Syllabus
MATH 2085, version 2.0
Effective: July, 2021

MATH 2085—Linear Algebra

Course Description: Systems of linear equations, vector spaces, linear transformations, matrices, determinants.

Textbooks and Other Materials

Read the following textbook information carefully. ODL is not responsible for student purchases that result in the receipt of the wrong materials. *It is your responsibility* of the student to order the correct textbook materials. Courses are written to specific textbook editions; edition substitutions *are not allowed*.

WebAssign Access

This course requires paid access to a WebAssign course website that includes an electronic version of the textbook. Since our courses have a longer duration than regular semester-based courses, you must purchase access through the WebAssign site when you create your account and enroll in the course. Please follow the instructions in the "Getting Started" module in your Moodle course to begin this process.

Hardcover Textbook

Ron Larson. *Elementary Linear Algebra*. Eighth edition. Boston: Cengage Learning, 2017.
    ISBN-13: 978-1-305-65800-4

CAUTION! If you choose to purchase a hard copy of the textbook, please make sure that you are *not* purchasing a WebAssign access code with your book. You *must* buy access at the WebAssign site to receive access that is long enough to complete your course work. Follow the steps in your Moodle course to purchase access.

Ordering Instructions

Please review the following tips for ordering your course materials:

1. Do not purchase your textbooks until your enrollment is approved. During the processing period, a new section may be opened that could require a different textbook or edition.
2. Always order by the ISBN. Publishers and vendors often offer the same textbook title under different ISBNs. You must have the correct ISBN to access your online website.
3. If you are having problems locating a textbook, contact us at Answers@outreach.lsu.edu for assistance.

Other Materials and Resources

Required Software: Adobe Acrobat Reader

You will use Acrobat Reader to view the module lecture materials.

We recommend that you use Mozilla Firefox or Google Chrome as your web browser. *Internet Explorer is not compatible with your Moodle course site.*

Required Hardware: Web cam, microphone (built-in or external), headphones or working speakers, and reliable high speed internet

Proctored exams are completed online and require the hardware listed above. You should review the technical requirements on the ProctorU website and perform an equipment test prior to enrolling in this course.

You may use a non-programmable, non-graphing calculator for exams.

ProctorU Technical Requirements

Equipment Test

Nature and Purpose of the Course

MATH 2085 is a standard introduction to linear algebra. Linear algebra courses have two basic parts. The first part is matrix arithmetic, a fairly simple, computational set of arithmetic rules. The second part of the course involves vector spaces. This will be most students' first exposure to axiomatic mathematics. In this section of the course, students will see material presented in the higher-level mathematical model of definition-theorem-proof. Students will usually find the vector space material more abstract and thus more difficult.

The purpose of this course is to enable you to employ the concepts and techniques of linear mathematics and to provide a stepping stone to higher-level mathematics classes.

It is assumed you have completed a second-semester calculus course and are familiar with differentiation and integration of real valued functions of a single variable.

Course Outcomes

Upon completion of this course, students are expected to be able to:

1. Master matrix arithmetic
2. Perform row-reduction of matrices to row-reduced echelon form
3. Solve linear systems using row-reduction of matrices and Cramer's Rule
4. Compute determinants of matrices
5. Compute matrix inverses
6. Explain the notions of vector spaces and subspaces
7. Explain the notions of linear independence, bases, and dimension
8. Explain the notions of row space and column space
9. Recognize linear transformations and their kernels and nulls
10. Create an orthonormal basis
11. Recognize matrix transformations
12. Compute the eigenvalues and eigenvectors of square matrices
13. Diagonalize a non-deficient matrix
14. Give coordinates of a vector with respect to a given basis

To pass the examinations, you must be able to correctly work most of the problems on them. It is not enough to say that you could work these problems several weeks or several months ago—you must be able to work them at exam time. For most people, this means that a systematic review of previously covered material must be undertaken regularly.

Working with the Course Materials

Remember, this course covers an entire semester of work or the equivalent of a classroom course lasting 15 weeks. That means that each module in this course equals nearly a week of course work and will require the same time and effort on your part. *Do not expect to complete each module in a single study session. Understand, too, that if you choose to submit assignments at a very high pace, your instructor may not be able to grade your work at the same rate.*

Each module contains information, activities, and assignments organized under a consistent series of headings. Get familiar with how the module is organized. Each module in this course is organized into the following sections:

1. The learning objectives of the module
2. Reading assignments from both the lecture material (key terms, theorems, and examples) and the textbook
3. Recommended videos in WebAssign if they are available
4. A self-check comprising chapter review questions from the textbook
5. The module assignment, consisting of problems in WebAssign and exercises in Moodle

6. Tutorials located in WebAssign

You should work through these parts of the module in order. Specific recommendations are provided in a link to the course module instructions, which you should review before beginning the first module.

Suggested Study Techniques

Carefully study the textbook and the lecture material before you begin the module assignments (you should keep a notebook when doing mathematics). This study should include a detailed examination of the illustrative problems and examples from the lecture material, as well the assigned reading. Even though the assignments are online, you should work them neatly in your notebook and correct them (if necessary) after completing them in WebAssign. Note also that you should submit each part of the question as you complete it.

General Instructions

1. Carefully review the module objectives to help you focus on the information that will be covered on the exams.
2. Concentrate on the reading assignments, the module lecture material, and any additional resources provided. This review should include a detailed examination of any illustrative problems and examples. After an assignment has been completed, a rapid re-reading of the related textbook and other materials is strongly recommended.
3. Put yourself on a definite schedule. Set aside a certain block of hours per day or week for this course and work in a place where distractions are minimal.
4. Try to submit one assignment each week or at least every two weeks. Delays in submitting assignments usually result in lagging interest and the inability to complete the course.
5. Review your module assignments after they have been graded, paying special attention to any instructor feedback provided. We suggest that you wait for feedback on your first assignment before you submit subsequent assignments.
6. Regardless of how you complete your graded assignments, keep in mind that module completion should not be your sole preparation for your exams. As with any college course, you should study for your exams.

Reading Assignments

To do well in this course, it is essential that you read and study all the course materials that precede the module assignment. Do not begin the module assignment until you have done so. Carefully follow the guidelines and examples provided in the textbook.

You will read an average of 10–15 pages per module. Specific reading assignments will be given in each module.

Topic Outline

This course covers the following specific topics:

Module	Topic
01	Systems of Linear Equations, Guassian and Gauss-Jordan Elimination
02	Matrix Arithmetic and Properties
03	Inverse of a Matrix
04	Determinants
05	Properties and Applications of Determinants
06	Vector Spaces
07	Subspaces
08	Spanning Sets, Linear Independence, Bases, and Dimensions
	Mid-Course Examination
09	Rank, Row Space, Column Space, Coordination, and Change of Basis
10	Length and Dot Product for Real Vectors and an Introduction to Inner Product Spaces
11	Orthonormal Bases, the Gram-Schmidt Process, and Cross Product
12	Linear transformations and Their Kernals and Ranges
13	Matrices for Linear Transformations, Transition Matrices, and Similarity
14	Eigenvectors, Eigenvalues, and Diagonalization
15	Symmetric Matrices
	Final Examination

Module Assignments

There are two parts to each module assignment: problems in WebAssign and exercises in Moodle. You will have five attempts for each assignment in WebAssign. After your first two attempts, you will be able to try another version. Do not get too dependent on this help as you will not have it on the exams. You will be able to use the "Show Your Work" function in WebAssign as you work through the problems, but you will not receive any additional credit for doing so.

The second portion of the module assignments are to be completed in Moodle. They are to be answered according to the directions of the assigned problems from the textbook. It is important that you review these assignments as the exams will include similar proofs and true/false questions. When you complete the assignments, you should make sure that you can work each exercise on your own, without reference to the textbook.

Once you submit an assignment, you cannot revise it, so be sure to check your work. Your instructor will normally post a grade for your assignment within *seven calendar days*. Understand that occasional delays will occur, such as during holidays and semester breaks or if you submit several module assignments within the same week.

Academic Integrity

Students in Online Distance Learning (ODL) courses must comply with the *LSU Code of Student Conduct*. Suspected violations of the academic integrity policy may be referred to LSU Student Advocacy & Accountability (SAA), a unit of the Dean of Students. If found responsible of a violation, you will then be subject to whatever penalty SAA determines and will forfeit all course tuition and fees.

Plagiarism

Students are responsible for completing and submitting their own course work and preparing their own modules. All work submitted in the course modules must be the student's own work unless outside work is appropriate to the assignment; all outside material must be properly acknowledged. It is also unacceptable to copy directly from your textbook or to use published answer keys or the teacher's edition of a textbook.

Collaboration

Unauthorized collaboration constitutes plagiarism. Collaborative efforts that extend beyond the limits approved by the instructor are violations of the academic integrity policy. Students who study together are expected to prepare and write their own individual work for submission and grading.

For more information and links to the *LSU Code of Student Conduct* and the SAA website, go to the ODL Academic Integrity policy on our website.

Grading Policy

Module assignments count 100 points each. In addition, there are two proctored examinations worth 100 points each. The mid-course exam covers material from Modules 01–08, and the final exam , which is not comprehensive, covers material from Modules 09–15. Each exam consists of problems in WebAssign and you will have a maximum total of three hours to complete each one.

It is possible to earn partial credit on your exams by using the "Show Your Work" function in WebAssign. You must show all steps, and any additional credit may be awarded at your instructor's discretion.

You are allowed a blank white board during the exam. To verify the white board is blank, you must show your white board to the proctor before you begin your exam. At the end of the exam, the proctor will instruct you to wipe clean the white board; the proctor must witness you wiping clean the white board.

You will be allowed to use a basic calculator; you cannot use a graphing or programmable calculator.

You will not be permitted to use textbooks, tables, or any other study aids during the examinations. This means that you must know the theorems, definitions, and procedures that have been presented in the course.

**YOU MUST EARN A PASSING AVERAGE ON THE
EXAMINATIONS IN ORDER TO PASS THE COURSE.**

If you earn a passing average on your exams, your grade will be computed as follows.

- Course grade = average of module assignments + average of quizzes + exam scores. Each component is weighted by the following predetermined percentages.

Component	Weight (%)
Average of Module Assignments	40%
Mid-Course Exam	30%
Final Exam	30%

The following grading scale applies:

$$97\%{-}100\% \;=\; \text{A+}$$
$$93\%{-}96\% \;=\; \text{A}$$
$$90\%{-}92\% \;=\; \text{A-}$$
$$87\%{-}89\% \;=\; \text{B+}$$
$$83\%{-}86\% \;=\; \text{B}$$
$$80\%{-}82\% \;=\; \text{B-}$$
$$77\%{-}79\% \;=\; \text{C+}$$
$$73\%{-}76\% \;=\; \text{C}$$
$$70\%{-}72\% \;=\; \text{C-}$$
$$67\%{-}69\% \;=\; \text{D+}$$
$$63\%{-}66\% \;=\; \text{D}$$
$$60\%{-}62\% \;=\; \text{D-}$$
$$0\%{-}59\% \;=\; \text{F}$$

IMPORTANT: The final exam cannot be taken until you meet the following requirements. Under no circumstances may the final exam be taken earlier.

1. You must have been enrolled in the course for *at least three weeks*, regardless of when the modules and other exams are completed.

2. You must have a grade posted in the Moodle grade book for the Module 15 Assignment in order to unlock access to the Final Exam. Please allow at least 7 days for the final assignment grade to be posted in the gradebook.

To read the full exam policy and other policy statements, visit the ODL policies page.

Taking Your Exams

You are required to create a Louisiana State University ODL ProctorU account and to take your exams through ProctorU, a remote proctoring service that allows you to take exams anywhere with internet access (some restrictions apply). Information on creating your ProctorU account can be found in the "Getting Started" module in Moodle. You cannot use an account created through another university, so if you already have an account, you will still need to create an account associated with LSU ODL.

There is a separate charge for each proctored exam. You should schedule your exams about a week before you are ready to take them in order to avoid any additional charges.

The ProctorU website provides links you can use to find out how ProctorU works and to check your computer to see that it meets the technical requirements. Remember that to test using ProctorU, you need access to a web cam, a microphone (built-in or external), headphones or working speakers, and reliable high speed internet to use this service.

Transcript Information

After you have completed this course, your grade will be filed with the Office of the University Registrar. If a transcript is needed, it is your responsibility to make a request to the registrar. If you would like to order a transcript, visit LSU's Office of the University Registrar Transcript Requests page to view your options.

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BATON ROUGE, LOUISIANA

Terrie White
Instructor
Distance Learning Programs
Louisiana State University

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