Table 1: Course objectives and Outcomes

Course Objectives
1. To introduce concepts and fundamentals Matrix algebra for engineering problems
2. To introduce concepts of Linear and Non-linear programming problems of optimization and its applications.
3. To enhance the skills to expand Fourier series for periodic functions with various period.
4. To familiarize with the concepts of probability distributions with its applications in engineering and science.
5. To introduce concepts of Linear and Non-linear programming problems of optimization and its applications.
6. To familiarize with the concepts of probability distributions with its applications in engineering and science.
Course Outcomes
1. Apply the concepts of eigen values and eigenvectors in engineering problems.
2. Solve Linear and Non-Linear Programming Problems for optimization of engineering problems.
3. Analyze modular arithmetic for security applications.
4. Expand the periodic function by using the Fourier series for real-life problems and complex engineering problems.
5. Apply the concept of Correlation and Regression to the engineering problems in data science, machine learning, and AI.
6. Apply the concept of probability distribution to engineering problems, mostly used in varied applications in engineering and science.

Table 2: Detail Syllabus Modules for IAE-I

Module No.	Content/ Sub Modules	CO	No of Hrs in Syllabus	Marks Weightage	% of Syllabus	Marks Range (Including Options) [20-32]
1	**Linear Algebra (Theory of Matrices)**	1	5	45	19	09-14
	1.Characteristic Equation, Eigenvalues and Eigenvectors, and properties (without proof) 2.Cayley-Hamilton Theorem (without proof), verification and reduction of higher degree polynomials. 3.Similarity of matrices, diagonalizable and non-diagonalizable matrices					
2	**Linear and Non-Linear Programming Problems**	2	5	45	19	09-14
	1.Types of solutions, Standard and Canonical of LPP, Basic and Feasible solutions, slack variables, surplus variables, Simplex method. 2.NLPP with one and two equality constraint (two or three variables) using the method of Lagrange's multipliers					
4	**Fourier Series**	4	1	10	04	02-04
	1.Dirichlet's conditions, Fourier series of periodic function with period 2π and 2l.					

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