



ADVANCE CERTIFICATE PROGRAM

Data Science & Artificial intelligence

Self Paced Program | 270 Lab Days | Certificate by IIT Roorkee



CloudxLab & Course

CloudxLab (CxL) has been a pioneer in the edtech space for the past few years. Founded in 2015 by Sandeep Giri, an alumnus of IIT Roorkee, At Cloudxlab, we are building one of the best gamified learning environments to make technology learning fun and for life. More than 100,000 users across the world have been benefited by our signature courses on Machine Learning and Big Data. Our vision is to upskill people on high-end technologies like Deep Learning, Machine Learning, Big Data and make them employable. We are a highly motivated team of developers, researchers, and engineers who build fresh and lasting learning experiences for our users. This Courses is designed for those who want to gain hands-on experience in solving real-life problems using deep learning. After finishing this specialization, you will find creative ways to apply your learning to your work like building a robot which can recognize faces or change the path after discovering obstacles on the path. .



Sandeep Giri

Founder at CloudxLab

About IIT Roorkee

IIT Roorkee has been ranked the best among IITs, as per the QS World Best Universities Ranking 2019. Established in 1847, it's the oldest technical institution in Asia and fosters a very strong entrepreneurial culture. Some of their alumni are highly successful as entrepreneurs in the new age digital economy. We are excited to partner with CloudxLab to offer a one-of-its-kind, academically rigorous and industrially relevant certification course in Deep Learning. Faculty of IIT-Roorkee will be discussing each and every concept of deep learning thoroughly. Course also includes industry relevant case studies and projects introduced by industry leaders from CloudxLab network. Further, our strong network, industry mentorship and the credibility of certification will provide you with just the right push to accelerate your career in the field of Deep Learning. We invite you to take this opportunity and join us and make use of the excellent pedagogy and industry collaborations. You will truly be getting the best of both worlds, which will help you achieve success.



Prof. Sanjeev Manhas

Coordinator E-Learning Centre
IIT Roorkee

Why CloudxLab & IIT Roorkee



**Earn a certificate
from IIT Roorkee.**



**Learn Deep Learning
from IIT Roorkee
professor and industry
experts and become
expert in Data Science
domain**



**Online cloud lab for
hands-on for
real-world experience**



**Best-in-class support
Throughout your
learning journey**



**Lifetime course
access**



**Work on real-world
projects.**



**Interact with the
international
community of peers
via the discussion
forum.**

Mentors / Faculties



Raksha Sharma

Faculty CSE Dept,
IIT Roorkee

Course Developer

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Gaurav Dixit

Faculty DoMS Dept,
IIT Roorkee

Course Developer

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Sandeep Giri

Founder at CloudxLab
Past: Amazon, InMobi, D.E.Shaw

Course Mentor

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Abhinav Singh

Co-Founder at CloudxLab
Past: Byjus

Course Mentor

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Praveen Pavithran

Co-Founder at Yatis
Past: YourCabs, Cypress Semiconductor

Course Mentor

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Course Curriculum

- **Foundations**

- Linux for Data Science/ Machine Learning
- Getting Started with Git
- Python Foundations
- Machine Learning Prerequisites(Including Numpy, Pandas and Linear Algebra)
- Getting Started with SQL
- Statistics Foundations

- **Introduction to Machine Learning and Deep Learning**

- In this topic, we will cover concepts like different types of Machine Learning algorithms (Supervised, Unsupervised, Reinforcement) and challenges in Machine Learning. We will see examples of solving the problems using the traditional approach and why Machine Learning algorithms give far better accuracy than the traditional approach. This topic will give you a brief introduction to both Machine Learning and Deep Learning world.

- **Data Preprocessing, Regression - Build end-to-end Machine Learning Project**

- We will start the course by learning concepts in Machine Learning. In this topic, we will build a machine learning model to predict housing pricing in California. By the end of this project, you will understand how to build machine learning pipelines to build a model. We will also cover concepts like data cleaning, preparing data for machine learning algorithms, exploring many different models, short-list the best one and fine-tuning the selected model

- **Classification**

- In this topic, we will train a model on the MNIST dataset to recognize handwritten digits. We will also learn various performance measures in classification like Confusion Matrix, Precision and Recall, and ROC Curve.

Course Curriculum

- **Machine Learning Algorithms**

- In this topic, we will learn various Machine Learning algorithms and concepts like Unsupervised Learning, Ensemble Learning, and Dimensionality Reduction

- **Introduction to Artificial Neural Networks with Keras**

- We will start the Deep Learning course with Artificial Neural Networks. We will learn about biological neurons, multilayer perceptrons, and back-propagation. We will implement a multilayer perceptron using Keras and visualize the runs and graphs using Tensorboard

- **Training Deep Neural Networks**

- In this topic, we will learn various challenges deep neural networks face while training like vanishing and exploding gradients. We will learn various techniques to solve these problems like reusing pre-trained layers, using faster optimizers and avoiding overfitting by regularization.

- **Custom Models and Training with TensorFlow**

- In this topic, we will dive deeper into TensorFlow and its lower level Python API. These lower-level Python APIs are useful when we need extra control like writing custom loss function, layers and many more.

- **Loading and Preprocessing Data with TensorFlow**

- Deep Learning systems are usually trained on very large datasets that may not fit in the RAM. In this topic, we will learn TensorFlow's Data API which helps in ingesting dataset and preprocessing it efficiently.

Course Curriculum

- **Deep Computer Vision using Convolutional Neural Network**
 - In this topic, we will learn how Convolutional Neural Networks - CNNs achieve superhuman performance on complex visual tasks. Today CNNs power image search services, self-driving cars, automatic video classification systems and more. We will learn CNNs basic building blocks and how to implement them using TensorFlow and Keras
- **Processing Sequences Using RNNs and CNNs**
 - Predicting the future is something we do all the time like predicting stock prices. In this topic, we will learn how Recurrent Neural Networks - RNN predict the future, the problem they face like limited short-term memory and solutions to these problems - LSTM (Long Short-Term Memory) and GRU cells
- **Natural Language Processing Concepts and RNNs**
 - Using Natural Language Processing we build systems that can read and write natural language. In this topic, we will learn different NLP techniques and generate Shakespearean text using a Character RNN.

Course Curriculum

Big Data With Hadoop & Spark

- Apache ZooKeeper
- HDFS - Hadoop
- YARN
- MapReduce
- Tutorial Session and how to proceed with rest of the course
- Pig & Pig Latin
- Getting Started with Hive
- Tutorial Session and how to proceed with rest of the course
- Sqoop, Flume and Oozie
- NoSQL and HBase
- Tutorial Session and how to proceed with rest of the course
- Scala foundations
- Getting Started with Spark
- Basics of RDD and Key-Value RDD
- Tutorial Session and how to proceed with rest of the course
- Advanced Spark Programming
- Spark Streaming(Including Kafka)
- Tutorial Session and how to proceed with rest of the course
- SparkSQL, Dataframes and SparkR
- Machine Learning and Graph Processing with Spark
- Tutorial Session and how to proceed with rest of the course

Projects

- Churn Email Inbox with Python
- Solve various problems using MapReduce and Python
- Sentiment Analysis using Hive
- Writing Spark Applications
- Parse Apache Access Logs using Spark
- Predicting the median housing prices in California
- Classifying handwritten digits in MNIST dataset
- Noise removal from images
- Building Spam Classifier
- Predicting Titanic Passenger Survival using Machine Learning and Python
- Image Classification with Pre-trained InceptionV3 Network
- Host an Image Classification App on Heroku
- Predicting Noisy Images using KNN Classifier
- Building a CNN Classifier using TensorFlow 2 for MNIST Fashion Dataset
- Deploy an Image Classification Model using Flask
- Build a Sentiment Classifier using Python and IMDB Reviews
- Mask R-CNN with OpenCV for Object Detection
- Image Classification with Pre-trained Keras models
- Build a Neural Network for Image Classification with TensorFlow
- Neural Style Transfer using Deep Learning & TensorFlow 2 (Art Generation Project)
- Credit Card Fraud Detection using Machine Learning
- Image Stitching using OpenCV and Python (Creating Panorama Project)
- Stock Closing Price Prediction using Deep Learning, TensorFlow2 & Keras
- Introduction to Transfer Learning (Cat vs Non-cats Project)
- Building Cat vs Non-Cat Image Classifier using NumPy
- Iris Flowers Classification using Deep Learning & Keras
- Classify Clothes from Fashion MNIST Dataset
- Face recognition - Identify person from digital image or video

Course Details and Fees —

Please find more information about the course and fees here:

<https://cloudxlab.com/course/122/advanced-certification-course-in-data-science-and-artificial-intelligence-by-iit-roorkee>

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