

## ABSTRACT

This thesis reflects some tremendous benefits of soft set theory under different uncertain environments (fuzzy, intuitionistic fuzzy, interval type-2 fuzzy, linguistic, complex fuzzy, complex neutrosophic, etc.). It is a combination of total ten chapters where, *Chapter 1* is basically the introductory part of the thesis containing some elementary concepts, literature survey and some motivations and objectives behind this research work. *Chapter 2* and *Chapter 3* are related with fuzzy soft set theory where, *Chapter 2* deals with group decision-making problems based on fuzzy soft sets and *Chapter 3* deals with some algebraic properties of classical group theory based on fuzzy soft sets. In *Chapter 4*, we have developed a decision-making approach through soft set theory under linguistic environment by using linguistic scale function. In this Chapter, a new similarity measure for linguistic valued sets has also been introduced via linguistic scale function. After that, in *Chapter 5*, we have proposed a new generalization of soft set theory named as, generalized trapezoidal intuitionistic fuzzy soft set where, every parameter is in generalized trapezoidal intuitionistic fuzzy sense. Further, we have applied our proposed soft set theory in analyzing the diabetic patient in medical science. In *Chapter 6*, we have dealt with stochastic multi-criteria decision-making through soft set theory. In this regard, a new concept of trapezoidal interval type-2 fuzzy soft stochastic set has been introduced and discussed. *Chapter 7* deals with complex fuzzy soft sets where, similarity measure approach and aggregation operator have been studied under complex fuzzy soft environment. Moreover, in this chapter, a decision-making methodology has been employed for solving problems through complex fuzzy soft sets. In *Chapter 8*, we have worked on complex neutrosophic soft sets to deal with real-life problems having complex valued truth membership, complex valued indeterminate membership and complex valued false membership. Finally, summary and further research work related to this proposed thesis have been concluded in *Chapter 9*. *Chapter 10* contains some references which have helped to complete this research work.