UNIVERSITY OF MADRAS

B.Sc. DEGREE PROGRAMME IN MATHEMATICS

SYLLABUS WITH EFFECT FROM 2023-2024

<table>
<tr><td>Title of the Course</td><td colspan="6">FUZZY SETS AND APPLICATIONS</td></tr>
<tr><td>Paper Number</td><td colspan="6">ADVANCED LEARNING</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">Part IV</td><td>Year</td><td>III</td><td rowspan="2">Credits</td><td rowspan="2">3</td><td rowspan="2">Course Code</td><td rowspan="2">334E6B</td></tr>
<tr><td>Semester</td><td>VI</td></tr>
<tr><td colspan="2" rowspan="2">Instructional Hours per week</td><td colspan="2">Lecture</td><td colspan="2">Tutorial</td><td>Lab Practice</td><td>Total</td></tr>
<tr><td colspan="2">4</td><td colspan="2">1</td><td>--</td><td>5</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="6">12th Standard Mathematics</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="6">• Students will acquire the basic ideas on fuzzy sets and properties of fuzzy sets.
• Students will acquire the knowledge on fuzzy components, fuzzy operations and fuzzy relations.</td></tr>
<tr><td colspan="2" rowspan="5">Course Outline</td><td colspan="6">UNIT-I: Fuzzy Set Theory: Fuzzy Sets – Definition – Types of Fuzzy Sets–Characteristics of Fuzzy Sets. Hours: 12</td></tr>
<tr><td colspan="6">UNIT-II: Other Important Operations – General Properties – Fuzzy vs Crisp – Operations on Fuzzy Sets – Some Important Theorems.
Hours: 12</td></tr>
<tr><td colspan="6">UNIT-III: Extension Principle for Fuzzy Sets – Fuzzy Complements
Hours:12</td></tr>
<tr><td colspan="6">UNIT – IV: Fuzzy Relations and Fuzzy Graphs – Introduction – Projections and Cylindrical Fuzzy – Relations – Composition – Properties of Min-Max Compositions. Hours: 12</td></tr>
<tr><td colspan="6">UNIT-V: Decision Making in Fuzzy Environment – Introduction – Individual Decision Making – Multi Person Decision Making
Hours: 12</td></tr>
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Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)	**Total Hours: 60** Questions related to the above topics, from various competitive examinations UPSC / TNPSC / others to be solved (To be discussed during the Tutorial hour)
Skills acquired from this course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
Recommended Text	Sudhir K. Pundir and Rimple Pundir, Fuzzy Sets and Applications, A Pragati Prakashan Publishers, Meerut, 2019 (9th Edition) **Chapter: 1 Sections: 1.20- 1.21, Chapter: 2 Sections: 2.1 – 2.2** **Chapter: 2 Sections: 2.3 – 2.5, Chapter: 4 Sections: 4.1 – 4.4** **Chapter: 10 Sections: 10.1 – 10.3**
Reference Books	1. Fuzzy Sets and its Applications, H.J.Zimmerman, Springer, 4th Edition, 2001. 2. Fuzzy Logic with Engineering Applications, Timothy J. Ross, McGraw Hill Inc. New Delhi, 2004 3. Introduction to Fuzzy Sets and Fuzzy Logic, M. Ganesh, PHI Learning Pvt. Ltd, New Delhi, 2009, (4th Edition) 4. Fuzzy Sets and Fuzzy Logic, Theory and Applications,George J. Klir and Bo Yuan, Prentice Hall of India, New Delhi, 1995
Website and e-Learning Source	https://nptel.ac.in/courses/111106050

Course Learning Outcome (for Mapping with POs and PSOs)
Students will be able to
CLO 1: Able to identify different types of fuzzy sets
CLO 2: Able to find the union of two fuzzy sets
CLO 3: Able to define fuzzy complements
CLO 4: Able to explain cylindrical fuzzy relations
CLO 5: Able to evaluate given decision making in fuzzy environment.

	POs						PSOs		
	1	2	3	4	5	6	1	2	3
CLO 1	3	1	3	--	--	--	3	2	1
CLO 2	2	1	3	1	--	--	3	2	1
CLO 3	3	1	3	1	--	--	3	2	1
CLO 4	3	1	3	--	--	--	3	2	1
CLO 5	3	1	3	--	--	--	3	2	1