Fixed interval scheduling problems have wide range of practical use in production planning, transportation, in hospitals or in schools when planning timetables. When solving these problems we often encounter requirement of integrality of solutions. Ignoring this condition is often not possible. In this thesis we propose some formulations of scheduling problems and their stochastic extensions. We also propose a new formulation of stochastic FIS problem, for which integrality of solution is byproduct of its definition. We present Gâteaux derivative and its relationship to stability of optimal value function of stochastic optimization problems under the influence of contamination. We propose a new theorem on the stability of such functions for fixed interval scheduling problems.