Forman Christian College, Lahore
(A Chartered University)
Department of Mathematics

Instructor Information

Asim Nadeem
Assistant Professor

Office: S 414 (Armacost Science Building)
Email: asimnadeem@fccollege.edu.pk
Cell# 0333-8620454

Office Hours: Monday to Friday: 11:00 AM – 01:00 PM
Tuesday, Thursday: 9:00 AM – 9:30 AM, 12:15 PM – 01: 00 PM

Online Office Hours: All days: 7 PM to 9 PM (Text / WhatsApp / E-mail)

Course Information:

Spring 2023

Introductory Linear Algebra
MATH-103 A
3 credits
Prerequisite: Math 101 / A-level Mathematics or Intermediate Mathematics
Room # S- 412
Timing: Tuesday, Thursday: 09:30 ---- 10:45

Textbook

Elementary Linear Algebra 9th Edition by Howard Anton.

Resources

- Video lectures will be uploaded on YouTube.
- Lecture notes will be uploaded on Moodle.

Course Introduction

This is a general education course for Mathematics. The course provides basic skills in linear algebra and creates background knowledge for higher level of linear algebra courses. The course contents include: Introduction to system of linear equations, matrices and matrix operations, elementary matrices, Gaussian elimination, Gauss Jordan method for solving a system of linear equation, determinants and their properties, vector spaces, subspaces, linear independence, basis and dimensions.

Course Objectives

This course will help the students to:

- understand basic and several concepts of Linear Algebra.
- improve their ability to think logically and analytically.
- learn techniques for solving problems expressed in mathematical notations.
- learn the ability to present a mathematical argument verbally.
- read and understand the subject at their own.

Learning Outcomes

After successfully completing this course, the students would be able to:

- understand and describe the basic concepts, definitions and terminologies of Linear Algebra.
- solve a linear system using Gaussian-elimination and Gaussian-Jordan elimination method.
- perform the arithmetic operations (properties) of matrices i.e. Addition, subtraction, multiplication, scalar multiplication, also transposes, trace and inverse of a square matrix.
- use various methods to find the inverse of a square matrix and properties of inverses.
- evaluate determinants using row reduction and other properties.
- use Cramer's rule and inverse matrix method to solve a linear system.
- apply the axioms of real vector spaces and subspaces.
- prepare themselves for higher level courses in mathematics.

Course Requirements:

- Students are expected to attend every class. Students must arrive at class on time, should remain in class for the entire class period and mobile phone should be switched off or on silence. Note that there is 5 marks for attendance, behavior and class participation. If a student arrives more than 10 minutes late or leave class during lecture or use mobile in class, he/she will be marked absent.
- Course assessment will be through **quizzes; attendance, behavior and class participation; assignments; midterm and final exam**.
- Quizzes, Mid-term exam and final exam will be conducted on campus for both even and odd ID students. Assignments will be conducted on Moodle. There is **no make up** for the missed quizzes and assignments. Make up for quizzes, midterm and final exam is possible only under extremes cases if a student provides strong documentary evidence. In case of make-up exam there will be a 0-20% deduction in marks depending upon case to case basis.
- Academic dishonesty or cheating will result in zero points (grade F) and will be referred to AIC (Academic Integrity Committee) at FCC for necessary action.

Grades	Quality Points	Numerical Value	Meaning
A	4.00	93-100	Superior
A-	3.70	90-92	
B+	3.30	87-89	
B	3.00	83-86	Good
B-	2.70	80-82	Fair
C+	2.30	77-79	
C	2.00	73-76	Satisfactory
C-	1.70	70-72	
D+	1.30	67-69	
D	1.00	60-66	Passing
F	0.00	59 or below	Failing

Course Evaluation:

Grading will be based on following criteria:

Quizzes	15 %
Homework	10%
Attendance, behavior and class participation	05%
Midterm	30%
Final	40%

Lesson Plans

Week	Topics	ASSESSMENTS
1	**Discussion of Course Plan:** Course introduction, requirements, policies and grading criteria, Matrices and matrix operations.	
2	Rules of matrix arithmetic. Inverses.	
3	System of linear equations and matrices.	
4	Gaussian Elimination.	QUIZ-1
5	Gauss Jordan elimination.	
6	Elementary matrices and a method of finding A^{-1}.	HW-1, Quiz -2
7	Further results on system of equations and invertibility.	
8	Diagonal, triangular and symmetric matrices. Application of linear system.	Midterm
9	Determinants by cofactors expansion	
10	Evaluating Determinants by row reduction	Quiz -3
11	Properties of determinant function. A combinatorial approach to determinants.	
12	Real vector spaces	
13	Subspaces, Linear Independence	QUIZ-4
14	Basis of vector spaces	HW-2
15	Dimension of vector spaces	