

## About IHFC

I-Hub Foundation for Cobotics (IHFC) was incorporated as a non-profit (Section-8) company at IIT Delhi in June 2020 with the funding of Rs. 170 crores (USD 20 millions) over a period of 5 years from the Department of Science Technology (DST), Ministry of Science and Technology, Govt. of India. The guiding theme for this venture is Collaborative Robotics (Cobotics) for enhancing human capabilities, reducing risk and improving productivity.

IHFC is tasked with the commercialization of the developed technology into products for application mainly in the four verticals:

- Medical
- Agriculture
- Defence
- Industry

IHFC is actively looking forward for collaborations with industry, start-ups, universities, and R&D organizations in India and abroad to create a market-oriented research framework, co-develop technologies and taking them to the market.

### Education and Training Programs

Apart from development of technological products, IHFC also contributes to the employability of professionals and students by enriching skills in them through organized courses and training programs in cobotics and associated technologies.

For queries on the course, please contact

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# IHFC

## I-Hub Foundation for Cobotics

Technology Innovation Hub  
of  
Indian Institute of Technology Delhi  
[Initiative of Department of Science and Technology, Government of India]

### GLOBAL ONLINE COURSE

ON

### MACHINE LEARNING FOR COBOTICS

October 16 - November 15, 2021

## Course Instructors

### Prof. Niladri Chatterjee

Dept of Mathematics,  
Indian Institute of Technology Delhi,  
New Delhi, India.

### Dr. Pramod Gupta

Lead Faculty Instructor,  
UC Berkeley Extension,  
Berkeley, California, USA.

## Industry Experts

### Dr. Rajesh Sinha

Chief Scientist and Head,  
Tata Consultancy Services Research,  
Noida, India

### Dr. Ravi Joshi

Senior Robotics Engineer  
TechMagic K.K.,  
Aichi, Japan

**Course Time Oct 16 - Nov 15, 2021**  
**Every Wednesday 19:00 - 21:00 Hrs. (IST)**  
**Every Saturday 10:00 - 13:00 Hrs. (IST)**

**Course Registration** [Click Here](#) to Register or scan the QR Code



For crediting purposes by universities or colleges & bulk registration discounts,  
please contact us at [venkat@ihfc.co.in](mailto:venkat@ihfc.co.in)

## About This Course & Who Should Attend?

Machine Learning is an indispensable tool in advanced computing application. This course covers the elementary concepts of machine learning with illustrative case studies in the area of robotics (collaborative robotics). The course consists of NINE lecture modules and a Team-based Online Project (TOP).

This course is primarily designed for working professionals, faculty, engineering and science graduates who are working in the area of

## Course Fee

Registration Category	<del>Advanced</del> Registration* Indian Festive Season Offer	<del>Full</del>
Students (UG/PG)	20000 INR	25000 INR
Faculty/ Industry	40000 INR	50000 INR
International Participants	800 USD	1000 USD
Last Date	<del>October 10</del> October 15, 2021	<del>October</del> 15, 2021

\*Discounted Registration on the eve of Indian Festive Season and date of registration extended to October 15, 2021

## Mode of Course: ONLINE

For updates and more details visit the [course webpage](#).

## Introduction

What is Machine Learning and Data Mining?  
Concepts in Machine Learning and Predictive analytics using simple problems  
What is Predictive Analytics and Machine Learning?  
Various Paradigms in Machine Learning  
Steps in developing ML application  
Application of ML  
Introduction to Python and various packages

## Data Pre-processing/Feature Engineering

Introduction to Data pre-processing and why it is needed?  
Various steps/techniques involved.  
Measure of Data Quality  
Major task involved in data preparation  
Dealing with missing values, outliers, data transformation etc.

## Linear Classifiers

Linear Regression  
Logistic Regression  
Linear classifiers – with practical applications

# Course Content

## Bayesian Classifiers

Histograms classifiers (Naïve Bayes)  
Probability density functions  
Bayesian classifiers  
Class-conditional density, priors and posteriors

## Classifiers Contd.

K-nearest neighbour algorithm

## Unsupervised Learning

Clustering  
K-means, Hierarchical Methods)  
Expectation maximization algorithm  
Outlier and anomaly detection

## Feature Selection/Reduction

Dimension Reduction  
Covariance Matrix  
Feature selection and Principal component analysis  
Regularization

## Decision tree and Ensemble methods

Decision Tree methods  
Random Forest

## Performance Evaluation of Algorithms and Practical Issues

Evaluating and Improving Model Performance  
Classifier performance evaluation  
Accuracy, sensitivity, specificity, positive predictive value  
Receiver operating characteristic  
Cross validation Training, testing and validation  
Applying Machine Learning Guidance and Practical Issues

Team based  
Online Project  
(TOP)