This research investigates photoionization modeling of the Narrow Line Region of Seyfert galaxies and Low-Ionization Nuclear Emitting Region (LINER) galaxies with the use of CLOUDY. Past research has shown that a correlation exists between αuv and αx, and by constraining αuv as a function of αx we develop a model for the ionizing spectrum of a typical Seyfert Narrow Line Region. To check the validity of this model, simulations were run across blackbody temperatures ranging from 10­­4 K to 107 K varying hydrogen density, photon flux, and elemental abundance. The emission lines produced by these simulations were plotting using standard diagnostic diagrams and compared to galactic data obtained from the Sloan Digital Sky Survey. We confirm We also examine the ability of this code to model the emission spectra of LINER galaxies, as debate still continues over the primary excitation mechanism of LINERs.