In this thesis, we are concerned with the modifications of the stochastic processes and the random probability measures. First chapter is devoted to modifications of the stochastic process to the space of continuous functions, modifications of submartingale to the set of right-continuous with finite left-hand limits functions and separable modifications of stochastic process. In the second chapter is the attention on the regularization of random probability measure in Markov kernel focused. In particular, we work with random probability measures on the Borel subset of the Polish space, or Radon separable topological space.