

Course Code	PEU4302					
Level	04					
Course Title	Linear Algebra					
Credit Value	3					
Core/Optional	Core					
Prerequisites	PEU3202(Pass / Valid OCAM/CR)					
Hourly Breakdown	Theory		Practical hours	Independent Learning	Assessments	Total hours
	25*2 = 50 hrs	DS hours 4*3 =12hrs	-	25*3=75 hours Online learning -5 Recommended readings -6	CA- 2 hours	150 hours
Course Aim/s	To introduce the most important and applicable basic idea of Linear Algebra, necessary for undergraduate level except the lessons of Vector Spaces.					
Programme Learning Outcomes (PLO) addressed by course	<p>PLO1: Knowledge: Explain the fundamental, principles and broader knowledge pertaining to the chosen science disciplines offered for the degree.</p> <p>PLO3: Communication: Demonstrate the competency in communicating efficiently and effectively to present information, ideas and concepts to the scientific community as well as to the wider society.</p> <p>PLO5: Creativity and Problem Solving: Identify and analyze problems using quantitative and/or qualitative approaches using scientific methodology to provide valid conclusions.</p> <p>PLO9: Lifelong Learning: Develop the capacity to foresee new trends and their impacts and continuously update knowledge and develop skills willingly to meet those future challenges.-</p>					
Course Learning Outcomes (CLO)	<p>At the completion of this course student will be able to</p> <p>CLO1: Define some types of real and complex matrices and recognize its arithmetic properties. (PLO1).</p> <p>CLO2: Apply the basic arithmetic operations on matrices, defining adjoint, inversion, rank and determinants using technology where appropriate; (PLO1)</p> <p>CLO3: Solve systems of linear equations using multiple methods, including Gaussian elimination, LU decomposition and matrix inversion. (PLO1,3,5,9)</p> <p>CLO4: Determine the eigenvalues and eigenvectors of a square matrix using the characteristic polynomial and how to diagonalize a matrix when it is possible; (PLO1,3,5,9)</p> <p>CLO5: Convert a quadratic form into canonical form by orthogonal transformations and by Lagrange's reduction. (PLO1,3,5,9)</p> <p>CLO6: Determine positive and negative definiteness, nature, index and signature of quadratic forms. (PLO1,5)</p> <p>CLO7: Define mappings, linear mappings and trace. (PLO1,5)</p>					
Content (Main topics, Sub topics)	Linear simultaneous equations and their solutions, Gauss Jordan reduction, Matrix Operations, Special Matrices, Elementary Transformations, Elementary Matrices, Echelon form of a matrix, Minors, Co-factors and Adjoin of a matrix, Inverse of a matrix, Determinants, Rank of a matrix, Normal form, Cramer 's Rule, Cayley-Hamilton Theorem, Application on Matrix Theory to Linear Equations, Systems of Linear non Homogeneous equations, Eigen values and Eigen vectors, Mapping, linear mapping and trace, Diagonalization, Quadratic Form, Transformation of Quadratic form to Canonical form, LU –Decomposition, LU-Decomposition from Gaussian Elimination, Complex Matrices: Hermitian, Skew-Hermitian, Unitary matrices					
Teaching – Learning methods	<p>Self-Learning/independent learning of Self-study</p> <ul style="list-style-type: none"> ▪ Instructional Material (IL) ▪ Online Activities (OL) ▪ Reference Work (RF) <p>Compulsory contact sessions</p> <ul style="list-style-type: none"> ▪ Assessments (AS) and Feedback-MCQs(MCQ); Structured Essay (SEQ); Essay Questions (ES); <p>Non-compulsory contact sessions</p> <ul style="list-style-type: none"> ▪ Day Schools (DS) 					
Assessments Strategy:	Overall Continuous Assessment Mark (OCAM): 40%		Final Assessment (FA): 60%			
	Details: Continuous Assessment1 (CAT1):- 1hr Continuous Assessment2 (CAT2):- 1hr OCAM=60% Maximum(CAT1, CAT2)+ 40% Minimum(CAT1, CAT2)		Final Evaluation-Theory: 100 %-2hrs:			
Recommended Readings	<ul style="list-style-type: none"> • Strang, G (2016). <i>Introduction to Linear Algebra (5th Edition)</i>. Wellesley-cambridge press. • Lay, D (2015). <i>Linear Algebra and its applications (5th Edition)</i>. Pearson Education. • Lipschutz, S (1974). <i>Theory and problems of Linear Algebra (1st Edition)</i>. McGraw-Hill Inc. 					