科目：**矩陣理論(Matrix Analysis)**

參考書：1. Horn, R. A. and Johnson, C. A. : Matrix Analysis, Cambridge University Press, New York, 1990.

2. Strang, G. : Linear Algebra and Its Applications, 3rd ed., Harcourt Brace Jovanovich Inc., 1988.

開設課程：數年開一次
矩陣理論、應用數學特論

Topics :

1. Relations : similarity, diagonalizable, unitary equivalence, unitarily diagonalizable, congruence, Sylvester's law of inertia.

2. Canonical Forms : Jordan and rational canonical forms, Shur normal form, polar and singular value decompositions, LU, QR, and Cholesky factorizations.

3. Matrix Norms : Frobenius norm, maximum column (row) sum norm, spectral norm, spectral radius, convergence of matrices.

4. Location of Eigenvalues : Gerschgorin disk theorem, diagonally dominant matrices, perturbation of eigenvalues.

5. Hermitian Matrices : spectral theorem, Rayleigh quotient principle, Courant-Fischer minmax theorem, Weyl's theorem, Cauchy interlace theorem, majorization of eigenvalues.

6. Positive Definite Matrices : quadratic forms, principal minors, eigenvalues, pivots, positive semi definite ordering.

7. Nonnegative Matrices : induced partial ordering, Perron's theorem, Frobenius theorem.