Proof: Suppose $A = PDP^{-1} = PDP^T$ is orthogonally diagonizable

Then $A^T = (PDP^{-1})^T = (PDP^T)^T$

$= (P^T)^T D^T P^T$

$= PDP^T$ ($\because$ D is diagonal matrix)

$= A$

$\Rightarrow A^T = A \Rightarrow$ A is symmetric