

## **Management and Design Trainees IIT Kharagpur Module**

Total duration: 3 weeks

### **1. AI/ML for communication :**

- a. Search Problem: Formulation, Problem solvers, Heuristics search algorithms
- b. Logic & Knowledge Representation: Propositional logic and First-order-Logic
- c. Constraint satisfaction problems: Formulation, CSP solvers, Satisfiability Solvers, Planning: Formulation. Reasoning with uncertainty: Probability basics, Bayesian Belief networks, probabilistic inference.
- d. Definition of learning, taxonomy of learning, model, capacity, bias and variance, evaluation models, overfitting/under-fitting
- e. Basics ML models: Classification vs. regression, supervised/unsupervised, semi-supervised, regression, Decision trees, Bayes learning, Ensemble methods, support vector machines, clustering, Gaussian mixture models, Expectation maximization
- f. Introduction to Neural Networks
- g. Multi-layer perceptron, sigmoid neuron, feedforward neural networks, backpropagation, Gradient descent and variants
- h. Sequence Modeling, Unsupervised Learning, Reinforcement Learning

### **2. Lab sessions:**

- a) Integrated avionics lab
- b) Flight control lab
- c) Navigation and communication lab
- d) Sensor & Instrumentation Lab.

Note : The above proposed hours includes assessment and evaluation period.