Offshore wind turbines (OWTs) are increasingly favored in Asia for their higher wind speeds and reduced land use, but they face significant environmental challenges, including dynamic forces and hazardous conditions. This study introduces a comprehensive analytical model of monopile-supported offshore wind turbines (MSWT), accounting for non-uniform geometry, fluid-soil-structure interaction, and rotor nacelle assembly modeled as a rigid body. The tower and monopile are modeled using Euler-Bernoulli beam theory, and the force-displacement relationship is established using the Spectral Element Method (SEM). A simplified single-degree-of-freedom (SDOF) system is developed, and the vibration reduction is examined using tuned mass dampers (TMDs) and novel dynamic vibration absorbers (DVAs), with both analytical and experimental studies. Parametric analyses reveal that conicity and foundation flexibility significantly impact the system's natural frequency, and the strategic placement of TMDs can create stop bands across the frequency spectrum, enhancing vibration attenuation.