INTRODUCTION

Since 1965, the year in which Lotfi A. Zadeh published his new classical paper, fuzzy set theory has received more and more attention from researchers in a wide range of scientific areas. Fuzzy systems are being studied from various angles.

In 1971, the year in which Azriel Rosenfeld published his paper on fuzzy groups. In this paper he introduced the concept of fuzzy subgroups. This work was the first fuzzification of any algebraic structure and thus opened a new direction, new explorations, new path of thinking to mathematicians, engineers, computer scientists, social scientists, physicists, chemists, and many others. Since then a lot of important discrete structures have been fuzzified by many researchers in various ways of various sets. It is true that not all these fuzzifications of algebraic structures will be nice tools for application areas in due time. Thus the fuzzy systems embrace the whole field of imprecisely described systems almost in all areas.

In this work we have discussed the concept of fuzzy ideals and fuzzy bi-ideals in semigroups. The word fuzzy ideal was also used by Azriel Rosenfeld. But it stands for different concept. We have introduced the concept of "Ternary Fuzzy Semigroups". Which generalize the concept of ternary semigroups.

This dissertation consists of two chapters. In Chapter One, the concept of fuzzy set is given. It is an essentially a collection of basic concepts from fuzzy set theory. In this chapter, the elementary results from fuzzy set theory and fuzzy subgroups are stated, which are used in the subsequent part of the dissertation. We have supplied the proofs of some important results. At times these proofs are mostly of our own and are different from those which are available in the literature.

The Chapter Two constitute the main body of the dissertation. We have discussed fuzzy semigroups, fuzzy ideals, and fuzzy bi-ideals in semigroups. Different examples and counter examples constructed by us are given in the present chapter. Lattice diagrams are provided for fuzzy ideals, fuzzy bi-ideals of semigroups

and ternary fuzzy semigroups. Tables for ternary operations are furnished. We have introduced the concept of ternary fuzzy semigroups and properties of ternary fuzzy semigroups are obtained.