

課程名稱：線性代數

開課年級：二年級

學分數：6 學分

課程內容：

1. **Vector Spaces:** Subspaces, Linear Combinations, Linear Independence, Bases, Dimensions.
2. **Linear Transformations:** Matrix Representation, Range, Rank, Kernel, Nullity, Invertibility and Isomorphisms, the Change of Coordinate Matrix.
3. **Linear systems:** Solve Linear Systems, Elementary Operations, Elementary Matrices, Solution Set of (Homogeneous or Non-homogeneous System), Rank of Matrices, Matrix Inverses, Systems of Linear Equations(theoretical and computational aspects).
4. **Determinant:** calculation and theory
5. **Diagonalization :** Characteristic Polynomial, Eigenvalue, Eigenvectors, Eigenspace, Invariant Subspace, Cayley-Hamilton Theorem.
6. **Jordan Canonical Forms:** Generalized Eigenspaces, Jordan Canonical Forms, Minimal Polynomials.
7. **Orthogonality:** Inner Product Spaces, Gram-Schmidt Process, Adjoint of Linear Operator, Normal and Self-Adjoint Operators, Unitary and Orthogonal Operators.