FORMAN CHRISTIAN COLLEGE, LAHORE

(A Chartered University)

Course Outline for Fall 2021

Instructor Information:

Dr Faira Kanwal Janjua
Assistant Professor
Office: S 110 (Armacost Science Building)
fairajanjua@fccollege.edu.pk

Office Hours And Online Office hours:

DAYS	Office hours
MWF	9:00am-9:50am 11:00am-11:50am
T,R	11:00am-12:00pm

Zoom ID:993 235 9744

(For online office hours students need to join the zoom link is given above)

Course Information:

Elementary Linear Algebra(Online)
MATH-103B
Class Timings: MWF 8:00-8:50
Credits:3 credits
Room#:S412
Prerequisite: None
Prerequisite: Math 101 / A-level Mathematics or Intermediate Mathematics
TextBook: Elementary Linear Algebra 9th Edition by Howard Anton.

Resources:

Video lectures and notes will be uploaded on Moodle weekly.

Course Introduction:

This course will help the students to understand basic concepts of Linear Algebra. In this course solution of homogeneous and non -homogeneous system of equations will be addressed. Matrices will be reduced to Echelon and reduced echelon form. This course provides basis for evaluating the determinants, use of determinants in solving system of equations and properties of determinant. In this course foundational knowledge of vector space, subspace and dimensions is provided which will be used in other courses. Contents of the course are 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.

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,scalarmultiplication,alsotransposes,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. I will follow the university's attendance policy especially the rule that student whose attendance is less than 67% won't be allowed to take the final exam. **In case if the university switch to online teaching due to Covid than online zoom sessions will be conducted(**Viva for the final exam will be of importance in case of open book exam)

Students must arrive at class on time. Student should remain in class for the entire class period and Mobile phone should be switched off or on silence. Course assessment will be through quizzes, assignment, attendance and behavior, midterm, and final exam. Students should make every effort to submit (online) assignments on time to assure timely assessment.

There is no make up for missed quizzes. Make up for midterm and final exam is possible only under extremes cases if student provide strong documentary evidence. In case of make up exam there will be a 0-20% deduction in marks depending upon case to case basis. Medical Certificate will be acceptable if it is verified by the medical officer of FCC.

Course Evaluation:

Grading will be based on following criteria:

Grading will be based on following criteria:

Class participation and behavior	5%

Assignment	10%
Quizzes (4 and **best 3** will be counted)	15%
Mid Term	30%
Final Exam	40%

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	Satisfactor
C-	1.70	70-72	
D+	1.30	67-69	
D	1.00	60-66	Passing
F	0.00	59 or below	Failing

\

Course Outline:

Week	Topics	Assessment
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.	QUIZ-1
4	Gaussian Elimination.	
5	Gauss Jordan elimination.	
6	Elementary matrices and a method of finding A^{-1}.	QUIZ-2
7	Applications of system of linear equations	
8	Further results on system of equations and invertibility.	**MID-TERM**
9	Diagonal, triangular and symmetric matrices. Application of linear system.	
10	Determinants by cofactors expansion	
11	Evaluating Determinants by row reduction	
12	Properties of determinant function. A combinatorial approach to determinants.	QUIZ-3
13	Real vector spaces	
14	Subspaces	
15	Linear Independence, Basis and Dimension	QUIZ-4