FMCE 606 Fuzzy and Rough Set Theory (3-1-0)

Module-I (10 hours)

Crisp sets and Fuzzy sets **:** Introduction – crisp sets an overview – the notion of fuzzy sets –basic concepts of fuzzy sets – membership functions – methods of generating membership functions – defuzzification methods- operations on fuzzy sets - fuzzy complement – fuzzy union – fuzzy intersection – combinations of operations – General aggregation operations.

Module-I (10 hours)

Fuzzy arithmetic and Fuzzy relations: Fuzzy numbers- arithmetic operations on intervals- arithmetic operations on fuzzy numbers- fuzzy equations- crisp and fuzzy relations – binary relations – binary relations on a single set – equivalence and similarity relations – compatibility or tolerance relations.

Fuzzy measures – belief and plausibility measures – probability measures – possibility and necessity measures – possibility distribution - relationship among classes of fuzzy measures.

Module-I (10 hours)

Fuzzy Logic and Applications **:** Classical logic : an overview – fuzzy logic – approximate reasoning - other forms of implication operations - other forms of the composition operations – fuzzy decision making –fuzzy logic in database and information systems - fuzzy pattern recognition – fuzzy control systems.

Text Book:

1. George J Klir and Tina A Folger , Fuzzy sets, Uncertainty and Information, Prentice Hall of India, 1988.

2. H.J. Zimmerman, Fuzzy Set theory and its Applications, 4th Edition, Kluwer Academic Publishers, 2001.

3. Goerge J Klir and Bo Yuan , Fuzzy sets and Fuzzy logic: Theory and Applications. Prentice Hall of India, 1997.

ReferenceBook :

1. Hung T Nguyen and Elbert A Walker, First Course in Fuzzy Logic, 2ndEdition , Chapman & Hall/CRC, 1999.

2. Jerry M Mendel, Uncertain Rule – Based Fuzzy Logic Systems ; Introduction and New Directions, PH PTR, 2000.

3. John Yen and Reza Langari, Fuzzy Logic : Intelligence Control and Information, Pearson Education, 1999.

4. Timothy J Ross, Fuzzy Logic with Engineering Applications, McGraw Hill International Editions, 1997.