Linear Algebra
and Vector Geometry

201-105-RE 0105 (75.1)

Units: 2 2/3
Ponderation: 3-2-3

Table of Contents

■ ■ ■

Welcome to the Course!

Linear algebra is an exciting, powerful branch of mathematics. "Linear algebra, exciting? Maybe for a math teacher, but not for me!" Think again. Linear algebra has an incredible number of applications, many of them unexpected and many of them in social science. Whenever possible, you will study real-life applications so that you can make concrete connections between this introductory course and what could be expected in the field of social science. Of course, the knowledge and skills you will develop throughout this course will be useful in your future studies, but don't be surprised if they turn out to be useful in your everyday life as well, helping you to understand human phenomena such as rumour propagation and traffic jams . . .

Whether or not this is your first experience with distance learning, remember that how well you do in the course you are about to begin depends primarily on the effort you put into it and how capable you are of organizing your work. Set time aside to complete your work, preferably in reasonable blocks of time. For example, you will probably find it easier to do three one-hour work sessions in a day with breaks in between, than to work for three hours straight.

Read this Study Guide; you will find that it is a good introduction to this course. And don't worry: you won't be left alone. On the contrary, you will be guided throughout the learning process, and your tutor will always be there to help you.

We wish you an enjoyable and motivating learning experience!

■ ■ ■

Presentation of the Content Experts

A great many people were involved in developing this course. In addition to the content experts, content reviewer, and education adviser, an entire team has worked hard to ensure that it will help you develop your skills. Before introducing the course itself and the program it is part of, we will briefly introduce the content experts who worked on it.

Mike Besner   After struggling through high school with average grades, I attended the Institut de Tourisme et d'Hôtellerie in Montréal to train to become a professional chef. When I graduated from the program in 1990, I moved to the Canadian Rockies where I began my first career—as a chef—at several Canadian Pacific Hotels and Resorts (now Fairmont Hotels). After a couple of years, I decided it was time to return to academia, and so I enrolled at Concordia University as a transition student in 1992. I graduated in 1997 with a bachelor of science degree, with a specialization in applied mathematics. I then began my second career as a high school teacher, teaching at a private high school in Montréal. It was during this time that I went back to school to do a master's degree in teaching mathematics, which I completed in 2006. I started working at Vanier College in the summer of 2006 and, with any luck, I'll still be here 20 years from now!

Stephen Newbigging   I received undergraduate degrees in physics (Queen's University, 1994) and mathematics (McMaster University, 1996) before completing my master's degree in mathematics at McMaster University in 1998. I then spent some time doing doctoral work in atmospheric and oceanic sciences at McGill University. Unlike Mike, my first and only full-time job has been teaching at Montréal's Vanier College, which I have done since 2001. When I'm not in the classroom, you will find me on the ski trails, paddling a lake in a canoe, or wandering the mountains with a pack on my back.

The entire team wishes you success in your studies.

■ ■ ■

Course Introduction

Linear Algebra and Vector Geometry (201-105-RE) is an elective course. It is part of the math profile of the Social Science program. Its prerequisite at Cégep@distance is secondary school mathematics 526 or 536, or the Science or Technical & Scientific mathematics options. The course is not a prerequisite for other Cégep@distance courses, but it may be a prerequisite for other institutions, as well as for bachelor of commerce programs at universities.

Successful completion of this course attests to the complete achievement of the competency 022Z: to apply methods of linear algebra and vector geometry to the study of various phenomena of human activity. This course also attests to the partial achievement of the competency 022R, to thoroughly analyze human phenomena, which is completely achieved when combined with two other courses from other disciplines within the program.

More specifically, the course provides you with new mathematical skills and appropriate technological resources that will allow you to solve real problems in social science, in fields such as transportation, resource distribution, optimization of demographic or economic functions, etc.

■ ■ ■

Course Flow

Course Overview

The learning outcome for this course is to apply the concepts, properties, and methods of linear algebra and vector geometry to solving problems in the area of social science. In order for you to establish relationships between linear algebra and vector geometry and see them as a whole as early as possible, the instructional approach consists of learning about aspects of both of these fields in realistic contexts at every step of the learning process.

The skills you learn are not independent from one learning step to the other; they are rather like building blocks that you must put together in order to solve more complex problems as you advance through the course. You will need skills from every learning step in order to succeed in the final exam.

To practise and evaluate your ability to apply methods of linear algebra and vector geometry to human phenomena, realistic scenarios will be used whenever possible. Certain applications of the content to social science are too complex for an introductory level course, however, so theoretical problems will sometimes be needed.

You will be supported throughout your learning process. Each module in your Workbook is divided into several lessons, which contain various learning activities. In all the activities, you will have opportunities to practise using new mathematical concepts, properties, and methods, and you will receive feedback in writing. At the end of each module in your Workbook, you will find a self-evaluation exercise containing several problems. Its function is two-fold: to help you judge how well you have achieved the module's learning objectives and to help you prepare for the related assignment.

WeBWorK Problems

In addition to practice activities in the Workbook and exercises in the Textbook, you will have the opportunity to apply your math skills using WeBWorK. WeBWorK is an online platform used to deliver math and science problems over the Internet. It gives you instant feedback on whether or not your answers are correct, and it randomizes certain problems for a more exclusive experience. The platform was developed at the University of Rochester and is now in use at over 80 universities and colleges worldwide.

Do WeBWorK problems contribute to your grade in this course?

No. In WeBWorK, scores are automatically calculated in the problem sets, but in this course, they are used only as indicators to measure your progress. **The scores you receive in WeBWorK have no impact on your results in the course**, yet they can help you and your tutor evaluate your understanding of the content.

How do I access WeBWorK?

You can access the WeBWorK platform from the course website, through the Tools menu.

What should I do if I have difficulties with WeBWorK?

If you have **technical difficulties** (unable to login, unable to access the problems, platform is not working properly, etc.), you should contact Cégep@distance technical support at this number: 514-864-6464, ext. 4975.

If you have **mathematical difficulties** (you tried a problem a few times and don't know how to get the correct answer, even with the given solution; you think you may have found an error in a problem; etc.), you should contact your tutor. The booklet *Introduction and Instructions: Your Guide to Success* contains all the necessary instructions on how to communicate with your tutor.

Course Structure

The table below lists the different sections of the course and the associated evaluation activities.

Course Section	Brief Description	Average Duration
Module 1: Systems of Linear Equations and Introduction to 3D Geometry		**30 h**
Lesson 1: Gauss-Jordan Elimination and Applications	In this lesson, you will: ▪ Use a new technique to solve a system of equations in two or more variables. ▪ Use the characteristics of an augmented matrix to make statements about the nature of its solution(s). ▪ Solve network flow problems.	11 h
Lesson 2: Solving Linear Programming Problems	In this lesson, you will: ▪ Graph linear inequalities from their standard or general form and shade the feasible region. ▪ Determine the extreme points of a feasible region using Gauss-Jordan elimination. ▪ Solve a linear programming problem using a geometric approach. ▪ Solve a linear programming problem using the simplex method.	6 h
Lesson 3: Introduction to Vectors	In this lesson, you will: ▪ Graph an equation with three variables of degree one on a three-axis coordinate system. ▪ Graph vectors in two and three dimensions. ▪ Perform vector addition and scalar multiplication in two and three dimensions. ▪ Determine whether a vector is a linear combination of other vectors. ▪ Use linear combinations to solve applied problems.	8 h
Self-Evaluation 1		2.5 h
Assignment 1 (15%)	In this evaluation, done at home, you will apply concepts and methods learned in Module 1 to solve problems involving network flows, optimization, and line and plane geometry.	2.5 h

Course Section	Brief Description	Average Duration
Module 2: Matrix Operations and Vector Arithmetic		**25 h**
Lesson 1: Matrix Operations	In this lesson, you will: ■ Apply new techniques to solve a system of equations in two or more variables. ■ Use the characteristics of an augmented matrix to make statements about the nature of its solution(s). ■ Apply matrix operations to solving problems in graph theory.	9 h
Lesson 2: Matrix Inverses	In this lesson, you will: ■ Identify the matrix as invertible or singular and, if invertible, compute the inverse. ■ Solve matrix algebra problems using matrix algebra. ■ Translate an applied problem involving systems of linear equations into a matrix equation and, if possible, use matrix inverses to solve it.	6 h
Lesson 3: Dot Products and Applications	In this lesson, you will: ■ Compute the dot product of two vectors. ■ Use the dot product to compute the norm of a vector. ■ Compute the angle between two vectors. ■ Use the dot product and the concept of orthogonality to define the equations of lines in two dimensions and planes in three dimensions. ■ Find a vector of a proscribed norm in the direction of a given vector. ■ Compute the projection of one vector onto another. ■ Solve shortest distance problems involving lines and planes.	5 h
Self-Evaluation 2		2.5 h
Assignment 2 (15%)	In this evaluation, done at home, you will apply concepts and methods learned in Module 2 to solve problems involving dominance networks, coded messages, network flows, and spatial relationships.	2.5 h
Module 3: Determinants and Vector Operations		**24 h**
Lesson 1: Determinants: Definition and Properties	In this lesson, you will: ■ Efficiently compute the determinant of a square matrix using cofactor expansion and row reduction. ■ Interpret a determinant.	9 h
Lesson 2: Solving Systems of Linear Equations Using Determinants	In this lesson, you will: ■ Use the properties of a determinant to compute other determinants. ■ Apply Cramer's rule to solve systems of linear equations.	4 h
Lesson 3: Vector Operations	In this lesson, you will: ■ Express the equations of lines in $\mathbb{R}^2$ and $\mathbb{R}^3$ using either vector or parametric equations. ■ Express the equations of planes in $\mathbb{R}^3$ using either vector or parametric equations. ■ Use vector and parametric equations to determine the solution of a nonhomogeneous linear system. ■ Compute cross products and use their properties.	5 h

Course Section	Brief Description	Average Duration
Self-Evaluation 3		3 h
Assignment 3 (15%)	In this evaluation, done at home, you will apply concepts and methods learned in Module 3 to solve problems involving properties of the determinant and distance between objects.	3 h
Module 4: Connecting Linear Algebra and Vector Geometry		**27 h**
Lesson 1: Geometric Transformations and Eigenvectors	In this lesson, you will: ▪ Find the image of a vector under multiplication by a matrix. ▪ Find the matrices of projections and reflections in lines through the origin. ▪ Find the eigenvalues and eigenvectors of a matrix.	9 h
Lesson 2: Further Applications of Linear Systems	In this lesson, you will: ▪ Solve Markov chain problems. ▪ Solve Leontief production problems.	6 h
Lesson 3: Analyzing Data with Linear Algebra and Vector Geometry	In this lesson, you will: ▪ Calculate the covariance between two variables. ▪ Interpret covariance between two variables graphically, verbally, and numerically. ▪ Analyze and interpret a data set using principal component analysis.	6 h
Self-Evaluation 4		3 h
Assignment 4 (15%)	In this evaluation, done at home, you will apply concepts and methods learned in Module 4 to solve problems involving current and long-term trends, economic models, and relationships among data in a social science study.	3 h
Final Exam (40%)	During a three-hour proctored cumulative exam, you will apply linear algebra and vector geometry methods to solve problems involving human activity.	**3 h**
	Total duration of learning activities	109 h
	Review time	11 h
	Grand total	120 h

■ ■ ■

Quality of Language and Plagiarism

In compliance with the *Politique institutionnelle d'évaluation des apprentissages (PIEA)* in effect at Cégep@distance, marks on exams or assignments (except for Assignment 1) will be reduced by up to 10% for poor language quality (0.5% per error). Except for spelling errors, marks will be deducted for repeated mistakes.

Remember that plagiarism is strictly forbidden, and that your tutor is capable of recognizing any plagiarized elements in your assignments. We urge you, therefore, to use your own words and to cite your sources when doing your work. For more information on plagiarism, refer to the booklet *Introduction and Instructions*.

■ ■ ■

Evaluations

The evaluation components listed below are consistent with the standards and criteria laid out in the Cégep@distance *Politique institutionnelle d'évaluation des apprentissages (PIEA).*[1]

Self-Evaluations

To help you prepare for assignments, a self-evaluation is available in the Workbook at the end of each module. All you have to do is solve the problems contained in the self-evaluation, showing your work and explaining your reasoning. Your solutions must include explanations and detailed calculations. Many problems also have an element of interpretation. In these situations, answer in complete sentences with justifications based on your work. An evaluation grid is provided with each self-evaluation, and the detailed answer key is available on the course website.

Assignments

After you have finished studying the corresponding material, do your assignments at home in the booklets provided in your course package. On average, each assignment should take you between two and three hours to complete.

Reminder: Do your written assignments directly in the booklets and send them to your tutor in the prepaid envelope provided in your course package.

All assignments together count for 60% of your final grade. See below for the material covered by and ponderation for each assignment.

Assignments	Material covered by the assignment	Deliverable/ Expected results	Evaluation requirements and ponderation	Procedure
Assignment 1	Module 1	The assignment is paper-based. You must solve the proposed problems and show your complete problem-solving process, including explanations and detailed calculations. The assignment is returned to the tutor by mail.	The assignment is marked out of 100 points and worth 15% of the final grade.	The assignment is included in the course package you received by mail. When you have completed the assignment, you must return it to your tutor by mail.
Assignment 2	Module 2	The assignment is paper-based. You must solve the proposed problems and show your complete problem-solving process, including explanations and detailed calculations. The assignment is returned to the tutor by mail.	The assignment is marked out of 100 points and worth 15% of the final grade.	The assignment is included in the course package you received by mail. When you have completed the assignment, you must return it to your tutor by mail.

1.   The full text of the *PIEA* is available on the Cégep@distance website.

Assignments	Material covered by the assignment	Deliverable/ Expected results	Evaluation requirements and ponderation	Procedure
Assignment 3	Module 3	The assignment is paper-based. You must solve the proposed problems and show your complete problem-solving process, including explanations and detailed calculations. The assignment is returned to the tutor by mail.	The assignment is marked out of 100 points and worth 15% of the final grade.	The assignment is included in the course package you received by mail. When you have completed the assignment, you must return it to your tutor by mail.
Assignment 4	Module 4	The assignment is paper-based. You must solve the proposed problems and show your complete problem-solving process, including explanations and detailed calculations. The assignment is returned to the tutor by mail.	The assignment is marked out of 100 points and worth 15% of the final grade.	The assignment is included in the course package you received by mail. When you have completed the assignment, you must return it to your tutor by mail.

Summary Sheets

At the end of each lesson, you will be encouraged to create a summary containing the important concepts and methods of that lesson. These summaries will help you build a summary sheet (maximum 1 page, 2 sides) at the end of each module, which you can submit to your tutor along with the related assignment. Your tutor will not grade the summary sheet, but if you encounter any difficulties in your assignment, he or she can verify in your summary sheet whether you identified all the important elements in the module and correctly understood the relationships between them. You tutor may even add comments to help you improve your summary.

"Why should I take time to create summary sheets if they are not even graded?"

▶   To receive additional feedback.

When you submit a summary sheet to your tutor, you create an opportunity to receive additional feedback on your comprehension of the course content. If you make a mistake in your assignment, having your summary sheet can help your tutor understand the cause of that mistake and give you appropriate advice.

▶   To reduce anxiety and improve your performance.

If you diagnose your difficulties early, you will have more time to work on them. You will grow more confident in your abilities, and when the final exam comes, you will know where to put your extra study time.

▶   To save time when studying for your final exam.

The time you invest in your summary sheets throughout the course is time you will save when studying for your final exam. You can't use your summary sheets during the exam, but

they are an essential study tool. For proof of this, consider the memory aids or "cheat sheets" you created for your final exams in high school. Perhaps you spent hours building your memory aids, writing as small as you possibly could to cram as much information onto the sheet as possible, yet when it came to the exam, you may have only glanced at the sheet briefly. Building the summary sheets is an effective learning strategy.

"How do I create good summary sheets?"

▶   Start early.

At the end of each lesson, summarize it in the space provided. Do it as you go along in the course, while the content is fresh in your mind.

▶   Be clear and concise.

Summaries do not have to be written paragraphs: you can use diagrams, tables, bullet-form sentences, etc. In the Learning Resources section on the course website, the Organizing Information tab contains a useful link to a web page that presents various ways of organizing information.

▶   Get feedback.

Submit your summary sheet for each module along with the related assignment: your tutor can give you feedback if improvement is needed, and you can use the tutor's comments to work on your summarizing skills or identify potential difficulties with the content.

Final Exam

The course ends with a three-hour final exam that is held in a supervised setting in an authorized institution such as a college. You will find the instructions for how to register for this evaluation in the *Introduction and Instructions* booklet.

The exam is **cumulative** and worth **40% of your final grade**. You will be evaluated on your ability to apply methods of linear algebra and vector geometry to the study of various phenomena of human activity. More specifically, the exam will consist of solving complex problems related to social science using the concepts, properties, and methods of linear algebra and vector geometry. An evaluation grid showing the criteria and performance scale will be provided.

In summary:

Material covered	Deliverable/ Expected results	Evaluation and ponderation requirements	Procedure
Modules 1, 2, 3, 4	The three-hour proctored exam will be in paper format. You must solve the proposed problems and show your complete problem-solving process, including explanations and detailed calculations.	The final evaluation is marked out of 100 points and worth 40% of the final grade. The evaluation criteria will be provided.	Proctored exam. Scientific calculator allowed. No documentation allowed.

The results of the final evaluation will be sent to you along with your Cégep@distance transcript.

Materials allowed for the exam

▶   Scientific calculator

IMPORTANT: **All documentation, including summary sheets, is forbidden during the final exam.**

"What? But how can I pass a math exam if I'm not even allowed to have a memory aid?!"

By bringing your memory aid in your head, of course! Don't worry: if you study the course material carefully, do the learning activities and self-evaluations, complete your summary sheets and assignments conscientiously, and make sure you fully understand your tutor's comments, you should have no difficulty showing your proficiency on the final evaluation.

In addition, the Final Exam Preparation section at the end of your Workbook will help you study effectively and will suggest different techniques that can help you store information in your long-term memory.

Test anxiety

Test anxiety is a learned behaviour that blocks memory. Students with test anxiety usually need to learn strategies to help them manage their anxiety, as well as learning good test-taking strategies. Many students who have trouble taking tests wait until it is too late to get help. If you have had a pattern of test anxiety in your past, get assistance before the exam. Be proactive: ask your tutor or your Academic Adviser for help and set up a plan.

You can start by watching the video "Examination Stress" on the Cégep@distance website to receive a few test-taking tips: http://www.cegepadistance.ca/en/services/capsules.asp.

Passing grade

To receive credit for the course, you must achieve an overall grade of 60% on your assignments and the Final Exam. But remember: even if you do really well on the assignments, you still need to get at least 50% on the Final Exam. For more detailed information about the conditions for passing your course, refer to the section on evaluations in the *Introduction and Instructions* booklet.

■ ■ ■

Resources

This course is designed for you to learn independently, but this does not mean that you are left to your own devices. Cégep@distance provides you with the help and support of a tutor. This person will provide invaluable assistance if you run into any difficulty. Contact your tutor by telephone or by Internet whenever you have concerns or questions: he or she is there to provide support as you learn.

Your tutor will also grade your assignments and your final exam. He or she will make comments, provide more detailed explanations, give useful advice, and provide encouragement as you strive to successfully complete your course.

You can also go to our website for helpful information on time management, taking distance courses, stress, and doing well on evaluations. Or you can read the section on distance education principles and policies in the *Introduction and Instructions* booklet. Pay special attention to the information on pedagogical support and learning evaluation.

Facilitating Communication with Math Symbols

Discussing a math problem or explaining a mathematical concept with symbolic language can be difficult in an email. You can agree with your tutor on a method that suits both of you. There are several ways to facilitate communication when it involves a heavy use of symbolic language:

Online collaborative tools

Many free online communication tools have a "white board" on which you and your tutor can write simultaneously. A good example of this type of tool is Twiddla, which you can access without registration: www.twiddla.com.

Scans and pictures

You and your tutor can exchange solutions to problems or exercises by taking a picture of the solution on paper (with a cellphone or digital camera) or by scanning it. With appropriate software (PDF Writer, drawing software, etc.), you can even add comments or put emphasis on certain elements with colours or symbols.

Electronic tablets

If you own an electronic tablet, such as an iPad, or a Smart Board, you can use it to write solutions or add details to a solution that is already in digital format.

■ ■ ■

Course Materials

Here is the list of materials you will need for your course. Check that you have everything you need. If you have any questions, feel free to get in touch with Cégep@distance.
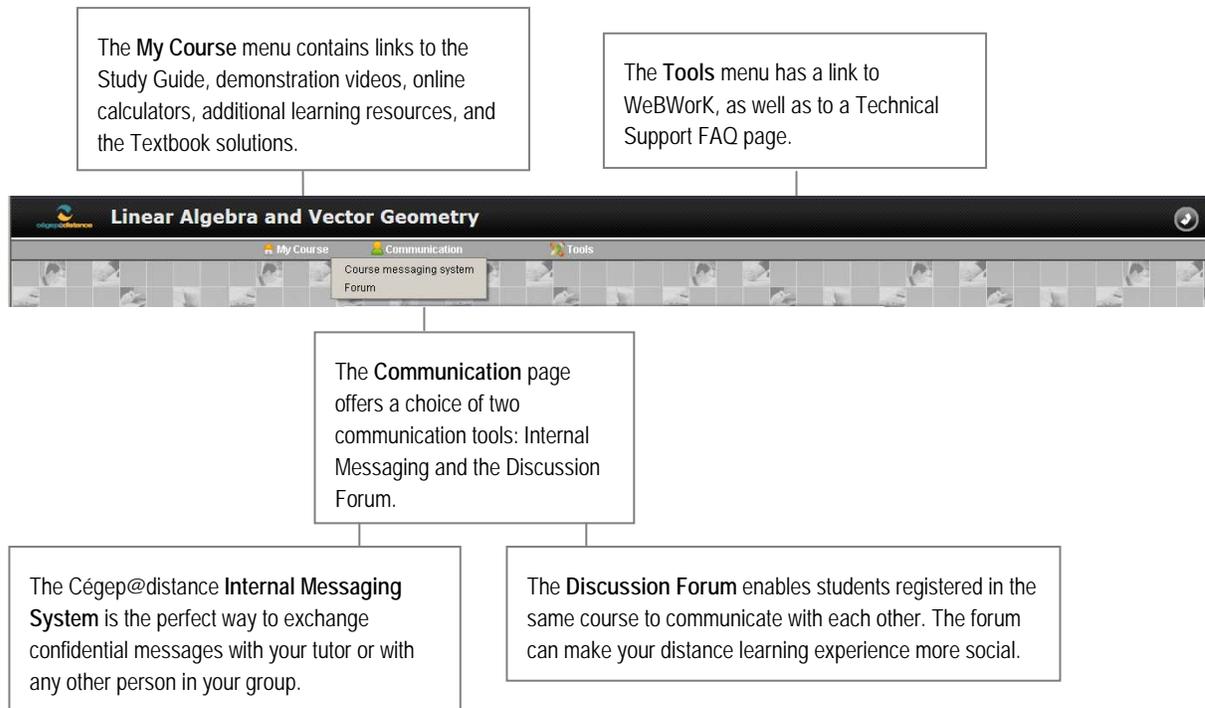
Course materials	Sent by mail	Available on the course website
Workbook Includes four modules of learning activities and four self-evaluations (one at the end of each module).	✓	
Textbook Anton, H., & Rorres, C. (2010). *Elementary Linear Algebra* (10th edition abridged). Mississauga, Canada: John Wiley & Sons.	✓	
Complete Textbook Solutions Note: Answers to the odd-numbered exercises in the Textbook are available at the end of your Textbook.		✓
Solutions to Practices and Self-Evaluations	✓	
Textbook Supplement – A Tutorial on Principal Components Analysis Smith, L I. (2002). *A tutorial on principal components analysis*. Otago, New Zealand: University of Otago.	✓	
Assignments (4) To be returned by mail to your tutor using the prepaid envelopes.	✓	
Demonstration Videos 16 short videos demonstrating important methods of linear algebra and vector geometry.		✓
WeBWorK Exercises You can access the WeBWorK platform through the Tools menu.		✓
Row Operations Calculator You can access the calculator from the Resources section of the course website.		✓

■ ■ ■

Course Website

The course website has information and resources you are sure to find useful in your studies, namely demonstration videos, online resources to improve your study skills, and access to WeBWorK and an online row operation calculator.

The following illustration provides a general description of the website's interface.

The **My Course** menu contains links to the Study Guide, demonstration videos, online calculators, additional learning resources, and the Textbook solutions.

The **Tools** menu has a link to WeBWorK, as well as to a Technical Support FAQ page.

Linear Algebra and Vector Geometry

My Course   Communication   Tools

Course messaging system
Forum

The **Communication** page offers a choice of two communication tools: Internal Messaging and the Discussion Forum.

The Cégep@distance **Internal Messaging System** is the perfect way to exchange confidential messages with your tutor or with any other person in your group.

The **Discussion Forum** enables students registered in the same course to communicate with each other. The forum can make your distance learning experience more social.

■ ■ ■

Schedule

This course requires 120 hours of work, including assignments, review, and time to take the exam. The proposed schedule covers a 16-week period with an average of 7.5 hours of work per week. Please note that you have six months to complete the course and three more months before you have to take the final evaluation. Remember to take these allotted times into account when making up your work schedule.

Here are some instructions to help you complete your schedule:

▶ Look at the blank schedule on the next page.

▶ See how many hours are required to complete the components of each module (lessons, self-evaluation, and assignment). Depending on your availability, your learning pace, and your organizational abilities, determine the date when you expect to finish each lesson of each module.

▶ Check whether your deadlines match those indicated in the *Introduction and Instructions* guide (especially regarding assignment submission and exam registration). If they don't, revise your schedule.

You can now cut out your schedule, put it up somewhere in plain sight, and use it to organize your work.

YOUR TUTOR'S NAME	
THE TUTOR'S CODE	

Course Section	Evaluation Activity	Average Duration	Suggested Schedule	Your Schedule
Module 1: Systems of Linear Equations and Introduction to 3-D Geometry		**30 h**		
Lesson 1: Gauss-Jordan Elimination and Applications		11 h	Weeks 1–2	
Lesson 2: Solving Linear Programming Problems		6 h	Weeks 2	
Lesson 3: Introduction to Vectors		8 h	Week 3	
Self-Evaluation 1		2.5 h	Week 4	
	Assignment 1 (15%)	2.5 h	Week 4	
Module 2: Matrix Operations and Vector Arithmetic		**25 h**		
Lesson 1: Matrix Operations		9 h	Weeks 5–6	
Lesson 2: Matrix Inverses		6 h	Week 6	
Lesson 3: Dot Products and Applications		5 h	Week 7	
Self-Evaluation 2		2.5 h	Week 8	
	Assignment 2 (15%)	2.5 h	Week 8	
Module 3: Determinants and Vector Operations		**24 h**		
Lesson 1: Determinants: Definition and Properties		9 h	Weeks 9–10	
Lesson 2: Solving Systems of Linear Equations Using Determinants		4 h	Week 10	
Lesson 3: Vector Operations		5 h	Week 10	
Self-Evaluation 3		3 h	Week 11	
	Assignment 3 (15%)	3 h	Week 11	

Course Section	Evaluation Activity	Average Duration	Suggested Schedule	Your Schedule
Module 4: **Connecting Linear Algebra and Vector Geometry**		27 h		
Lesson 1: Geometric Transformations and Eigenvectors		9 h	Week 12–13	
Lesson 2: Further Applications of Linear Systems		6 h	Week 13	
Lesson 3: Analyzing Data with Linear Algebra and Vector Geometry		6 h	Week 14	
Self-Evaluation 4		3 h	**Week 15**	
	Assignment 4 (15%)	3 h	**Week 15**	
Review for Final Exam		variable	**Week 16**	
	Final exam (40%)	**3 h**		

■ ■ ■

Conclusion

Now that you have read through the Study Guide, you have all the information you need to start your journey along the path of learning.

Remember to draw up a schedule that suits your learning style and to abide by it. This is a key factor for doing well in college.

Feel free to call your tutor; he or she is there to help you through every difficulty and over every roadblock.

We hope taking this course is an enjoyable and satisfying experience for you!

■ ■ ■