitemathonline.blogspot.com/> (This is NCSU's online version of the course)

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

### Schedule

We will be following the approximate schedule below. Feel free to modify it to suit your class and the academic calendar.

Lectures	Textbook Section and Topic	Comments
1	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.
2 and 3	Section 4.1 (Matrix Addition and Scalar Multiplication) Section 4.2 (Matrix Multiplication)	With 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 <a href="https://www.zweigmedia.com/tcpage.php?book=finite&amp;lang=en&amp;ed=6">https://www.zweigmedia.com/tcpage.php?book=finite&amp;lang=en&amp;ed=6</a> That website also has tutorials and problems students can use for extra

		practice.
4 and 5	Section 4.1 (Matrix Addition and Scalar Multiplication) Section 4.2 (Matrix Multiplication)	
6 and 7	Section 3.2 (Using Matrices to Solve Systems of Equations) Section 3.3 (Applications of Systems of Linear Equations)	Emphasize that row reduction steps are the same as algebra steps you may have done in Section 3.1.
8	<b>Test 1</b> Section 4.3 (Matrix Inversion)	
9	Section 4.5 (Input-Output Models)	
10 and 11	Section 5.1 (Graphing Linear Inequalities) Section 5.2 (Solving Linear Programming Problems Graphically)	Again, we recommend doing some graphing by hand but then using available online tools like Desmos or from the link above.
12 and 13	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: <ol style="list-style-type: none"> <li>1. Given a word problem, turn it into something that can be solved via the simplex method.</li> <li>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?</li> <li>3. Take a nonstandard problem and adapt it into a standard problem</li> </ol>
14	<b>Test 2</b> Section 6.1 (Sets and Set Operations)	
15 and 16	Section 6.2 (Cardinality)	

	Section 6.3 (Decision Algorithms)	
17 and 18	Section 6.4 (Permutations and Combinations) Section 7.1 (Sample Spaces and Events)	
19 and 20	Section 7.2 (Relative Frequency) Section 7.3 (Probability and Probability Models)	
21 and 22	<b>Test 3</b> Section 7.4 (Probability and Counting Techniques)	
23 and 24	Section 7.5 (Conditional Probability and Independence) Section 7.6 (Bayes' Theorem and Applications)	
25	Section 7.7 (Markov Chains) Review	

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-address>.

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 Resources Office (<https://dro.dasa.ncsu.edu/>), 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>.

### **Make Up Tests**

Should you need to miss an in-class test, a cumulative makeup test will be given during class time in the last week of the semester. Everyone will take the same makeup exam, regardless of which test you missed. The grade for the makeup exam will be used in place of the grade for the test you missed. Details about the makeup test will be sent to students eligible to take it later in the semester. Only students who missed a test are eligible to take the makeup exam.

### **Trans-Inclusive Statement**

In an effort to affirm and respect the identities of transgender students in the classroom and beyond, please contact me if you wish to be referred to using a name and/or pronouns other than what is listed in the student directory.

### **Basic Needs Security**

Any student who faces challenges securing their food or housing or has other severe adverse experiences and believes this may affect their performance in the course is encouraged to notify the professor if you are comfortable in doing so. Alternatively, you can contact the Division of Academic and Student Affairs to learn more about the Pack Essentials program <https://dasa.ncsu.edu/pack-essentials/>

### **Supporting Fellow Students in Distress**

As members of the NC State Wolfpack community, we each share a personal responsibility to express concern for one another and to ensure that this classroom (as well as the campus as a whole) remains a healthy and safe environment for learning. Occasionally, you may come across a classmate whose personal behavior concerns or worries you, either for your classmate's well-being, for your well-being or for the well-being of others. When this is the case, I would encourage you to report the behavior on the link located on NC State's Students of Concern website (<http://go.ncsu.edu/NCSUcares>).

### **List of Policies**

Students are responsible for reviewing the NC State University PRRs (policies, rules and regulations) that pertain to their course rights and responsibilities:

- Equal Opportunity and Non-Discrimination Policy Statement <https://policies.ncsu.edu/policy/pol-04-25-05/> with additional references at <https://oied.ncsu.edu/equity/policies/>
- Code of Student Conduct <https://policies.ncsu.edu/policy/pol-11-35-01/>
- Grades and Grade Point Average <https://policies.ncsu.edu/regulation/reg-02-50-03/>
- Credit-Only Courses <https://policies.ncsu.edu/regulation/reg-02-20-15/>
- Audits <https://policies.ncsu.edu/regulation/reg-02-20-04/>