University of Kerala

Descipline	Mathematics				
Cours Code	UK2DSCMAT109				
Course Title	Matrices and Linear Equations				
Type of Course	DSC				
Semester	II				
Academic Level	100-199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical	Total Hours per week
	4	4	-	-	4
Pre-requisites	Matrices				
Course Summary	This is a brief introductory course on matrices and system of linear equations				

Detailed Syllabus

Module	Unit	Contents	Hrs
I	**Matrices**		**10**
	1	Introduction to System of Linear equations, (Matrices and Matrix Operations, Inverses; Algebraic Properties of Matrices- review only). Elementary matrices and method for finding inverse, more on linear systems and invertible matrices, diagonal, triangular and symmetric matrices	
	Chapter 1: Section 1.1, 1.3 to 1.7 of the Text[1]		
II	**Determinanats**		**12**
	2	Determinants by cofactor expansion, evaluating determinants by row reduction, properties of determinants, Cramer's rule	
	Chapter 2: Sections 2.1, 2.2 and 2.3 of Text [1]		
III	**Systems of linear equations**		**12**

Module	Unit	Contents	Hrs
	3	Linear Systems of Equations, Gauss Elimination, Linear Independence, Rank of a Matrix. *(Sections 7.2, 7.4 of Text [2] (avoid vector space))*	
	4	Solutions of Linear Systems: Existence, Uniqueness *(Chapter 7 Section 7.5 of Text [2] (omit proofs of theorems))*	
IV	**Eigen values and Eigen vectors**		**14**
	5	The Matrix Eigenvalue Problem. Determining Eigenvalues and Eigenvectors *(Chapter 8 Section 8.1 of Text [2])*	
	6	Symmetric, Skew-Symmetric, and Orthogonal Matrices *(Chapter 8 Section 8.3 of Text [2])*	
	7	Diagonalization *(Chapter 8 Section 8.4 of Text [2] except eigen bases)*	
V	**Suggestions for teacher designed module**		**12**
	For internal assessment examinations only.		
	8	Matrix transformations Orthogonality Geometry of linear systems Orthogonal Matrices Quadratic Forms	
	These topics can be found on Chapters 1 and 3 of Text [1] and Chapter 8 of Text [2]		

Textbook

1. H Anton, C Rorres, Elementary linear algebra, 11th Edition, John Wiley & Sons, 2013.

2. Erwin Kreyszig, *Advanced Engineering Mathematics*, Wiley Publishers, 10^{th} Edition, 2018.

References

1. David Poole, Linear Algebra, a modern introduction, Brooks/Cole Cengage learning, 2005.

2. Lee W.Johnson, R. Deanriess, Jimmy Arnold, Introduction to Linear Algebra, Fifth edition, Addison Wisely, 2019.

Course Outcomes

CO No.	Upon completion of the course the graduate will be able to	PO/PSO	Cognitive Level	Knowledge Category	Lecture(L) Tutorial (T)	Assignment (As)
CO 1	Understands system of linear equations	PSO1,2, PO1	U	F,C	L,T	
CO 2	Perform various operations on matrices and determinants	PSO2, PO3, 4	An	F	L,T	
CO 3	Understand the concept of vectors in Euclidean spaces	PSO1,3, PO2, 3	U,An	C	L,T	
CO 4	Apply matrices to soleve system of linear equations	PSO1,3	Ap	C	L,T	

(R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create)
(F-Factual, C-Conceptual, P-Procedural, M-Metacognitive)

Mapping of CO with PSOs and POs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	2	1					3							
CO2		2							1	3				
CO3	2		3					2	2					

(- -Nill, 1-Slightly/Low, 2-Moderate/Medium, 3-Substantial/High)

Assessment Rubrics

- Quiz/Assignment/Discussion/Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

Mapping of COs to Assessment Rubrics

	Internal Examination	Assignment	Project Evaluation	End Semester Exam
CO1		✓		✓
CO2		✓		✓
CO3	✓			✓
CO4	✓			✓