

MMA-E411
FUZZY SETS AND THEIR APPLICATIONS

MM : 100
Time : 3 hrs
L T P
5 2 0

Sessional : 30
ESE : 70
Pass Marks : 40

NOTE: The question paper shall consist of two sections (Sec.-A and Sec.-B). Sec.-A shall contain 10 short answer type questions of six marks each and student shall be required to attempt any five questions. Sec.-B shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Questions shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper

Crisp sets, Fuzzy sets (basic types), Fuzzy sets (basic concepts), Representation of fuzzy sets, Basic operations on fuzzy sets, Fuzzy convex set, α -cuts, Additional properties of α -cuts, Decomposition Theorems, Extensions principal for fuzzy sets and related theorems,

Fuzzy Complements, Equilibrium of a fuzzy complement, Theorems on fuzzy complement, Increasing generator, Decreasing generators, Characteristic theorems for fuzzy complement (without proof), Fuzzy intersection (t-norms), Drastic intersection , Characteristic theorem for t-norms (without proof), Theorems on t-norms, Fuzzy Unions (t-conorms), Drastic union, Theorems on t-conorms, Characteristic theorem for t-conorms (without proof), Combinations of operations and related theorems.

Fuzzy numbers, Linguistic variables, Arithmetic operations on fuzzy numbers, Lattice of fuzzy numbers, Fuzzy equations.

Crisp and fuzzy relations, Projections, Binary fuzzy relations, Binary relations on a single set, Fuzzy equivalence relations, Max-min composition, Transitive closure of a binary relation, Fuzzy compatibility relations, Fuzzy ordering relations, Fuzzy morphism, Sup-i compositions of binary fuzzy relations, Inf- w_i compositions of fuzzy relations.

Fuzzy relation equations, Fuzzy logic, Fuzzy ranking method; Based on Hemming distance, Based on α –cut, Defuzzification; Center of area method, Center of Maxima method, mean of maxima method, Fuzzy linear programming.

Text /Reference Books

1. H.J. Zimmerman, Fuzzy Set Theory and Its Applications, Kluwer Academic Publishers
2. George J. Klier and Bo Yuan, Fuzzy Sets and Fuzzy Logic, Prentice Hall of India
3. Kaufmann, A. and Gupta, M.M. , Fuzzy Mathematical Models in Engineering and Management Science