SPIT : Linear Algebra Jan–Apr 2022

(SEComp / SEIT)

Syllabus for Linear Algebra

(Theory Component)

Prerequisites :

Basic concepts of set theory, Number systems, Elementary algebra of sets of natural numbers, integers, rational numbers, real and complex numbers. Fields and Examples.

Topics :

No.	Topics	Hrs.
1.	**Systems of linear equations** Gauss elimination process, Pivot elements, Elementary row operations, Eliminating variables, Solutions space of a homogeneous system. Row-equivalent systems, Description of the solution set of a system (particular + homogeneous), Gauss-Jordan method.	**6 hrs**
2.	**Vectors and Matrices** Sum and dot product of vectors in n-space, scalar multiplication. Matrix operations – Sums, Scalar multiplication and Matrix multiplication. Properties, Invertible matrices, Examples. Coefficient and Augmented matrix of a system of linear equations. Elementary row operations on matrices, row-equivalence on matrices, Echelon and reduced echelon forms. Elementary matrices.	**8 hrs**
3.	**Vector spaces** Definition and Examples, Subspaces, Examples. Generating systems and Linear Independence, Examples Bases and Dimension Dimension of solution space of system of homogeneous liner equations.	**6 hrs**
4.	**Linear maps** Definition and Examples, Homomorphisms and Isomorphisms, Examples. Rank space and Null space, Rank-Nullity theorem. Representing linear maps with matrices and Linear maps defined by matrices. Rank of matrices.	**8 hrs**