Code	Soft Computing II	2 Hours/Week	2 Units

Contents of Syllabus	Hours
Evolutionary Computation: Evolutionary Strategies, Features of Evolutionary Computation, Advantages of Evolutionary Computation,	2
Evolutionary Algorithms: Historical Note, Genetic Algorithms: Concept, Solution, Initial Population, Genetic Operators, Fitness Function, Stopping Condition.	2
Fitness Scaling: Rank Scaling, Proportional Scaling, Top Scaling. **Selection:** Roulette Wheel Selection, Stochastic Universal Sampling, Rank Selection, Tournament Selection, Other Selection Methods Mutation **Mutation:** Uniform Mutation, Gaussian Mutation, Variable Mutation Rate **Crossover:** One-Point Crossover, Two-Point Crossover, Scattered Crossover, Intermediate Crossover, Heuristic Crossover **Other Genetic Operators:** Eliticism, Insert and Delete, Hard and Soft Mutation	4
Other Optimization Techniques: Particle Swarm Optimization, Ant Colony Optimizations, Metaheuristic Search, Traveling Salesman Problem	4
Grammatical Evolution, Genetic Programming: Comparison of GP with Other Approaches, Primitives of Genetic Programming, Attributes in Genetic Programming, Steps of Genetic Programming, Applications of Genetic Programming	2
Fuzzy Logic and Systems: Fuzzy Sets and Membership Functions. Operations on Fuzzy Sets. Fuzzification. Fuzzy Numbers**:** Uncertain Fuzzy Values. Fuzzy Numbers and its L-R representation. Operations on Fuzzy Numbers	4
Fuzzy Relations: Cartesian product. Binary Fuzzy Relations. IF-THEN fuzzy relation. n-ary Fuzzy Relations. Compositions of Fuzzy Relations. max-min composition. max-product composition	4
Fuzzy Inference Systems: Architecture of Fuzzy Inference System. Fuzzy Inference Rules and Reasoning. Defuzzification. Applications of Fuzzy Logic: Fuzzy Control Systems. Pattern Analysis and Classification. Fuzzy Expert Systems.	4
Hybrid Systems: Introduction, Key Takeaways from Individual Systems, Architectures of neuro-fuzzy systems, Adaptive Neuro-Fuzzy Inference Systems, Application in a Real Life Problem, Evolutionary Neural Networks, Soft computing for smart machine design	4

Textbook:

1. **Soft Computing: Fundamentals and Applications, D. K. Pratihar, 2016**
2. **Introduction to Soft Computing, Eva Volna, 2013**