Genetic Algorithm

1.1 Course Number: CS361

1.2 Contact Hours: 3-0-0 Credits: 9

1.3 Semester-offered: 3rd Year-Even

1.4 Prerequisite: fundamentals of Programming and Basic Algorithms

1.5 Syllabus Committee Member: Dr. Sushum Biswas, Dr. Daya Sagar Gupta & Dr. Gargi Srivastava

2. **Objective:** Understanding the concepts of Genetic Algorithms and using them for oil and gas applications.

3. **Course Content:**

Unit-wise distribution of content and number of lectures

Unit	Topics	Sub-topic	Lectures
1	Introduction	Introduction; Fundamentals; Genotype representation	8
2	Population	Population; Fitness function; Parent selection	8
3	Crossover	Crossover; Mutation; Survivor selection	8
4	Termination condition	Termination condition; Models of lifetime adaptation; effective implementation	8
5	Advanced topics	Advanced topics; Application areas	8
		Total	**40**

4. Readings

4.1 Textbook:

Genetic Algorithms in Search, Optimization and Machine Learning by David E. Goldberg.

Genetic Algorithms + Data Structures = Evolutionary Programs by Zbigniew Michalewicz.

4.2 Reference books:

Practical Genetic Algorithms by Randy L. Haupt and Sue Ellen Haupt.

Multi Objective Optimization using Evolutionary Algorithms by Kalyanmoy Deb.

5 Outcome of the Course: The students will be able to learn the nuances of Genetic Algorithms. They will also learn how to use this computer based technique to solve O & G problems, in terms of exploration, mapping, pipeline laying out and reservoir modeling.