

# Math 160 – Finite Mathematics

## Fall 2023 Course Syllabus

James Jones, Professor of Mathematics

Mathematics, Science, and Business Division – Richland Community College

### Course Meeting Information

The Fall 2023 semester begins August 14 and ends December 7.

Section 01 meets in W249 from 3:30 to 4:40 pm on Monday, Wednesday, and Friday.

Here are some important dates.

- August 24 is the last day to withdraw and get a refund.
- December 1 is the last day to withdraw from the course without receiving a letter grade.
- The comprehensive final exam is Monday, December 4, from 2:00 to 3:50 pm.
- No late work will be accepted after December 6.

This is a face-to-face course that uses the Canvas learning management system. We will not be using Pearson's MyLab and Mastering. There is an online student orientation to Canvas and the College that must be completed prior to obtaining access to your courses in Canvas.

Submitting assignments in Canvas does not count as attending class. Assignments will be due throughout the week and, per federal guidelines, you should expect to dedicate a minimum of 12 hours per week to this course.

### Instructor Information

James Jones, Professor of Mathematics

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Web: <https://people.richland.edu/james>

Phone: 217-875-7211, ext 6490

Office: S224

Canvas: <https://richland.instructure.com>

The best way to contact the instructor is through Canvas or by email. Please do not leave a voice mail as it will not reach the instructor in time to help you.

### Office Hours

I spend most of my office hours in the classroom before and after class. This allows me to help students with their assignments, homework, projects, exams, and questions. Students are encouraged to come to class early each day and use that time to ask questions of the instructor, work on projects, or just socialize with other students in the course.

These office hours are on Monday, Wednesday, and Friday in room W249.

8:45–9:00 am, 10:10–10:30 am, 11:40–12:00 pm, 1:35–1:45 pm, 3:10–3:30 pm, 4:40–4:55 pm

## Text

The textbook for this course is *Finite Mathematics for Business, Economics, Life Sciences, and Social Sciences*, 13<sup>th</sup> edition, by Barnett, Ziegler, and Byleen. It is copyright 2015 by Pearson.

We are using the 13<sup>th</sup> edition, which is not the most recent edition of the text. You are welcome to use either the printed or electronic textbooks with this course, just make sure that whatever you get is not bundled with MyMathLab.

- ISBN-13: 978-0-321-94552-5 is a hardcover stand-alone version of the textbook. This can be purchased or rented from the bookstore.
- ISBN-13: 978-0-321-94672-0 is the unbound, loose-leaf, three-hole-punch version of the textbook. It is a cheaper alternative to a hardcover textbook.

## Student Audience

Most students taking Finite Mathematics are business, accounting, or psychology majors and many are planning on taking introductory statistics. Most will transfer to another school.

Others will take this course because it is a general education mathematics course.

## Prerequisite

The prerequisite is successful completion of Math 116, College Algebra, with a "C" or better grade or equivalent competencies.

## Course Description

**MATH 160 - Finite Mathematics**

Hours: 4 lecture - 0 lab - 4 credit

Mathematics 160, Finite Mathematics, is an introductory level course covering mathematical ideas needed by students of business management, social science, or biology. The topics include sets and counting, functions, introduction to probability and statistics, interest and annuities, matrix theory, linear systems, and linear programming.

Applicable toward graduation where program structure permits:

- Certificate or Degree - All Certificates, A.A.S., A.L.S., A.A., A.S.
- Group Requirement - Mathematics
- Area of Concentration - Mathematics

## Illinois Articulation Initiative (IAI)

The mathematics component of general education focuses on quantitative reasoning to provide a base for developing a quantitatively literate college graduate. Every college graduate should be able to apply simple mathematical methods to the solution of real-world problems. A quantitatively literate college graduate should be able to:

- interpret mathematical models such as formulas, graphs, tables, and schematics, and draw inferences from them;
- represent mathematical information symbolically, visually, numerically, and verbally;
- use arithmetic, algebraic, geometric, and statistical methods to solve problems;
- estimate and check answers to mathematical problems in order to determine reasonableness, identify alternatives, and select optimal results; and
- recognize the limitations of mathematical and statistical models.

Courses accepted in fulfilling the general education mathematics requirement emphasize the development of the student's capability to do mathematical reasoning and problem solving in settings the college graduate may encounter in the future. General education mathematics courses should not lead simply to an appreciation of the place of mathematics in society, nor should they be merely mechanical or computational in character.

To accomplish this purpose, students should have at least one course at the lower-division level that emphasizes the foundations of quantitative literacy and, preferably, a second course that solidifies and deepens this foundation to enable the student to internalize these habits of thought.

Math 160, Finite Mathematics, satisfies the Illinois Articulation Initiative definition of a General Education Mathematics Course. It corresponds to form A of M1 906: Finite Mathematics.

### **M1 906: Finite Mathematics (3-4 semester credits)**

Emphasis on concepts and applications, rather than mathematical structures. Form A (designed especially for students in business, economics, Social Sciences and Life Sciences, with applications drawn from these fields) must include the following topics: systems of linear equations and matrices; linear programming; counting and probability theory. Other possible additional topics include: vectors; determinants; systems of inequalities; simplex method; set theory; logic and Boolean algebra; stochastic processes; game theory; Markov chain methods; mathematical modeling; and the mathematics of finance. Form B: matrix algebra; systems of linear equations and matrices; determinants; vectors in 2-space and 3-space; vector spaces; eigenvalues and eigenvectors. Prerequisite: C or better in college algebra.

## Topical Outline

A weekly calendar listing the specific material covered each week is provided at the end of this syllabus. This section is provided as a broad overview of the major topics covered.

This course does not run on calendar weeks and any attempt to coerce the calendar into a weekly schedule necessarily introduces some approximation. For example, an exam may be in a different week than the weekly heading suggests or a chapter may begin midweek.

The official calendar that the students receive is a one page, 16 week, daily calendar. This calendar lists the section from the textbook being covered each day and the dates that major assessments are due. Due dates will also be listed in the Canvas learning management system.

- Matrices and Systems of Equations – 3 weeks
- Linear Programming and Simplex – 4 weeks
- Sets, Counting, and Probability – 3.5 weeks
- Markov Chains and Games – 3.5 weeks
- Finance – 2 weeks

## Applications

This course places a heavy emphasis on solving application problems rather than performing calculations by hand and almost every section of homework has application problems.

Applications come from the area of business, economics, life sciences, and social sciences. In addition, projects require that students incorporate larger, real-world applications using information obtained from the Internet.

## General Course Objectives

While learning Finite Mathematics is certainly one of the goals of this course, it is not the only objective. Upon completion of this course, the student should be able to ...

- demonstrate comprehension and understanding in the topics of the course through symbolic, numeric, and graphic methods<sup>1,2</sup>
- demonstrate the use of proper mathematical notation<sup>1,2</sup>
- use technology when appropriate and know the limitations of technology<sup>1,2,3,4</sup>
- work with others towards the completion of a common goal<sup>1,2,4</sup>
- use deductive reasoning and critical thinking to solve problems<sup>4</sup>

The numbered superscripts refer to the Richland Cross-Disciplinary Outcomes addressed by that objective.

## Richland Cross-Disciplinary Outcomes

Richland Community College has established some outcomes for degree-seeking students. These are not necessarily completed within a single course, but should be demonstrated and assessed at some point before the student graduates. Richland may utilize anonymous student work samples for outcomes assessment and continuous improvement of courses and programs.

Richland Community College's cross-disciplinary outcomes are:

1. The degree-seeking student will communicate effectively in writing.
2. The degree-seeking student will orally communicate effectively.
3. The degree-seeking student will access, evaluate, and appropriately use information in research and applied contexts.
4. The degree-seeking student will think critically and creatively.

## Program Outcomes

In addition to the cross-disciplinary outcomes, the mathematics program at Richland Community College has established some discipline-specific outcomes and goals.

1. **Mathematical Reasoning:** Students will apply mathematical reasoning to solve story problems. This goal is directly measured in this course.
2. **Preparatory Skills:** Students will demonstrate mathematical competencies needed for success in other courses. This goal influences the course, but is not measured directly.

## Specific Course Objectives

Upon completion of this course, the student should be able to ...

- solve finance problems involving compound interest, future value annuities, and present value annuities
- apply ordinary annuities to plan retirement or purchase of a house
- solve a system of linear equations having a unique solution, no solution, and many solutions
- transform between a system of linear equations and an augmented matrix
- read the solution to a system of linear equations from an augmented matrix
- use matrices to solve applied problems such as network flow, incidence matrices, and the Leontief input-output model
- graph a system of linear inequalities in two variables
- solve a linear programming problem with two decision variables graphically
- solve a linear programming problem using a table
- explain the simplex method
- apply the simplex method to solve a standard maximization problem

- apply the dual method to solve a standard minimization problem
- solve non-standard minimization and maximization problems
- find the union, intersection, complement of sets
- apply basic counting principles to determine the number of ways an event can occur
- use permutations and combinations
- find probabilities of simple and compound events
- find conditional probabilities including Bayesian probabilities
- find the expected value of a probability distribution
- apply the Bayesian (expected value), maximax, maximin, and minimax criteria to decision making
- solve regular Markov chain problems to find the long term probabilities of being in any state
- solve absorbing Markov chain problems to find the expected number of states encountered before exiting the system and find the long term probabilities of ending in any absorbing state
- solve strictly determined two player, zero sum games
- solve  $2 \times 2$  non-strictly determined games
- apply the simplex procedure to solve larger games

## Course Expectations

### Student Expectations of Instructor

Here are some things you can expect from the instructor.

- Responses to email or Canvas messages will occur in a timely manner. The goal is within 12 hours during the week and within 36 hours over the weekend. At times, you will find the instructor at the computer and have a response to simple questions within 15 minutes. That is not, by any means, a guaranteed response time, but don't be surprised if it happens. I do not have a smartphone and am not connected to email 24/7. I do take my laptop with me while traveling, but sometimes hotel internet is flaky. In other words, don't wait until something is due to ask about it. When the problem is too difficult to answer within 12 hours, the instructor will send you a message notifying that it will take longer.
- Assignments will be graded within 3 days of submission. Exams may take longer and the instructor may withhold release of exam grades until all students have completed their exams.
- The instructor will provide guidance and direction on assignments, but will usually steer the student towards the answer rather than just providing the correct answer. Understanding the problem and process is more important than just getting the answer.
- When the instructor makes a mistake, he will admit it and not blame Canvas or other technology for his mistakes. Be aware that the explanation of the mistake may include his

frustration with the technology, but he will accept blame if it is really his mistake. If the mistake warrants, adjustments may be made.

- The instructor will treat students with civility and respect.

## **Instructor Expectations of Student**

Here is what is expected out of students in this course.

- Students will communicate with the instructor. Life-events happen, but the instructor needs to know about them as soon as possible when they are going to interfere with learning. Do not just disappear from the course for a while and expect to be okay.
- Students will be civil and respectful of all persons in the course.
- Students will monitor Canvas and their student emails and respond to the instructor or other classmates in a timely fashion.
- If a student contacts the instructor for help and then figures it out before the instructor has a chance to respond, the student will notify the instructor that the problem has been resolved or that help in a different area is needed.
- Students will read the book, watch the videos, and read the material in Canvas before contacting the instructor for help. Many of the questions that students have are already answered in the online material and you can find them faster yourself than you can by contacting the instructor and waiting for a response.
- When a student contacts the instructor for help, the student should be prepared to show what has been attempted or already accomplished. If emailing, the student should be specific in his or her requests. Do not send a request for help that just says, for example, "I don't understand Linear Programming," and expect help by email. That is too large of a topic and it is usually just one sticking point that is difficult to self-identify when you don't understand the material. You should meet with the instructor in person in that situation.
- Students will be academically honest in their work. Among other things, this means that you will complete your own homework and take your own exams. You are welcome to receive help on homework, projects, and discussions, but the exams need to be yours. You may use a calculator on all exams unless otherwise indicated.
- Students will seek help if there are technology issues.

## **Type of Instruction**

Classroom lectures, video lectures, projects, activities, problem solving, discussions, book readings, homework, and group work will be used in this course.

## Method of Evaluation

### Exams – 50% of grade

Traditional paper and pencil exams will be used in this course. You may use your calculator on your exams, but you may not use other resources on exams.

Most exams cover two chapters. The final exam is comprehensive.

No exams grades will be dropped.

### Grading Exam Questions

Each exam question will have a specific point value attached to it.

Other questions are more involved and may involve multiple parts of different point values.

<b>Rating</b>	<b>Score</b>	<b>Description</b>
<b>Awesome</b>	105%	Exceptional job, work is shown, items are labeled
<b>Good</b>	90%	Mastery of the topic, insufficient work, work has minor errors
<b>Okay</b>	75%	Mostly on target, few conceptual errors
<b>Fair</b>	60%	Major conceptual errors, needs substantial improvement
<b>Poor</b>	45%	Shows little understanding, most of problem is wrong
<b>None</b>	0%	Did not answer, answer and/or work is completely wrong

Some questions are simple enough that they do not need work – either you know it or you don't. These are often multiple-part questions. For these questions, a fully correct answer will get Awesome and all other questions will have the percentage of correct responses rounded to the nearest rating from the rubric. For example, if there are six (6) parts and you get four (4) of them correct, then you would get 66.7%, which is closest to 60% and Fair. Note that not all responses have equal weight – sometimes a four part question may have one part that is more involved than others and so it counts more.

Other questions have parts that are dependent upon previous answers. If you answer part (a) incorrectly, but answer part (b) correctly based on what you have in part (a) then you may get partial credit for part (b) provided I can tell what you did.

### Homework – 20% of grade

Homework should be attempted shortly after the scheduled date for that section. This gives you a chance to ask questions before it is collected. Check your answers against those in the back of the book. Correct any mistakes that you can. If you fall behind in the homework, you may need to see the instructor outside of class to get help

Homework will be collected at the beginning of the second class period after the section is



scheduled to be introduced. For example, if we start a section on Monday, the homework will be collected at the start of Friday's class. If we start a section on Wednesday, but there is a holiday on Friday, then the homework will not be due until the following Wednesday. Homework may be turned in early. Late homework will receive a 20% reduction in point value for each class period it is late.

No homework grades will be dropped.

Even though some homework may not be due until after the exam over that material, it is to your benefit to work the problems before the exam.

No work will be accepted after December 6.

### **Homework Instructions**

Place your name, the section number, and the unreduced fraction of questions you have correct in the top right-hand corner of the first page. Additional pages should have your name and section number on them. Your score should be based on the number of questions that you have correct when it is turned in, not the number that you originally had correct before you checked the answers.

Homework should consist of more than just answers and a reduction in points may occur if it appears you're merely copying answers from the book or other resource. This includes not showing sufficient work, failure to label, or skipping important steps.

The point of homework is to help you understand the material. Taking shortcuts doesn't help you in the long run.

Work should include labels when appropriate. This is especially true when dealing with matrix applications where rows and columns have specific meanings.

Story problems deserve written answers – don't say  $x_1 = 10$  when you mean "produce 10 thingamajigs at the whatchamacallit plant."

Homework must be the student's original work and completed within the Fall 2023 semester to receive credit. Do not submit work from previous semesters.

### **Homework Philosophy**

Homework is crucial to your success in this course. There is an association between doing your homework and success in the course. Not only does the homework directly count towards your grade, but it also prepares you for the tests.

Many students are aware, even if some instructors aren't, that answers to homework are widely available on the Internet or that there are web sites that will do your homework for you for a fee. This tempts the student to circumvent the traditional homework model and think it's

just about getting the points. The real benefit to homework is to practice and solidify the understanding. Professional athletes did not get great by having someone else do their practice.

This course incorporates technology. The TI-83/84 calculators, either natively or through instructor-written programs, will do much of the time-consuming problems in the text. When that is the case, students wonder why they should "waste" their time doing homework when the calculator will do it for them. These are valid concerns and the instructor realizes that with other life events, students don't want to be doing "busywork."

There are typically three groups of homework in each section of this textbook. The "A" set are preparatory, the "B" set are to practice skills with no context, and the "C" set are application problems. Rather than focusing on the working lots of skill-development problems that can easily be accomplished with the calculator, the assigned homework in this course focuses on a few application problems.

Story (application) problems are typically the hardest for students to understand because they must translate the English into mathematics. This is also the most useful type of exercise because it includes the context behind the problem rather than rote mechanics.

The problems that students struggle with are often the problems that are worked as examples in the textbook or in the online notes in Canvas. Be sure to read the book and the notes before attempting the homework.

The instructor has a list of his favorite problems from each section in the section notes contained in Canvas. These are prime fodder for exam questions and should be looked at.

All homework submissions must be original and completed during the Fall 2023 semester to receive credit. Some of you may have attempted the course before. Submitting homework from that attempt, even if they are the same problems, does not help you learn the material.

## **Reading Quizzes – 10% of grade**

Students should read through the material on by the day it is scheduled. Too often, students wait until the last day to attempt the homework, but then it is too late to ask questions. By having a reading quiz over the material, you are exposed to it earlier while there is still a chance to seek help.

The reading quizzes are short quizzes to assess your basic understanding. They are completed inside Canvas before we work on the material in class. The quizzes normally consist of a few (2-5) questions and you have 10 minutes to complete the quiz.

The quizzes are due five (5) minutes before class begins on the day a section is scheduled to begin. You may take a quiz up to one week early, but they close when they are due and cannot be made up if missed.

The reading quizzes are designed to be completed after you have read and taken notes on a section. You only get one (1) attempt at each reading quiz, so be sure to study the material ahead of time. If you go into them without having looked at the material, you may find it difficult to complete within the 10 minutes allowed.

The answers are available as soon as you complete the quiz. Please do not share them with other students who have not completed the quiz. This may change if it becomes too big of a problem.

These reading quizzes cannot be made up if missed, but the three (3) lowest reading quiz grades will be dropped.

### **Projects – 10% of grade**

There are several projects in this course that go beyond the typical problem found in the textbook.

A convenient way to think of the projects is as extended homework problems. Some projects will require that you look up information on the Internet, while others are just larger versions of applications like those in the textbook.

Questions similar to those found on the projects often appear on the exams and you should always finish and understand your projects before attempting the exam, even if the projects are not due until after the exam.

All of the projects, with the exception of the one on planning your personal retirement, are designed to be worked in teams of up to three students. Students will be able to self-select their groups. Make sure you pick partners who will contribute to the group.

Although you may work together, each student must submit their own work. All work must be completed during the Fall 2023 semester to receive credit. Do not turn in projects from previous semesters.

Projects are submitted electronically to Canvas and are due by the end of the day two class periods after we have covered the material needed to complete the project. Projects may be turned in up to one week late but they lose 20% of their original value for each class period they are late.

No late work will be accepted after December 6.

No projects will be dropped.

### **Discussions & Notations - 10% of grade**

Each chapter has a discussion and a mathematical notation to create. There may be a few miscellaneous quizzes or other assignments in the course, although not enough to warrant

another category and a distinct percentage of the grade. Those assignments will be included in this category.

The lowest score in the group will be dropped.

## **Discussions**

There will be discussion questions in Canvas.

Most of these discussion questions are in post-first format. That means that you post your initial response before you can see what other students have said. Then you carry on a discussion with the class about the question and responses.

In a post-first discussion, there will be two due dates. At this time, Canvas only allows one due date for an assignment. Based on end-of-semester feedback from students, they would like this to be the date the initial post is due and then the discussion continues after that. It is up to you to remember to come back into the discussion after you make your initial post and continue with any follow-up discussion.

The top of each discussion will contain a box that indicates when the initial post is due and how long the follow-up discussion continues.

Discussion questions become available as soon as we start a chapter, so you have some time to prepare your initial post before it is due.

During a discussion, you should establish a pattern of on-going communication throughout the allowed time frame. Students who wait until the assignment is almost due to post their comments end up robbing the other students of the ability to reply to their comments, effectively getting the "last word" because of timing, not because of merit.

The purpose of the discussions is to assist in learning the material. It is not to attack other students or make them feel stupid, but to help them understand while strengthening your own understanding of the material. If you need to disagree with what someone else has posted, then do so with a civil and respectful tone. Understand that your issue is with what the other person has written, not with the other person.

Discussions will be graded holistically using the following scale. Exceptional discussions can earn a little extra credit.

<b>Rating</b>	<b>Score</b>	<b>Description</b>
<b>Awesome</b>	105%	Exceptional job that really impresses the teacher
<b>Good</b>	90%	Beyond what was required
<b>Okay</b>	75%	Satisfactory completion of requirements
<b>Fair</b>	60%	Almost there, but needs some development
<b>Poor</b>	45%	Minimal attempt at completing assignment
<b>None</b>	0%	Did not participate or submission nowhere close to assignment

Holding a discussion requires communication between more than one person. You cannot come in after the discussion is over and expect that other people will respond.

Correspondingly, late work will not be accepted for discussions.

All discussion content must be original for this course during the Fall 2023 semester. Do not reuse discussions you have previously used or used in another course.

### **Notations**

One goal of any course is to properly use the language of that subject. The mathematical notations are designed to provide you that opportunity while reinforcing important concepts from the unit at the same time. They are a series of documents that contain important formulas and summarize major concepts or difficult topics from the unit. In some cases, they condense an entire chapter of formulas down to one page and identify which concepts students should study.

Your assignment is to recreate these documents using Microsoft Word and then submit them through Canvas. There are no mathematical calculations to be performed on the pages. The assignment is just to recreate the document and properly construct and format the mathematical content.

Learning how to properly create mathematical content will also benefit you when you contact the instructor with questions or work on the projects.

Mathematical notations are submitted electronically through Canvas. They are due by the end of the day of the next class period after we finish a chapter. For some chapters, this will be the day of the exam. Mathematical notations will be accepted up to one week late, but may lose 20% of its original value for every class period it is late.

All notations must be the student's original work and completed during the Fall 2023 semester to receive credit. Do not turn in notations from previous semesters.

No late work will be accepted after December 6.

## Grading Policy

Letter grades will be assigned to final adjusted scores as follows:

A: 90–100%    B: 80–89%    C: 70–79%    D: 60–69%    F: below 60%

Final scores will be rounded to the nearest integer, so a 79.5% will round up to 80% and be considered a "B".

All grades are subject to audit and correction. Sometimes mistakes are made entering grades, other times mistakes are made in the grading itself. Your grade may increase or decrease when this happens. For this reason, you should strive to do better than the minimum needed for the grade you desire.

Consideration may be given to such qualities as participation, attitude, and cooperation to produce the optimal learning situation for everyone.

Grades will be kept inside the Canvas learning management system.

### Late Work

Unless indicated otherwise, assignments that are turned in on paper are due in class, even though the due date in Canvas may indicate the end of the day.

Exams should be taken in class when scheduled. Communicate with the instructor as soon as possible if this is not possible.

<u>Category</u>	<u>% Grade</u>	<u>Drops</u>	<u>Late work accepted</u>
Exams	50%	0	See instructor ahead of time
Homework	20%	1	Yes
Projects	10%	0	Yes
Discussions & Notations	10%	1	Discussions – no, Notations – yes
Reading Quizzes	10%	3	No

When late work is accepted, it may be accepted up to one week late and incurs a late penalty of 20% penalty per class.

No late work will be accepted after December 6.

## Attendance / Engagement Policy

### Participation vs Attendance

This class expects that you participate, not just that you attend. Participation involves attendance, being familiar with the material, taking notes, reading the book, attempting homework, submitting projects, and participating in discussions.

Attending class without engaging while there does not qualify as participation. Submitting assignments without attending class does not qualify as participation, either. Both are required for participation.

Regular attendance and participation is essential for satisfactory completion of this course. You need to be actively involved in this course several times a week, if not daily. You need to regularly monitor your Canvas inbox and Richland email for notifications and information.

Students who do not communicate with the instructor and have irregular or infrequent attendance, miss the first day of class, or miss any two consecutive days may be dropped.

Students who do not communicate with the instructor, have irregular or infrequent attendance, or are failing before midterm may be dropped from the course. Students who, because of excessive absences, cannot complete the course successfully, are required to be administratively dropped from the class at midterm. If a student stops attending after midterm, it is the student's responsibility to withdraw to avoid an "F". Do not stop participating and assume that you will be withdrawn from the class by the instructor.

Although dropping students for non-attendance at midterm is required, students whose participation in the course is occasional or sporadic may be dropped from the class at any point during the semester at the instructor's discretion. The safest way to make sure you're not dropped for non-attendance is to continue to actively participate in the course.

The student is responsible for all assignments, changes in assignments, or other information given in the course. Regularly and frequently monitor your communications for updates or changes, but communicate with your classmates to get notes and other information.

## Time Requirements

The federal government requires that there is enough material in this course for a typical student to spend a minimum of 12 hours per week working on it.

In [34 CFR 600.2](#), the federal government requires that the amount of student work for a credit hour reasonably approximates not less than one hour of class and two hours of out-of-class work per week for each semester hour. That is, there are three (3) hours of material per week for each credit hour.

Since this is a four (4) credit hour course, you are expected to spend a minimum of 12 hours per week on this course.

If you are taking 15 credit hours, then you should expect to spend at least 45 hours a week on course work. That is the equivalent of a full-time job. The government considers that if you are taking 15 credit hours, then being a student is your full-time job.

According to the federal regulations, this target is a minimum, not an average.

Failure of the course to meet these time requirements could result in loss of program integrity, forcing the college to recover federal financial aid, and ultimately loss of accreditation.

At face value, it sounds overwhelming and impossible, but the time includes reading the book, watching videos, working on homework and projects, and participating in discussions.

The point is to manage your time effectively so that you don't feel the course is overwhelming.

## Technology

The use of technology in this course is consistent with the Technology Statement in the [Illinois Mathematics & Computer Science Articulation Guide](#) (IMACC, 2023, p. 2). Technology is used to enhance the learning of Finite Mathematics, but it is not the focus of the instruction. There will be instances when we will use the calculator or computer to aid in our understanding or remove some of the tediousness of the calculations. There may be some projects, homework, or portions of a test that require you to use technology to complete.

Here are some of the technology tools that we may use.

### Internet (required)

All assignments are submitted through the Canvas learning management system. There are instructional videos for both content and technology online as well. This means that you need a reliable, high-speed Internet connection to take the course.

You should have a back-up plan for connectivity issues. Many of you will have a smartphone with a data plan that might be your backup plan. But be aware of locations such as Richland, neighbors, friends, or restaurants that have an internet connection you can use if you lose yours.

Generally speaking, you should not be waiting until something is due to work on it and turn it in. With the exception of exams and discussions, late work is accepted, but you lose 10% of the original point value for each calendar day it's late. No late work will be accepted after the final.

### TI-83 or TI-84 Graphing Calculator (required)

This course will focus on the applications of Finite Mathematics instead of the arithmetic skills or mechanical steps needed to solve the problem. To facilitate that, we will be using programs, written by the instructor, for the graphing calculator. Use of these programs will allow the student to solve more problems in less time as well as tackle the more difficult problems, which would be too time consuming by hand.

Your calculator must be a Texas Instruments TI-83, TI-84, TI-85, or TI-86 graphing calculator. Variants like the plus, silver, or color editions are fine. Other calculators, including the TI-nspire



family, are not supported.

It is expected that you will have a suitable calculator and use it for homework, quizzes, projects, and exams.

### **Microsoft Office (required)**

Microsoft Word will be required to type the Mathematical Notation assignments. Microsoft Excel may be beneficial for working with some of the larger matrices.

Microsoft Office 365, which includes Word, Excel, PowerPoint, Access, and Publisher, is available free to students enrolled in credit courses at Richland through the Microsoft Student Advantage program. The software will work on recent versions of Windows or MacOS. It does not install on a Chromebook.

You can obtain Office 365 by going to <https://office.com>, logging in with your Richland NetID and password, and choosing "Install Office."

More about information about obtaining Microsoft Office 365 is available at <https://jics.richland.edu/MicrosoftStudentAdvantage/>

### **Google Drive (recommended)**

Google Docs is a free online collaboration suite that in some cases will serve as an alternative to Microsoft Office. The word processor is not as powerful as Word and its equation capabilities are insufficient for the mathematical notations. But one area where it is clearly better than Microsoft Word is in its ability for real-time collaboration. This means that students may work together on a document such as a project and as one student types, it automatically shows up on the other students' screens. You can leave comments in the document and hold a chat session while you're collaborating.

Google Docs works best with a Gmail account, which can be created for free. It also integrates with Canvas and students can start a new Google Doc collaboration directly from within Canvas and choose the other students for their project.

Google Spreadsheets is an alternative to Microsoft Excel that also provides the real-time collaboration that Excel doesn't. Google Spreadsheets does not integrate directly with Canvas and you will need to manually share documents among your group.

Google Drive is available at <https://drive.google.com>

## **Additional Supplies**

The student should have access to a pencil, paper, and calculator each day. You may occasionally want a ruler or graph paper.

## **Additional Help**

The student is encouraged to seek additional help when the material is not comprehended. Mathematics is a cumulative subject; therefore, getting behind is a very difficult situation for the student. There are several places where you can seek additional help in your classes.

Some services provide a phone number or extension. When only an extension is provided, you will need to first call the main phone number at 217-875-7211.

## **Instructor**

I try to make myself as available to the students as I can. My office hours are listed at the beginning of this syllabus, but those are just the times I'm scheduled to be available to the students. Grab me and ask me questions if you see me in the hallway. Ask questions before or after class. If I'm in my office and it's not my scheduled office hours, go ahead and stop in.

The instructor should be considered the authoritative source for material related to this class. If a tutor or other student says something that disagrees with the instructor, believe the instructor.

## **Study Groups**

Probably the best thing you can do for outside help is to form a study group with other students in your class. Work with those students and hold them accountable. You will understand things much better if you explain it to someone else and study groups will also keep you focused, involved, and current in the course.

## **Mathematics Enrichment Center**

The Mathematics Enrichment Center, room S102, provides free walk-in tutoring for mathematics courses. They also provide help with study skills and preparation for taking the mathematics placement test.

Contact [tutoring@richland.edu](mailto:tutoring@richland.edu) for more information.

## **Testing Center**

The testing center is located in room N114. You may be required to use the testing center if you miss an in-class exam or if an online exam needs proctored.

You must provide a photo identification and know the name of your instructor to use the service.

## Academic Success Center

The Academic Success Center consolidates several student services into one area. It is located in room S134.

### Tutoring

The tutoring center provides tutoring on a walk-in or appointment basis in room S134.

Students seeking mathematics tutoring should visit the Mathematics Enrichment Center in room S102. Evening and weekend tutoring is available via NetTutor inside Canvas. For the current tutoring schedule and study resources, visit

<https://richland.instructure.com/courses/1830817>

### Accommodations

The Accommodations Office is located in room S134 and provides support to students with documented physical, psychiatric, or learning disabilities. Students needing accommodation services should visit <https://www.richland.edu/accommodations> or contact [accom@richland.edu](mailto:accom@richland.edu) as early in the semester as possible.

If you request an accommodation, you will be required to provide documentation that you need that accommodation and the instructor will be unable to provide the accommodation until the notified of the accommodations by the Accommodations Office.

Students who have approved accommodations should contact their instructor to discuss the implementation of the accommodations for the course.

## Student Tech Support

The Student Tech Support help desk is located inside the Teaching and Learning Center. They provide technical support for students including answering questions about Canvas, myRichland, e-mail, cell phones, tablets, and laptops. They can also help troubleshoot your computer issues and make sure your computer is ready for course work.

They are located in room W202, but the best way to contact them is electronically.

For Canvas-related issues, use the "Help" link in the lower-left corner of Canvas and select Report a problem.

For non-Canvas related issues, email [student.tech@richland.edu](mailto:student.tech@richland.edu) or visit <https://www.richland.edu/academics/tlc/student-tech-support/>

## Open Computer Labs

Students often wish to know where, besides the classroom, they can go to use the software. There are computers located in the Learning Resources Center and in the Academic Success

Center that you may use.

## **Microsoft Office Student Advantage**

Currently enrolled students in credit courses may download and install the Microsoft Office software on their personal Mac or Windows devices at no additional cost. To install the software, visit <https://office.com>, log in using your Richland email address and NetID password, and choose "Install Software."

For questions or assistance with Microsoft Office, contact Student Tech Support by email at [student.tech@richland.edu](mailto:student.tech@richland.edu), at extension 6376, or in person at the Teaching and Learning Center in room W202.

## **Richland Thrive**

Richland Thrive is an implementation of an early-alert identification and intervention system powered by the Hobsons' Starfish software. The software is designed to help students achieve academic success, retention, and graduation.

When academic indicators suggest a student may be experiencing difficulties that may negatively impact academic success, the instructor may raise a referral flag that notifies the student of concern through an email to the student's Richland email, requests a Student Success Coach or Student Success staff member contact the student to discuss and follow-up on the issue, or encourages student to discuss the matter with the instructor.

If you receive an email notification of a referral flag in any of your courses, you are encouraged to contact the instructor as soon as possible to discuss the issue. The purpose of the discussion is to accurately assess its potential impact on your academic success and to plan and put into action steps to be successful in the course. For more information about the Richland Thrive system, contact the Student Success Center at ext. 6267.

## **College & Division Policies**

### **Academic Integrity Policy**

All students are expected to maintain academic integrity in their academic work and honesty in all dealings with the College. A student who cheats, plagiarizes, or furnishes false, misleading information to the College is subject to disciplinary action up to and including failure of a class or suspension/expulsion from the College.

The Academic Integrity Policy also governs student misuse of intellectual property.

All work must be original and completed during the Fall 2023 semester to receive credit. Generative AI such as ChatGPT is not considered original work.

Students who are suspected of violating the Academic Integrity Policy may be required to take

quizzes or exams in a proctored setting.

## **NetID Password and User Account Privacy**

Your Richland NetID password should not be shared with anyone. Providing your password or account access to anyone else will be considered a violation of the RCC Academic Integrity Policy and the Responsible Use of Information Technology Policy.

To protect your account, you should always log off of College computers and online systems before exiting a classroom or public location.

Students who are suspected of allowing others to access their account may be required to take quizzes or exams in a proctored setting.

## **Non-Discrimination Policy**

Richland Community College policy prohibits discrimination on the basis of race, color, religion, sex, marital or parental status, national origin or ancestry, age, mental or physical disability (except where it is a bonafide occupational qualification), sexual orientation, military status, status as a disabled or Vietnam-era veteran.

## **Responsible Use of Classroom Content**

Class discussions, papers, pictures, video, and any other work created for a course are all considered official course content. Work including papers, discussions, quizzes, assignments, etc., must be confined to the classroom (either on-campus or virtual) and should not be shared outside the classroom without the express permission of the person who created it. Students should respect the privacy of person-to-person or person-to-class communication in all forms. Violating others' privacy may result in removal from the course. Significant or repeated violations may result in suspension or expulsion. This standard is pursuant to Board Policy 5.8.1 (Responsible Use of Information Technology) and the Code of Student Conduct

## **Copyright Notice**

The materials used in this course are protected by Copyright law. Faculty lectures, course supplementary materials, articles, quizzes and exams, papers, data, web pages, and artwork are among the properties protected. This is not an exhaustive list. Items may or may not be marked with a Copyright symbol ©. Regardless, the intellectual property used in this course is owned by the creator who is the sole determiner of how the property is used, including but not limited to copying, distribution, performance, display, or revisions.

Any questions a student may have about the use of course materials can be explained by the instructor or library staff.

Student misuse of intellectual property is subject to the Academic Integrity Policy as explained in the Student Handbook and Section 5.9 of the Board Policy Manual.

## **Title IX and Sexual Misconduct**

Richland Community College is committed to providing for all students a safe learning environment that is free of all forms of discrimination and sexual harassment, including sexual assault, domestic violence, dating violence, and stalking. If you (or someone you know) has experienced or experiences any of these incidents, know that you are not alone.

All Richland Community College faculty members are "responsible employees," which means that if you tell me about a situation involving sexual harassment, sexual assault, dating violence, domestic violence, or stalking, I must share that information with the Title IX Coordinator. Although I have to make that notification, you will control how your case will be handled, including whether or not you wish to pursue a formal complaint. Richland's goal is to make sure students are aware of the range of available options and have access to the needed resources.

If you wish to speak to someone privately, you can contact Growing Strong Sexual Assault Center at 217-428-0770.

More information about Title IX can be found on Richland's website at <https://www.richland.edu/campus-police>. Richland's Title IX Coordinator is Nicole DelMastro-Jeffery, [titleix@richland.edu](mailto:titleix@richland.edu), N186A, phone: 217-875-7211, ext. 6273.

## **Electronic Communication Devices Policy**

The Mathematics, Science, and Business Division prohibits the use of cell phones, pagers, and other non-learning electronic communication equipment within the classroom. All equipment must be turned off to avoid disturbances to the learning environment. If a student uses these devices during an examination, quiz, or any graded activity, the instructor reserves the right to issue no credit for these assignments. The instructor needs to approve any exceptions to this policy.

## **Richland Community College Core Values**

- **Commitment:** We are dedicated to meeting the needs of the communities we serve.
- **Respect:** We recognize the expertise of all members of the College community and encourage individual contributions.
- **Excellence:** We strive to develop and pursue higher standards.
- **Integrity and Accountability:** We are accountable to the communities we serve and are truthful, sincere, transparent, and responsible for our actions.
- **Diversity, Equity, Inclusion, and Belonging (DEIB):** We foster an environment where diversity, equity, inclusion, and belonging are incorporated across all levels of the

organization and recognize the importance of eliminating barriers for students, employees, and community members.

## Other College Services

Richland provides many services to its students. While they may not directly pertain to this class, you may benefit from them. A list of support services with descriptions, phone numbers, and email addresses is found online at

<https://jjcs.richland.edu/syllabi/mastersyllabus-studentservices.pdf>

## Weekly Calendar

This course is organized by unit and day rather than by week. Content scheduled and due throughout the week and the title for the week may not reflect the only content covered that week. This chart is provided as a convenience for students who organize their life by calendar week.

Students will receive a separate daily calendar that contains the section numbers covered each day as well as the due dates for major activities. Due dates are also listed in Canvas.

### **Week 1, August 14–20 ..... Matrices**

- Review: Systems of Linear Equations in Two Variables
- Systems of Linear Equations and Augmented Matrices
- Gauss–Jordan Elimination

### **Week 2, August 21–27 ..... Matrices**

- Discussion 4: Traffic Flow
- Gauss–Jordan Elimination
- Matrices: Basic Operations
- Inverse of a Square Matrix
- Matrix Equations and Systems of Linear Equations

### **Week 3, August 28–September 3 ..... Matrices**

- Leontief Input–Output Analysis
- Project 4A, 4B due
- Exam 4: Matrices
- Discussion 5
- Linear Inequalities in Two Variables
- Systems of Linear Inequalities in Two Variables

### **Week 4, September 4–10 ..... Linear Programming**

- Linear Programming in Two Dimensions: A Geometric Approach

- The Table Method: An Introduction to the Simplex Method

**Week 5, September 11–17 . . . . . Linear Programming**

- The Simplex Method: Maximization with Problem Constraints of the Form  $\leq$
- Project 5 due
- Discussion 6: Linear Programming

- The Dual Problem: Minimization with Problem Constraints of the Form  $\geq$

**Week 6, September 18–24 . . . . . Linear Programming**

- Maximization and Minimization with Mixed Problem Constraints
- Exam 5-6: Linear Programming

**Week 7, September 25–October 1 . . . . . Logic, Sets, and Counting**

- Logic
- Project 6 due
- Sets
- Basic Counting Principles

**Week 8, October 2–8 . . . . . Probability**

- Discussion 7: Counting
- Permutations and Combinations
- Sample Spaces, Events, and Probability
- Union, Intersection, and Complement of Events; Odds

**Week 9, October 9–15 . . . . . Probability**

- Conditional Probability, Intersection, and Independence
- Bayes' Formula
- Discussion 8: World Series
- Random Variable, Probability Distribution, and Expected Value

**Week 10, October 16–22 . . . . . Markov Chains**

- Decision Theory
- Exam 7-8: Counting and Probability
- Properties of Markov Chains
- Project 8 due

**Week 11, October 23–29 . . . . . Markov Chains**

- Regular Markov Chains
- Discussion 9: Transitions
- Absorbing Markov Chains



- Project 9A due

**Week 12, October 30–November 5 . . . . . Games**

- Strictly Determined Games
- Mixed-Strategy Games
- Project 9B due
- Discussion 10: Games People Play
- Linear Programming and  $2 \times 2$  Games: A Geometric Approach

**Week 13, November 6–12 . . . . . Games**

- Linear Programming and  $m \times n$  Games: Simplex Method and the Dual Problem
- Exam 9-10: Markov Chains and Games

**Week 14, November 13–19 . . . . . Finance**

- Simple Interest
- Project 10 due
- Compound Interest
- Future Value of an Annuity; Sinking Funds

**Week 15, November 20–26 . . . . . Finance**

- Discussion 3: Retirement Planning
- Present Value of an Annuity; Amortization

**Week 16, November 27–December 3 . . . . . Finance**

- Present Value of an Annuity; Amortization
- Work Day
- Review
- Project 3A,3B due

**Finals Week, December 4–7 . . . . . Final Exam**

- Comprehensive Final Exam, Monday, December 4, 2:00-3:50 pm