

FUZZY SET THEORY FUZZY LOGIC AND APPLICATIONS

**B.Tech. III Year I – Semester
(Elective)**

| Credits | Periods | | | Exam Hrs. | Sessional Marks | Exam Marks | Total Marks |
|---------|---------|----------|-----|-----------|-----------------|------------|-------------|
| | Theory | Tutorial | Lab | | | | |
| 3 | 3 | 1 | - | 3 | 40 | 60 | 100 |

Course objectives:

This course introduces students to the basic concepts of modeling in systems using fuzzy sets. The concepts of fuzzy sets are introduced and their role in applications of semantic interpreters, control systems and reasoning systems.

Course Outcomes : At the end of the course, the student will be able to:

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| 1 | Understand basic knowledge of the fuzzy sets, operations and their properties. |
| 2 | Understand the fundamental concepts of Fuzzy functions and Fuzzy logic |
| 3 | Apply the concepts of Fuzzy sets in image processing, pattern reorganization and decision making. |
| 4 | Apply the concepts of Fuzzy logic in image processing. |
| 5 | Identify the applications of fuzzy sets. |

CO – PO Mapping :

| | PO-1 | PO-2 | PO-3 | PO-4 | PO-5 | PO-6 | PO-7 | PO-8 | PO-9 | PO-10 | PO-11 | PO-12 |
|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|
| CO-1 | 3 | 2 | | | | | | | | | | 1 |
| CO-2 | 3 | 2 | | | | | | | | | | 1 |
| CO-3 | 3 | 2 | | | | | | | | | | 1 |
| CO-4 | 3 | 2 | | | | | | | | | | 1 |
| CO-5 | 3 | 2 | | | | | | | | | | 1 |

SYLLABUS

UNIT – I : FUZZY SETS

[12 Periods]

Basic concepts of fuzzy set – t-norm – t-conorms – Membership function – α -cut – Algebra of fuzzy sets – Distance between fuzzy sets – Fuzzy relation.

UNIT – II: FUZZY ARITHMETIC

[12 Periods]

Fuzzy numbers – Arithmetic operations of fuzzy numbers – Extension principle – Interval arithmetic – Defuzzification.

UNIT – III : FUZZY FUNCTION

[12 Periods]

Fuzzy valued functions – Fuzzy equations, fuzzy inequalities, system of fuzzy linear equations – Maximum and minimum of fuzzy functions.

UNIT – IV: FUZZY LOGIC

[12 Periods]

Classical Logic – Multi-valued Logics – Fuzzy Propositions – Fuzzy Quantifiers – Linguistic hedges – Inference from conditional Fuzzy proposition.

UNIT – V: APPLICATIONS OF FUZZY SET THEORY

[12 Periods]

Fuzzy sets in Decision making – Optimization in Fuzzy environment – Fuzzy set application in image processing – Fuzzy set application in pattern reorganization.

PRESCRIBED TEXT BOOK:

1. **George J.Klir and Bu Yuan**, *Fuzzy sets and Fuzzy logic Theory and applications*, Prentice Hall of India, New Delhi.

REFERNCES:

1. **Didier Buboiss and Henri Prade**, *“Fuzzy sets and systems”*, Academic Press..
2. **James J Buckley, Esfandiar Eslami**, *“An Introduction to Fuzzy logic and Fuzzy sets”* (Springer).
3. **H.J.Zimmerman**, *“Fuzzy set theory and application”* (Allied Publication in Association with KLUWER).