Course Code: 1BMAEE201

Course: Applied Mathematics-II Electrical and Electronics Engineering

Credits: 4
L:T:P:S: 3:2:0
SEE: 50% Marks
CIE: 50% Marks
SEE Hours: 3 Hrs
Max. Marks: 100

Prerequisites if any	None
Learning objectives	The goal of the course **(1BMAEE201)** is to 1. **Develop** the knowledge of Linear Algebra to solve the system of equations. 2. **Understand** the geometry of linear transformations and its applications. 3. **Analyze** EEE problems applying ODE using Laplace Transforms.

Course Outcomes:
On the successful completion of the course, the student will be able to

	Course Outcomes	Bloom's level
CO1	Apply the concepts of vector spaces, discuss linear transformations and construct orthonormal basis.	Understand, Apply, Analyze
CO2	Apply diagonalization and singular value decomposition in dimensionality reduction.	
CO3	Apply the concepts of Laplace transforms to solve the ordinary differential equations.	
CO4	Develop familiarity with modern mathematical tools namely SCILAB/PYTHON/MATLAB and *stimulates creative problem solving through experiential learning.*	

Mapping with POs and PSOs:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11		PSO1	PSO2	PSO3
CO1	3	3	3	2	-	-	-	-	-	-	2		3	2	-
CO2	3	3	3	3	-	-	-	-	-	-	2		3	2	-
CO3	3	3	3	3	-	-	-	-	-	-	2		3	2	-
CO4	3	2	-	-	3	-	-	-	-	-	2		3	-	-

Strong: 3 Medium: 2 Low: 1

Course Content

		No. of Lecture Hours	No. of Tutorial Hours	Self-Learning Hours
	Module – I Linear Algebra-I			
1.1	Vector Spaces, The Nullspace.	2	1	
1.2	Solving AX=0 and RX=0, the Complete Solution to AX=b.	2	1	
1.3	Independence, Basis and Dimension.	2		
1.4	Dimension of four Fundamental Subspaces.	2		
	Module – II Linear Algebra-II			
2.1	Linear Transformations.	2	1	
2.2	The Matrix of Linear Transformations.	2	1	
2.3	Orthogonality of the four Subspaces.	1		
2.4	Orthonormal Bases, Projections.	1	1	
2.5	Gram-Schmidt Method.	2		
	Module –III Linear Algebra-III			
3.1	Determinants and some of its properties, Introduction to eigenvalues and eigenvectors.	2		
3.2	Diagonalization of a Matrix.	2	1	
3.3	Complex matrices-Hermitian and Unitary Matrices.	2	1	
3.4	Triangular form with Unitary matrices.	2		
	Module –IV Linear Algebra-IV			
4.1	Similarity transformations.	2	1	
4.2	Singular value decomposition.	2		
4.3	Least square solutions.	2		
4.4	PCA.	2	1	
	Module –V Laplace Transforms			
5.1	Laplace transform (LT): Definition and Formulae of Laplace Transform, LT of elementary functions.	1		
5.2	Properties– linearity, scaling, shifting property, differentiation in the s domain, division by t.	1		
5.3	LT of periodic functions, Heaviside Unit step function.	2	1	
5.4	Inverse Laplace Transform: Definition, properties, evaluation using completing square method, partial fractions method.	2		
5.5	Convolution theorem (without proof)-problems.	1	1	
5.6	Solving ordinary differential equation of higher order using Laplace transforms.	1	1	
	Total No. of Lecture Hours	40		
	Total No. of Tutorial Hours		12	
	Total No. of Self learning Hours			0

Textbooks:

1. **B.S.Grewal**: "Higher Engineering Mathematics", Khanna publishers, 44th Ed., 2021.
2. **E.Kreyszig**:"Advanced Engineering Mathematics", John Wiley & Sons, 10th Ed., 2018.

Reference Books:

1. **B .V. Ramana:** "Higher Engineering Mathematics" McGraw-Hill Education, 11th Ed.
2. **Gilbert Strang:** "Linear Algebra and its Applications" CENGAGE, 4th Ed.

Online Resources:

1. https://www.youtube.com/watch?v=ixDGaEqWuA0
2. https://www.youtube.com/results?search_query=nptel+linear+algebra