SARDAR PATEL UNIVERSITY
Programme & Subject: M.Sc (Instrumentation)
Semester: IV
Syllabus with Effect from: June - 2010

Paper Code: PS04CINS03	**Total Credit: 4**
Title Of Paper: Robotics & Fuzzy Logic	

Unit	Description in detail	Weightage (%)
I	Robot: Classification, Advantages – Disadvantages, Components, Degrees of Freedom, Joints, Coordinates, Reference Frames, Programming Modes, Characteristics, Languages & Applications, Robots as Mechanisms	25%
II	Matrix Representation, Homogenous Transformation Matrices, Representation of Transformations, Inverse of Transformation Matrices, Forward & Inverse Kinematics of Robot, Denavit - Hartenberg Representation of Forward Kinematic Equations, Inverse Kinematic Solution, Kinematic Programming	25%
III	Degeneracy & Dexterity, Fundamental Problem with Denavit - Hartenberg Representation, Design Project: Three Degree of Freedom, Examples, Differential Relationships, Jacobian, Differential Motions of Frame, Differential Motions of Robot and its Hand Frame, Relation of Jacobian & Differential Operator, Inverse Jacobian, Design Project	25%
IV	Fuzzy Sets - Types & Concepts, Operations on Fuzzy Sets, Fuzzy Arithmetic, Fuzzy Relations & Possibility Theory, Fuzzy Logic, Uncertainty based Information, Fuzzy Expert System – Overview, Fuzzy Controllers, Applications of Fuzzy Logic in Robotics.	25%

Basic Text & Reference Books:-

- Introduction to Robotics – Analysis, Systems, Applications, Saeed B. Niku, Prentice Hall of India Private Limited.
- Fuzzy Sets and Fuzzy Logic – Theory and Applications, George J. Klir & Bo Yuan, Prentice Hall of India Private Limited.
- Robotics – Principles and Practice, K. C. Jain, L. N. Aggarwal, Khanna Publishers.
- Fuzzy Sets, Uncertainty and Information, George J. Klir & Tina A. Folger, Prentice Hall of India Private Limited.
- Fundamentals of Robotics – Analysis & Control, Robert J. Schilling, Prentice Hall of India Private Limited.