

# Math 160 – Finite Mathematics

## Spring 2020 Course Syllabus

James Jones, Professor of Mathematics  
Mathematics, Science, and Business Division – Richland Community College

### Course Meeting Information

Section 01 meets from 2:00 to 3:10 pm on Monday, Wednesday, and Friday in room S137. The class meets from January 15<sup>th</sup> to May 11<sup>th</sup>.

The comprehensive final exam will be Monday, May 11<sup>th</sup>, from 2:00 to 3:50 pm.

This is a face-to-face course, but the Canvas learning management system will be used. We will not be using MyMathLab. 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.

### Instructor Information

James Jones, Professor of Mathematics

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Office: S224

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

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, room S137. 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.

- Monday: 8:45-9:00 am, 10:10-10:30 am, 1:40-2:00 pm, 3:10-3:30 pm, 4:40-4:55 pm
- Wednesday: 8:45-9:00 am, 10:10-10:30 am, 1:40-2:00 pm, 3:10-3:30 pm, 4:40-4:55 pm
- Friday: 8:45-9:00 am, 10:10-10:30 am, 1:40-2:00 pm, 3:10-3:30 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. This means that the 13<sup>th</sup> edition is available from many sources and in many formats for discounted prices.

There are several options available for obtaining this textbook. 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: 978-0-321-94733-8 is an electronic copy of the textbook through VitalSource. It is a rental and you will lose access to the electronic book after the course is over.

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 long-term 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.*

Here is the IAI description of M1 906.

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.

The degree-seeking student at Richland Community College will:

1. communicate effectively in writing.
2. communicate effectively orally.
3. access, evaluate, and appropriately use information in research and applied contexts.
4. think critically and creatively.

## 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 be civil and respectful of all persons in the course.
- Students will attend class and stay current with the material.
- 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. 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." While you may be lost, that is a larger request than can be solved by email and it provides no place for the instructor to begin. It may require meeting with the instructor or a tutor to address.
- 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 work should be your own. You may use your calculator on your exams, but you may not use other resources.

## Type of Instruction

Lecture, projects, activities, problem solving, discussions, book readings, homework, and group work will be used.

## 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.

### Homework – 20% of grade

Homework should be attempted after the material is covered in class and before the next class meeting. Check your answers against those in the back of the book. Correct any mistakes that you can and then come to the next class with a list of questions you still have. 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 material 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. Homework may be turned in early. Late homework will receive a 20% reduction in point value for each class period it is late. 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 the final.

Each section of homework should be stapled if there is more than one page. 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. 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.

### **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. That said, students often fail to see the benefit in doing something when they are not assessed (get points) on it.

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, 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.

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.

### **Reading Quizzes – 10% of grade**

You are expected to read through the material in a section before coming to class. You do not have to understand all of it, but there should be a basic level of familiarity before class because a large portion of class time will be spent working on conceptual understanding, not basic skills.

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 the start of class and will be unavailable to complete after this time. They become available after the previous class meeting has finished, so you will have about 46.5 hours in which to attempt each quiz (longer on the weekends and holidays).

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.

We're going to try making the answers 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 quizzes cannot be made up, 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.

Projects are due two class periods, after we have covered the material needed to complete the project. Projects may be turned in late, up until the final, but they lose 20% of their original value for each calendar day, including weekends, that they are late.

### **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.

## 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 due the day after we finish the material in a chapter. For some chapters, this will be the day of the exam. Mathematical notations will be accepted late, up until the final, but it will lose 20% of its original value for every calendar day it is late.

## 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.

<b>Category</b>	<b>% Grade</b>	<b>Drops</b>	<b>Late work accepted (20% penalty)</b>
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

Absolutely no late work will be accepted after the final.

## Attendance 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, 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

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 and that a 50 minute period is acceptable for class or lecture.

Richland considers the minimal meeting time as 50 minutes per week for 15 weeks for each credit hour. Since this course is a four credit hour course, that means  $50 \times 15 \times 4 = 3,000$  minutes of class time. That is  $3000 \div 60 = 50$  hours of class time.

There is to be a reasonable approximation of two hours of outside time for each hour inside class, so the 50 hours of classroom instruction needs 100 hours of outside work. In total, you should expect to spend a minimum of 150 hours this semester for this course.

Since the course meets for 15 weeks, that is an average of  $150 \div 15 = 10$  hours per week. Note that the 150 hours is a minimum, but that the 10 hours per week is an average.

You should expect to spend a minimum of 10 hours per week on this course.

If you are taking 16 credit hours, then you should expect to spend at least 40 hours a week on course work. That is the equivalent of a full-time job. The government considers that if you are taking 16 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 outside the class 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

### Internet (required)

Although this is not an online course, many 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.

Richland has computers that can be used, but Richland is only open Monday – Friday. However, it is highly recommended that you have Internet access at home. I would not recommend relying on Richland's computers.

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 20% 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. More information 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 bring a pencil, paper, and calculator to class each day. You may occasionally want a ruler or graph paper. There will be a paper punch and stapler in the classroom.

## 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.

You may use a recording device to record the lectures. Feel free to use a camera or cell phone to take pictures of the boards if you have trouble getting all of the information into your notes.

## 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 in my office. 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, located in S118, provides free walk-in tutoring for mathematics courses.

## **Academic Success Center**

The Academic Success Center consolidates several student services into one area. It is located in the south wing of the first floor next to the Kitty Lindsay Learning Resources Center (library).

### **Testing**

The testing center is located in room N114. You must provide a photo identification and know the name of your instructor to use this service.

### **Tutoring**

The tutoring center provides tutoring on a walk-in or appointment basis in room C148. Students seeking mathematics tutoring should visit the Mathematics Enrichment Center.

### **Accommodations**

There are accommodations available for students who need extended time on tests, note takers, readers, adaptive computer equipment, braille, enlarged print, accessible seating, sign language interpreters, books on tape, taped classroom lectures, writers, or tutoring. If you need one of these services, then you should see Learning Accommodation Services in room C148. If you request an accommodation, you will be required to provide documentation that you need that accommodation.

## **Online Learning**

Despite the title, Online Learning provides help with much more than just your online courses. 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 W143, but the best way to contact them is through the "Help" link in the lower-left corner of Canvas or at <http://www.richland.edu/online/helpdesk>.

## **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.



## **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.

### **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.

### **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 a safe learning environment for all students 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 us about a situation involving sexual harassment, sexual assault, dating violence, domestic violence, or stalking, we must share that information with the Title IX Coordinator. Although we 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. Our goal is to make sure you are aware of the range of options available to you and have access to the resources you need.

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 at [www.richland.edu/security](http://www.richland.edu/security). Richland's Title IX Coordinator is Alex Berry, email: [aberry@richland.edu](mailto:aberry@richland.edu), office: N105, phone: 217-875-7211, ext. 6314.

## **Electronic Communication Devices Policy**

The Mathematics and Sciences 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.
- Accountability - We assume and demonstrate responsibility for our actions.
- Diversity - We believe that our similarities and differences are opportunities for establishing a common bond and strengthening the College.

## Other College Services

There are some additional services that Richland provides to its students. While they may not directly pertain to this class, you may benefit from them.

### Learning Feedback System

At the end of each semester, students are invited to provide feedback to their instructors about the course. This includes things that went well and opportunities for improvement. This online feedback is anonymous and the instructor won't see it until grades have been turned in.

The Learning Feedback System (LFS) is primarily intended to provide feedback to the instructor. However, if you have a issues or concerns, you should not wait until the end of the semester to talk to your instructor. Please come to me at any time. The feedback system is available at <https://people.richland.edu/feedback>.

### myRichland

myRichland is the student information system portal and is located at <https://my.richland.edu>.

You may use it to find the course schedule, register for classes, check your grades, obtain unofficial transcripts, review financial aid, and other student services.

### Library

The Learning Resources Center (LRC) has print and electronic resources available. They offer research assistance and information literacy sessions; they also have individual and group study areas.

### Student Success Center

The Student Success Center, in room N117, is designed to be a one-stop shop for most student services. These include advising and registration, career services, counseling services, financial aid, veteran affairs, student records, and the transfer center.

The Student Success Center has coffee and snacks available daily, school supplies such as paper, pens, and highlighters, and personal supplies such as toothpaste, toothbrushes, and cough drops.

A few other student services are located in other rooms of the main building. These include Campus Life, which supports new student orientation, clubs, organizations, and student leadership, and the TRiO program that offers academic and personal support to first-generation, low-income, and students with disabilities.

## **Office of Student Engagement**

The Office of Student Engagement, in room C133, has a Snack Center to provide grab-and-go food for students who were short on cash while on campus or who did not have time to grab a meal before coming to campus. The office also has personal supplies such as condoms and menstrual products available for students.

The Gender Inclusive/Family bathroom and many women's bathrooms are also stocked with complimentary menstrual products.

## **Food Pantry**

In addition to the snacks in the Student Success Center and the Office of Student Engagement, Richland has partnered with The Good Samaritan Inn to create The Pantry at Richland Community College. If you are a student facing food insecurity, please complete the referral form at <http://bit.ly/2ykuGUL> or visit the Student Success Center.

## **Directory of Student Services**

The main phone number for Richland Community College is 217-875-7211 or 217-875-7200. This is an automated system available 24 hours a day.

Student Service	Location	Extension
Accommodations	C148	6379
Campus Life	C131	6243
Career Services	N117	6267
Cashier	N117	6227, 6226
Counseling Services	N117	6267
Financial Aid	N117	6271
Library	C152	6303
Mathematics Enrichment Center	S118	6383
Online Learning Support	W143	6376
Registration and Enrollment	N116	6267
Student Employment	N103	6305
Student Engagement	C131	6243
Student Records	N117	6267
Student Support Services/TRiO Program	C143	6440
Testing	N114	6238
Transfer Center	N117	6438
Tutoring	C148	6379
Veterans' Affairs	N117	6205

## Weekly Calendar

This course does not run on a calendar week basis. 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, January 15–19 . . . . . Matrices & Systems of Equations**

- Review of solving systems of linear equations, substitution, elimination
- Augmented matrices, elementary row operations

### **Week 2, January 20–26 . . . . . Matrices & Systems of Equations**

- Gauss-Jordan elimination

### **Week 3, January 27–February 2 . . . . . Matrices & Systems of Equations**

- Equality, addition, subtraction, and multiplication of matrices
- Inverses of matrices
- Matrix equations and systems of equations

- Leontief Input-Output analysis

**Week 4, February 3–9 . . . . . Linear Programming**

- *Exam on Matrices & Systems of Equations*
- Linear inequalities
- Systems of linear inequalities, corner points, bounded and unbounded regions,
- Geometric approach to linear programming, iso-profit lines, existence of solutions

**Week 5, February 10–16 . . . . . Simplex Method**

- Table method, feasible solutions, basic and non-basic variables
- Standard maximization problems using the Simplex method

**Week 6, February 17–23 . . . . . Simplex Method**

- Standard minimization problems using the Dual problem
- Non-standard maximization and minimization problems, big-M technique

**Week 7, February 24–March 1 . . . . . Simplex Method**

- Non-standard maximization and minimization problems, big-M technique
- *Exam on Linear Programming*
- Logic, truth tables

**Week 8, March 2–8 . . . . . Sets and Counting**

- Sets, unions, intersections, subsets, complements, Venn diagrams
- Basic counting principles, addition rule, multiplication rule

**Spring Break, March 9–15**

- No Classes

**Week 9, March 16–22 . . . . . Probability**

- Factorials, permutations, combinations, and distinguishable permutations
- Sample spaces, events, and probability
- Joint frequency tables, Venn diagrams
- Unions, intersections, complements, odds, mutually exclusive events

**Week 10, March 23–29 . . . . . Probability**

- Conditional probability, intersections, independence
- Bayesian inference problems
- Random variables, probability distributions, expected values
- Decision theory: expected value, maximax, maximin, minimax criteria

**Week 11, March 30–April 5 . . . . . Markov Chains**

- Decision theory: expected value, maximax, maximin, minimax criteria
- *Exam on Sets, Counting, and Probability*

- Properties of Markov chains, transition diagrams, transition matrices, state matrices

**Week 12, April 6–12 . . . . . Markov Chains**

- Regular Markov chains, stationary (steady-state) matrices
- Absorbing Markov chains

**Week 13, April 13–19 . . . . . Games**

- Absorbing Markov chains
- Two-player, strictly determined games
- Mixed strategy games, recessive rows and columns,
- Solution to a  $2 \times 2$  non-strictly determined games

**Week 14, April 20–26 . . . . . Games**

- Geometric approach to  $2 \times 2$  games using linear programming
- Simplex approach to  $2 \times 2$  games using linear programming
- Extension of simplex method to  $m \times n$  games
- *Exam on Markov Chains and Games*

**Week 15, April 27–May 3 . . . . . Finance**

- Simple interest problems
- Compound interest
- Future value annuities

**Week 16, May 4–10 . . . . . Finance**

- Future value annuities
- Present value annuities

**Finals Week, May 11–17**

- *Comprehensive Final Exam*