

**Course Number: MT 415**

**Course Title: Linear Algebra**

**Course Description:**

Studies vector spaces, linear transformations, matrices, determinants, systems of equations, Eigen values and characteristic matrices.

**Prerequisite Courses:**

MT 360A Calculus I

**Course Outcomes:**

Upon successful completion of the course, the student should be able to:

- Demonstrate the ability to communicate the concepts of linear algebra, so that you may provide the public with information and expert judgment as part of the basis for social and political decisions.
- Demonstrate an awareness of the socially beneficial uses of mathematics, as well as harmful uses of mathematics.
- Describe systems of linear equations and implement their solutions.
- Explain the concepts of vectors, vector spaces, and subspaces.
- Demonstrate the concepts of matrix operations, partitioned matrices, matrix factorization, symmetric matrices, and quadratics form.
- Demonstrate knowledge of determinants, their properties, and rank of matrices.
- Demonstrate understanding of transformations, coordinate systems and graphical interpretation of coordinates.
- Describe Eigen vectors, Eigen values, and their applications.
- Explain the concepts of orthogonal vectors, sets, and projections.

**Course Materials:**

**Required Text:**

Lay, David C., Lay, Steven R., McDonald, Judi J., (2016) *Linear algebra and its applications* (5<sup>th</sup> edition). Pearson. ISBN 0-321-98261-4

Graphing calculator with matrix capability. Calculators with the requisite capabilities include the HP48S, HP48SX, or the TI-85. Each of these may require some add-on programs to perform special operations on vectors and matrices. Generally, no instruction will be provided for the calculators. The student may use other programs such as MathCAD<sup>®</sup> or Matlab<sup>®</sup> to help in doing homework, but these programs will not be available for use on an exam.

**Supplemental:**

Lipschutz, Seymour, (1989). *3000 Solved Problems in Linear Algebra*, New York, NY: McGraw Hill Professional Publishing; ISBN: 0-07-038023-6

**Course Assignments and Activities:**

	Learning Topics	Activities	Reading Assignments	Assignments
1	Solutions of Linear Equations	Lab Exercises, Facilitated Discussions, and Lectures	Chapter 1 Sections 1 to 6	My Math Lab Week 1 Assignments in Course Compass  Weekly Quiz  Discussion Board
2	Linear Independence and Transformations	Lab Exercises, Facilitated Discussions, and Lectures	Chapter 1 Sections 7 to 10	My Math Lab Week 2 Assignments in Course Compass  Weekly Quiz  Discussion Board
3	Matrix Algebra and Applications	Lab Exercises, Facilitated Discussions, and Lectures	Chapter 2 Sections 1 to 3 and 8	My Math Lab Week 3 Assignments in Course Compass  Weekly Quiz  Discussion Board
4	Determinants	Lab Exercises, Facilitated Discussions, and Lectures	Chapter 3 Sections 1 to 3	My Math Lab Week 4 Assignments in Course Compass  Weekly Quiz  Discussion Board

5	Vector Spaces and Subspaces (Part 1)	Lab Exercises, Facilitated Discussions, and Lectures	Chapter 4 Sections 1	My Math Lab Week 5 Assignments in Course Compass  Midterm exam  Discussion Board
6	Vector Spaces and Subspaces (Part 2)	Lab Exercises, Facilitated Discussions, and Lectures	Chapter 4 Sections 2 to 5	My Math Lab Week 6 Assignments in Course Compass  Weekly Quiz  Discussion Board
7	Eigen values and Eigenvectors	Lab Exercises, Facilitated Discussions, and Lectures	Chapter 5 Sections 1 to 3	My Math Lab Week 7 Assignments in Course Compass  Weekly Quiz  Discussion Board
8	Orthogonality	Lab Exercises, Facilitated Discussions, and Lectures	Chapter 6 Sections 1 to 3	My Math Lab Week 8 Assignments in Course Compass  Discussion Board  Final Exam

**Student Evaluation Grid:**

Assignments	Weighted Percentage
Weekly Assignments	20%
Weekly Quizzes	20%
Midterm Exam	20%
Final Exam	30%
Participation	10%
TOTAL	100 %

## Participation

Because of the accelerated nature of the course, class participation is very important. Class participation/effort is important because we can all learn from each other. Your participation points can make a difference in the final grade. If the student does not participate during any given week, they will lose the participation points for that week.

Participation means:

1. Present in class every session (classroom)/Present in the forum every week (on-line)
2. Effectively respond to questions from the facilitator (classroom)/Regularly check forum and post all required assignments/discussion questions/items by the deadlines (on-line)
3. Contributes to classroom/forum discussions.

## Tutoring Information:

Occasionally students need additional assistance with course content. Tutorial assistance is available to students through SmartThinking, writing assistance and personal tutoring. SmartThinking provides every student with ten hours of free online tutoring in writing, math, statistics, economics and accounting each year. Writing assistance is available in the form of Roving Writing Tutors and a variety of writing workshops. Individual personal tutors are available in a variety of discipline areas with fees and arrangements made between the individual student and tutor. For access to these services, go [www.regis.edu](http://www.regis.edu), Current Student, Services for CPS Students, Academic Tools, Tutoring/SmartThinking.

## CC&IS Grading Scale

Letter Grade	Percentage	Grade Point
A	93 to 100	4.00
A-	90 to less than 93	3.67
B+	87 to less than 90	3.33
B	83 to less than 87	3.00
B-	80 to less than 83	2.67
C+	77 to less than 80	2.33
C	73 to less than 77	2.00
C-	70 to less than 73	1.67
D+	67 to less than 70	1.33
D	63 to less than 67	1.00
D-	60 to less than 63	.67
F	Less than 60	0

Additional information about grading can be found in the latest edition of the University Catalog, available at <http://www.regis.edu/Academics/Course%20Catalog.aspx>.

## CC&IS Policies and Procedures

Each of the following CC&IS Policies & Procedures is incorporated here by reference. Students are expected to review this information each term, and agree to the policies and procedures as identified here and specified in the latest edition of the University Catalog, available at <http://www.regis.edu/Academics/Course%20Catalog.aspx> or at the link provided.

- The CC&IS Academic Integrity Policy.
- The Student Honor Code and Student Standards of Conduct.
- Incomplete Grade Policy, Pass / No Pass Grades, Grade Reports.
- The Information Privacy policy and FERPA. For more information regarding FERPA, visit the [U.S. Department of Education](http://www.ed.gov).
- The HIPAA policies for protected health information. The complete Regis University HIPAA Privacy & Security policy can be found here: <http://www.regis.edu/About-Regis-University/University-Offices-and-Services/Auxiliary-Business/HIPAA.aspx>.
- The Human Subjects Institutional Review Board (IRB) procedures. More information about the IRB and its processes can be found here: <http://regis.edu/Academics/Academic-Grants/Proposals/Regis-Information/IRB.aspx>.

The CC&IS Policies & Procedures Syllabus Addendum summarizes additional important policies including, Diversity, Equal Access, Disability Services, and Attendance & Participation that apply to every course offered by the College of Computer & Information Sciences at Regis University. A copy of the CC&IS Policies & Procedures Syllabus Addendum can be found here: <https://in2.regis.edu/sites/ccis/policies/Repository/CCIS%20Syllabus%20Addendum.docx>.