National Institute of Electronics and Information Technology, Chennai

COURSE PROSPECTUS

Name of the Group:	VLSI/ES/AE
Name of the Course:	**Online** Certificate course in Deep Learning using Tensorflow 2 and Keras
Course Code:	AI 120
Starting Date:	**1st November 2020**
Duration:	5 weeks
Course Coordinator:	Mr. Ripunjay Singh (Scientist-D), Mob: 9445220125 (9AM – 6PM)
Last date of Registration:	25th October, 2020

Preamble:

Artificial Intelligence (AI) which consists of Machine learning (ML) and Deep Learning (DL), refers to technology used to do a task by machine that requires some level of intelligence to accomplish — in other words, a tool trained to do what a human can do. Why is AI different than ordinary software? Three core components — high-speed computation, a huge amount of quality data and advanced algorithms differentiate AI from ordinary software. Core AI technologies provide better accuracy and stability to everyday processes using an algorithm that connects quality data with fast computation services. DL technology is used to add wisdom to continuous increasing amount of data. The use of AI and Data Science analysis offers better insight into how to execute and operate.

DL has emerged as a leading technology used in the Booming areas like Cloud Computing, Internet of Things (IoT) and Data analytics. Currently available academic curriculum is not much enough to fulfil the requirement of Skills needed for DL in Industry. This course offers required skills and hands-on experience in DL to candidate and professionals; this will increase the employability opportunity for candidate and bridging the Gap of Skilled Human requirement for Industry.

Online Certificate course in **Deep Learning using Tensorflow 2 and Keras** covers the crucial skills you need for a successful career in artificial intelligence (AI). You'll master the concepts of deep learning, machine learning, natural language processing (NLP), plus the programming languages needed to excel in an AI career with exclusive training and certification from NIELIT. You will learn how to design intelligent models and advanced artificial neural networks and leverage predictive analytics to solve real-time problems in this course. Students will be industry ready for AI and data science job roles upon successfully completing this course.

Objective of the Course:

To acquire the skills required for the implementation of Deep Learning Algorithm and its Performance evaluation for various applications

Outcome of the Course:
After successful completion of this Course, students can able to:
- Develop Programming Skills Required for Deep Learning
- Learn to Analyse and Process the Data
- Learn to use Data Analytics tools: Numpy, Panda for various applications
- Learn to use Machine learning tool Scikit - Learn for various applications
- Learn to use Deep learning tool Tensorflow and Keras for various applications

- Develop expertise in implementation of ML algorithm using Python
- Develop expertise in implementation of DL algorithm using Python

Course Structure:

S.No.	Topics	Duration (in weeks) via online mode
1	**Introduction to Python Programming**	
2	**Data Science and Analytics**	2 Week
3	**Mathematics for Deep Learning**	
4	**Machine Learning concept**	1.5 Week
5	**Performance Analysis Techniques**	
6	**Deep Learning**	1.5 Week
7	**Case Studies / Project**	Within the stipulated learning period

Note: Please Refer Annexure for detailed syllabus

Other Details:

Course Fees: Rs. 2000/- (Including GST) (Non-Refundable)

However the above Training fee shall be refunded on few special cases as given below:
1. If course postponed and new date is not convenient for the student.
2. If course cancelled

Payment schedule: The Fee has to be paid in one installment as given below.

Instalment No.	Last Date for Payment	Amount (in Rs.)
1.	25-10-2020	Rs. **2000/-**

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Pre-requisite/ Eligibility: Knowledge of Python Programming and Machine Learning concepts **Or Attended NIELIT Chennai AI 100 / AI 110 certificate programes**

How to apply:

Candidates can apply online in our website https://reg.nielitchennai.edu.in/. Payment towards Course fee can be paid through any one of the following modes:

- Online transaction: **Beneficiary Name: NIELIT CHENNAI, Account No: 31185720641, Branch: Kottur (Chennai), IFSC Code: SBIN0001669**.
- Pay through Unified Payment Interface (UPI) payment methods eg: Google Pay, Paytm, BHIM, Phone Pe
- DD drawn from a nationalized bank (preferably SBI) in favor of ―NIELIT Chennai‖ payable at Chennai.

Note: The Institute will not be responsible for any mistakes done by either the bank concerned or by the depositor while remitting the amount into our account.

Last date of Registration: 25th October 2020

Selection of candidates: Selection is based on the first come first serve basis

Admission Procedure:

All interested candidates are required to fill the Registration form with the Course fees before 25th September 2020 with all the necessary following documents.

- One passport size photograph and one stamp size photograph for identity card.
- Self-attested copy of Govt. issued photo ID card
- Candidates may also submit the certificate of their highest qualification

Note: Working days are from Monday to Friday.

Discontinuing the course: No fees under any circumstances shall be refunded in case of a student discontinuing the course. No certificate shall be issued if discontinued.

Course Timings: 3 pm to 4 pm (1 hour online) from Monday to Friday

Mode of Training: Online

Location:

NIELIT Chennai is located at Gandhi Mandapam Road, Kotturpuram, Chennai (Landmark: Opp. To Anna Centenary Library)

Certification:

After Successful completion of the course, Certificate will be issued.

National Institute of Electronics and Information Technology, Chennai

Address: National Institute of Electronics and Information Technology Chennai Centre, ISTE Complex, No. 25, Gandhi Mandapam Road, Chennai – 600025
E-mail: training.chennai@nielit.gov.in / Phone: 044-24421445
Contact Person: Ripunjay Singh, Mobile: 9445220125. (9 AM- 6PM)

Course enquiries: Students can enquire about the various courses either on telephone or by personal contact between 9.15 A.M. to 5.15 P.M. (Lunch time 1.00 pm to 1.30 pm) Monday to Friday.

Annexure

Detailed Syllabus of the Course

Module 1: Introduction to Python Programming

- Beginning Python Basics,
- Python Program Flow,
- Functions& Modules,
- Exceptions Handling,
- File Handling

Learning Outcome:

– Capable of Programming with Python

– Able to Prepare Data for Analysis using Python

– Acquire the pre-requisite Python Programming Language skills to move into specific branches Machine Learning, Data Science, Deep Learning, Artificial Intelligence etc.

Module2: Data Science and Analytics

- An Introduction to Data Science and Analytics,
- Data Analysis Using NumPy,
- Data Analysis Using Pandas,
- Data Visualization – Pandas, Matplotlib, Seaborne, Plotly.

Learning Outcome:

– Principals of Data Science and Analytics

– Able to use NumPy for Numerical Data

– Able to use Pandas for Data Analysis

– Able to use Data Visualization tools for interactive dynamic visualizations

Module 3: Mathematics for Deep Learning:

- Descriptive & Inferential Statistics,
- Probability Concept,
- Probability Distributions
- Regression Analyssis
- Matrix Basics,
- Derivatives

Learning Outcome:

– Understand the mathematical principles required for Deep Learning.

– Able to Apply the principles in developing the Learning Model

– Able to implement model in python.

Module 4: Machine Learning concept for DL

- What is Machine Learning?,

- Supervised Learning: Regression and Classification,

- Unsupervised Learning: Clustering,

- Case studies/hands-on practice

Learning Outcome:

– Understanding of Machine Learning Algorithm.

– Develop expertise to implement ML algorithm using Python.

– Learn to use Machine learning Sklearn–tool for various applications.

Module 5: Performance Analysis Techniques:

- K Fold Cross Validation

- Hyper Parameter Tuning

- Loss Function

- Bias & Gradient Descent

- Stochastic Gradient Descent

Learning Outcome:

– Acquire skill for Performance Measurement and Improvisation Techniques.

– Parameter Tuning Technique.

– Able to Implement Performance Analysis Techniques in Python

Module 6: Deep Learning:

- Introduction to Deep Learning
- Artificial Neural Network -ANN
- Convolution Neural Networks -CNN
- Recurrent Neural Networks - RNNs
- Natural Language Processing-NLP
- Auto Encoders
- Generative Adversarial Networks (GANs)
- Deployment

Learning Outcome:

- Learn to use Tensor Flow 2.0 for Deep Learning
- Conceptual understanding of ANN using
- Able to build DL models using various neural network techniques.
- Perform Image Classification with CNN
- Natural Language Processing using DL
- Use GPUs for accelerated deep learning
- Able to Deploy the model for project

Case Studies / Project

- Covid-19 data Analysis

- Data Pre-processing and Data Analysis for Banking Application

- Medical Diagnosis using ML (Diabetic and Cancer)

- Implementation of Spam filtering messages for Mails

- Hand Written Number Image Classification Using CNN

- Complex image recognition (CIFAR) using DL

- Creating Sin wave Signal using RNN

- Use Deep Learning for medical imaging

- Generate text with RNNs and Natural Language Processing

NOTE: Course may further modify for improvisation