The neighborhood polynomial of graph $G$ is the generating function for the number of vertex subsets of $G$ of which the vertices have a common neighbor in $G$. In this talk, we investigate the behavior of this polynomial under several graph operations. Specifically, we provide an explicit formula for the neighborhood polynomial of the graph obtained from a given graph $G$ by vertex attachment. We use this result to propose a recursive algorithm for the calculation of the neighborhood polynomial. Finally, we prove that the neighborhood polynomial can be found in polynomial-time in the class of $k$-degenerate graphs.

**Keywords:** Neighborhood Polynomial, Graph Operations, Graph Degeneracy.

**AMS Subject Classification:** 05C31, 05C76.