	Matrices		Operators	
	Real	**Complex**	**Finite space** (All linear operators are bounded)	**Infinite Dimensions** (Not possible to use Matrices)
Symmetric	$A = A^T$ (is Normal)	$B = B^T$ BUT B might not be Normal	$\equiv$ Self Adjoint	$\langle Au \vert v\rangle = \langle u \vert Av\rangle$ Unbounded
Anti-symmetric / skew symmetric (All Normal)	$A = -A^T$			
Self Adjoint	$\equiv$ Symmetric	$\equiv$ Hermitian	$\langle Au \vert v\rangle = \langle u \vert Av\rangle$ (cf: Adjoint) $A = A^\dagger$ OR $A = A^*$ (Real symmetric matrices represent Self-Adjoint operators)	(For the course, assume bounded in Hilbert space?) Does that mean we stay in finite Hilbert space?
Hermitian (All Normal)	N/A (Symmetric)	Is Symmetric AND complex, AND $A = A^\dagger$	self Adjoint AND satisfying boundary conditions	
Anti-Hermitan (All Normal)		$A = -A^\dagger$		
Adjoint	N/A	$A^\dagger = (A^T)^*$	$\langle u \vert \mathcal{L}u\rangle = \langle \overline{\bar{\mathcal{L}}u \vert u}\rangle$ $\langle f \vert g\rangle = \langle g \vert f\rangle^*$ OR $\langle f \vert Tg\rangle = \langle T^* f \vert g\rangle$	(For the course, assume bounded in Hilbert space?)
Unitary (All Normal)	$U^{-1} = U^T$ (Real U's are orthogonal)	$U^{-1} = U^\dagger$		
Conjugate	N/A	$A^* = a_{ij}^*$	Hermitian Conjugate $\equiv$ Self Adjoint	
Conjugate Transpose	A^T	$A^\dagger = (A^T)^*$		

Key: conjugate(A)= A^* ; transpose(A)= A^T ; conjugate transpose(A)= $A^\dagger$

- Matrix is normal if $[B, B^*]$ =0, ie $B, B^* commute$