



FUZZY SETS, LOGIC AND SYSTEMS & APPLICATIONS

PROF. NISHCHAL KUMAR VERMA

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INTENDED AUDIENCE : UG, PG Students, industry professionals, researchers etc.

COURSE OUTLINE :

The course is designed to give a solid grounding of fundamental concepts of fuzzy logic and its applications. The level of the course is chosen to be such that all students aspiring to be a part of computational intelligence directly or indirectly in near future should get these concepts.

ABOUT INSTRUCTOR :

Prof. Nishchal K Verma (SM'13) is Professor, Department of Electrical Engineering and Inter-disciplinary Program in Cognitive Science, Indian Institute of Technology Kanpur, India. He obtained his PhD in Electrical Engineering from Indian Institute of Technology Delhi, India. He is an awardee of Devendra Shukla Young Faculty Research Fellowship by Indian Institute of Technology Kanpur, India for year 2013-16. His research interests include big data analysis, deep learning of neural and fuzzy networks, machine learning algorithms, computational intelligence, computer vision, brain computer/machine interface, intelligent informatics, soft-computing in modelling and control, internet of things/ cyber physical systems, cognitive science and intelligent fault diagnosis systems, prognosis and health management. He has authored more than 200 research papers. Dr. Verma is an IETE Fellow. He is currently serving as Guest Editor of the IEEE Access special section "Advance in Prognostics and System Health Management", an Editor of the IETE Technical Review Journal, an Associate Editor of the IEEE Transactions on Neural Networks and Learning Systems, an Associate Editor of the IEEE Computational Intelligence Magazine, an Associate Editor of the Transactions of the Institute of Measurement and Control, U.K. and Editorial Board Member for several journals and conferences.

COURSE PLAN :

Week 1: Introduction and Fuzzy Sets Theory

Week 2: Membership Functions

Week 3: Set Theoretic Operations

Week 4: Fuzzy Arithmetic

Week 5: Fuzzy Relations

Week 6: Fuzzy Inference Systems I

Week 7: Fuzzy Inference Systems II

Week 8: Wang and Mendel Model

Week 9: TSK Model

Week 10: Fuzzifiers and Defuzzifiers

Week 11: ANFIS Architecture

Week 12: Fuzzy Systems and Machine Learning