In this study, it was aimed to developing the fabrics that can manage moisture depending on temperature change. For this aim, poly (2 hydroxyethyl-6- (vinyl amino) hexanoate) polymer having lower critical solution temperature close to the human body temperature was applied to the cotton fabric using pad-dry-cure. The morphology of the treated fabric was examined by Scanning Electron Microscope (SEM), while the presence of the polymer in the fabric structure was investigated chemically by Fourier Transform Infrared (FT-IR) spectroscopy analysis. To determine thermo-responsible property of the fabric depending on the change in temperature, the hydrophilic or hydrophobic behaviors of the treated fabric in the water at temperatures above and below the lower critical solution temperature was investigated. Moreover, wetting time of the fabric at different temperatures was determined. The analysis results were indicated that the hydrophilic character of the treated fabric transformed to hydrophobic character due to the increase in temperature. The wetting time of the fabric increased from 3.4 seconds to 31 seconds with the temperature rising from 20 °C to 40 °C. As a result the fabric treated with poly (2 hydroxyethyl-6- (vinyl amino) hexanoate) polymer exhibited thermo-responsive behavior.