BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, Pilani
Pilani Campus

INSTRUCTION DIVISION
FIRST SEMESTER 2015-2016
Course Handout (Part II)

Date: 03/08/2015

In addition to part-I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

Course No.	**: BITS F312**
Course Title	**: Neural Networks and Fuzzy Logic**
Instructor-in charge	**: Surekha Bhanot**
Team of Instructors	**: Parikshit Singh**

1. **Course Description**: This course aims to introduce basic idea of modern control system concepts and control applications with artificial intelligent techniques. Knowledge based intelligent systems, their architecture and methods of representing and processing knowledge are explained. Techniques of soft computing particularly fuzzy logic, neural networks, and genetic algorithms are focused with intention of making course less mathematical and more engineering application oriented.

2. **Scope and objective of the Course :** Keeping in view present day need of industry automation with more and more intelligently controllable devices, this course will help students student understanding concepts of intelligent techniques. Implementing these techniques in real time engineering application in laboratory oriented assignments and projects will broaden their scope in solving industrial problems.

3. **Text Book :**

3. **Reference Books :**

1. Introduction to Soft Computing , Samir Roy, Udit Chakraborty, Pearson
2. Process control: principles and applications, Surekha Bhanot, Oxford University Press
3. Fuzzy Logic with engineering application, Timothy J Ross
4. Nature-inspired metaheuristc algorithms, Xin-She Yang, Luniver Press
5. Neural Network Design, Martin D Hagen et al http://hagan.okstate.edu/NNDesign.pdf
6 :A first course in Fuzzy and Neural Control, By Hung T Nguyen, N R Prasad, C L Walker, E A Walker Chapman & Hall/CRC Press Company
7. Fundamentals of Neural networks, architecture, algorithms and applications, Laurene Fausett, Pearson Education

5. Course Plan :

Lec. No.	Learning Objectives	Topic to be Covered	References
1-2	Introduction to Intelligent systems, soft computing	Machine learning, Intelligent Systems,	R2:Ch15 +Class Notes
3-4	Expert Systems	Structure, Search strategies, Applications	R2 : Ch16+class notes
2-17	Fundamentals of artificial neural network & ANN applications	introduction, model of artificial neuron, Architecture ,Learning methods: Supervised, Unsupervised, Reinforcement, Perceptron, Back propagation, Hebbian, Hopfield, dynamic, competitive, RBF networks, ANN applications in function approximation, modeling, pattern recognition, prediction, modeling & control, Matlab implementation	R1 : Ch 6 & 10 R2 : Ch 17 R5:part of Ch 2,3,4,7,11,14,15,16,17,21,23-27 R6 : Ch 5 &6 R7: Ch1,2,3,45,6 +Class Notes
18-29	Fundamentals of Fuzzy Logic & Applications	Fuzzy Set theory, fuzzy set operations, fuzzy relations, Fuzzy applications in control, classification, pattern recognition, Matlab implementation	R1 : Ch 2,3 &4 R2 : Ch 18 R3 : part of ch1,2,34,11,13 R6 : Ch 3&4+Class Notes
30-40	Hybrid systems, Evolutionary computing techniques	Neuro Fuzzy, Genetic algorithm, Differential evolution, particle swam, firefly and applications, Matlab implementation	R1 : Ch 11,12 & 13 R4:Ch5,6,8,10 R6: Ch 7 +Class Notes

6. **Evaluation Scheme:**

Component	Duration	Weightage (Marks)	Date & Time	Remarks
Midsem Test	90 Min	90	10/10 2:00 - 3:30 PM	CB
Quizzes	-	40		OB+CB
MATLAB	-	50		OB

Assignment				
Comprehensive Exam.	3 hours	120	14/12 FN	OB and CB

7. Chamber Consultation Hour: Tesday-9th hour

8. Notices: Notices concerning this course will be displayed on CMT

Instructor-in-charge
BITS F312