राष्ट्रीय इलेक्ट्रॉनिकी एवं सूचना प्रौद्योगिकी संस्थान,कालीकट

National Institute of Electronics & Information Technology, Calicut

Ministry of Electronics and Information Technology
Government of India

Course Prospectus

Advanced Diploma in Artificial Intelligence

July 2020-December 2020

National Institute of Electronics & Information Technology

C A L I C U T

An Autonomous Scientific Society of Ministry of Electronics and Information Technology, Govt. of India

ISO 9001-2015 Certified

National Institute of Electronics and Information Technology (NIELIT) is an autonomous body of Ministry of Electronics and Information Technology, Govt. of India. The Centre is a premier organisation for education, training, R&D and consultancy in IT and electronics.

The history of NIELIT dates back to 1974 when the Department of Electronics (DoE) now Ministry of Electronics and Information Technology (MCIT), Govt. of India and the University Grants Commission (UGC) set up the first CEDT within the premises of Indian Institute of Science (IISc.), Bangalore with assistance from Swiss Development Corporation.

The objective was to bridge the gap between the academic institutions and industries. A decade after the successful running of CEDT, Bangalore, the then Department of Electronics (DoE), initiated a programme to set up similar centres in other parts of the country with a wider objective to develop human resources at different levels and in different specialised areas of Electronics Design.

CEDT Calicut was established in 1989 . Later in December 2002, it was renamed as DOEACC Centre Calicut. The Centre adopted its current name NIELIT since 2011.The present infrastructure is developed in 25 acre campus provided by Government of Kerala and houses advanced facilities. The beautiful buildings accomodates several state of the art laboratories in a lush green scenic ambience.

The unique Kerala style architecture of the buildings, its proximity to world class institutions like NIT & IIM, makes it one of the best NIELIT Centres in the countryThis Centre is engaged in the conduct of industry oriented quality education and training in the state-of-the-art areas through various formal and non-formal programs.The Centre is an implementing agency for various Government schemes related to human resource development in the field of Information, Electronics and Communications Technology (IECT) in the state of Kerala and Karnataka.The centre is also engaged in R & D activities and provides product development and industrial consultancy services.

The Centre has 5 excellent laboratories, fully equipped with the latest systems and development tools in the area of Embedded Systems, VLSI, Information Technology, Product Design and Process Control & Instrumentation. Large collections of reference books in the above areas are accessible to the trainees from the Centre's library in addition to IEEE Online Journal access & NKN connectivity. All the labs, library and office are connected through the central network and students can retrieve information from their terminals itself and through well connected Wi-Fi system. The fully furnished NIELIT Calicut hostel (ladies & mens) in the campus can accommodate around 250 students.

NIELIT Calicut has successfully executed many software development and electronics design projects for reputed organisations like TISCO, BPL, BPL Telecom, KEL, Kannur University, Kerala Feeds, KCMMF Ltd., MTAB, etc. NIELIT Calicut is also having authorised training centers in Kerala for conducting computer software and hardware courses.

Formal programs such as M.Tech in Embedded Systems and M.Tech Electronics Design Technology are affiliated to Kerala Technical University and approved by AICTE.

The Centre is recently recognised as a research centre by University of Calicut to undertake Ph.D. programs.

The Course

Name of the Group
IT Group

Name of the Course
Advanced Diploma in Artificial Intelligence

Course Code
SW800

Starting Date
16-04-2020

Duration
12 Weeks

Course Coordinator

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Preamble

Intelligent machines has replaced human capabilities in many areas. Artificial intelligence is the intelligence exhibited by machines or software. It is the branch of computer science that emphasizes on creating intelligent machines that work and react like humans. Artificial Intelligence spans a wide variety of topics in computer science research, including machine learning, deep learning, reinforcement learning, natural language processing, reasoning, perception etc.

Objective of the Course

This twelve weeks course presents the components of Artificial Intelligence to the participants. The participants will get to work with Machine learning, Neural Networks, explore the Platforms for AI, implement methods to solve problems using Artificial Intelligence and Natural Language Processing, etc.

Outcome of the Course

This course is designed in synchronization with the industry requirements to provide the participants in-depth knowledge and skills required by AI field around the globe. It provides comprehensive knowledge about the fundamental principles, methodologies and industry practices in AI.

Expected Job Roles

Machine Learning Engineer, Deep Learning Engineer, AI Engineer

Course Structure

Sl. No	Modules	Duration(Hours)		
		Theory	Lab	Total
1	Introduction to AI and Programming Tools	52	68	120
2	Machine Learning	30	40	70
3	Deep Learning and Natural Language Processing	38	52	90
4	AI Platforms & Reinforcement Learning	20	15	35
5	Project	10	95	105
	Sub Total	150	270	420
	Total Credits	18		

Know More…

I. Course Fees

General Candidates: Course fee is Rs. *35000*/- + all taxes as applicable

SC/ST Candidates: Tuition Fees are waived for SC/ST students admitted under SCSP/TSP. However they are required to remit an amount of **Rs. *4200*/- as Advance caution/security deposit**. This amount will be considered as caution/security deposit and will be refunded after successful completion of the course. If the student fails to complete the course successfully, this amount along with any other caution/security deposits by the student will be forfeited.

Module wise Course Fee

Not Applicable for this course

II. Registration Fee

An amount of Rs.1000/- (including all taxes as applicable) (nonrefundable) should be paid at the time of registering for the course.

This fee shall be considered as part of course fee, if the student joins the course. If a student register and pay for more than one course and join for any one course, all such amount will be adjusted against the course fee payable.

If the student does not join for the registered course / any of the registered courses, fee paid shall be forfeited.

For SC/ST candidates, the registration fee is Rs.500/- and will be considered as part of caution/security deposit and will be refunded after successful completion of the course. If the candidate does not join or fails to complete the course the amount will be forfeited

However above the registration fee shall be refunded on few special cases as given below

- Course postponed and new date is not convenient for the student
- Course cancelled in advance, well before the admission date

III. Course Fee Installment Structure

"Not applicable for this course"

Students can pay the full fees of Rs. 35000 + all taxes in installments as given below

Fees	*Amount for General Candidates	Amount for SC/ST Candidates. (considered as caution/security deposit)	# Due Date (on or before)
Registration Fee	Rs.1000/-	Rs.500/-	During Registration
**Advance Fee	Rs 5000/-	Rs 3700/-	03-04-2020
1st Installment	Rs 35,650/-	Nil	16-04-2020
2nd Installment	Not Applicable		
Total Fee	Rs 41,650	Rs. 4200 (refundable after successful completion of course)	-

*Above fees is inclusive CGST 9%, SGST 9% and KFC 1%, and revision, if any by Government shall be applicable at the time of payment.

Fine will be applicable for late fee payment.

** Advance fee - After publication of first selection list, the students in the first selection list have to pay the Advance Deposit within the due date to take the provisional admission. Students in the additional selection list should pay both Advance and First installment fee together on or before counseling day

IV. Eligibility:

BE/BTech/BSc/3 year Diploma (IT/Computer Science/Electronics), BCA/MCA, Degree holders with PGDCA, DOEACC A, B level or equivalent of any of these having good computer programming knowledge.

V. Number of Seats

40 (Forty)

VI. Selection of candidates

Selection is based on the marks in the qualifying degree.

VII. Test/Interview

Not Applicable

VIII. Counseling/Admission

16th April 2020

IX. Important Dates

Last date for submitting application: 27-Mar-2020

Selection intimation through mail/website : 30-Mar-2020 (After 5.00 PM)

Counseling/Admission : 16-Apr-2020

X. Course Timings

9.30 am to 5.00 pm

XI. Placement:

Placement Assistance shall be provided.

Click here for a partial List of placements.

XII. Lab Facilities

The Lab is equipped with Intel Xeon Dual Processor based servers from HP, IBM, DELL, HCL, GPU- Intel Xeon Gold Processor 5120 with NVIDIA Quadro P5000 16GB, managed gigabit switches and more than 100 networked PCs with 1Gbps internet facility. A variety of software is available which include various flavors of Windows and Linux Operating Systems like Windows, RedHat Enterprise Linux/CentOS 6/7, RT Linux, OpenStack, CloudStack, OpenVAS/Nesses and various commercial and open source development tools, database and cloud servers, etc.

XIII. Course Contents

Topics	Learning Outcome
Module-1 : Introduction to AI and Programming Tools	
1.0 Linux basics 1.1 Python Basics Data Types, Conditional Statements, Looping, Control Statements, String, List And Dictionary Manipulations, Python Functions, Modules And Packages, Object Oriented Programming in Python, Regular Expressions, Exception Handling, Popular python packages like pandas for data handling 1.2 Introduction to Database Management System & SQL, Database Interaction in Python. 1.3 Data Analysis & visualization – using numpy, matplotlib, scipy, pandas 1.4 R Programming:- Basics - Vectors, Factors, Lists, Matrices, Arrays, Data Frames, Reading data. 1.5 Data visualization - barplot, pie, scatterplot, histogram, scatter matrix 1.6 Probability and Statistics- Probability, Mean, Median, SD, Variance, Probability distributions in R- Normal distribution, Poisson distribution, Binomial distribution. Correlation and Regression.	After completion of this module, the candidate will be able to : • Operate in Linux OS environment. • Design and write python applications. • Learn basics of database management systems and write python programs to interact with DBMS. • Write python programs to do data analysis and visualization using various libraries • Write R programs and use its various data structures for data analysis, Do data visualization using R. • Solve problems involving probability and do statistical data analysis using statistics and probability distribution methods.
Module 2- Machine Learning	
2.0 Structured and unstructured data handling 2.1 Data Preprocessing	After learning this module the participant will be able to

2.1.1 Handling missing data 2.1.2 Data Standardization 2.1.2 Label Encoding 2.1.3 One hot encoding 2.2 Supervised and Unsupervised Learning 2.3 Classification, Regression & Clustering 2.4 Linear Algebra 2.5 Machine Learning Algorithms 2.5.1 Linear Regression 2.5.2 KNN 2.5.3 K Means 2.5.4 Logistic Regression 2.5.5 Support Vector Machine 2.5.6 Decision Tree 2.5.7 Naïve Bayes, etc. 2.6 Ensemble Methods -Random Forest, Boosting and Optimization, etc. 2.7 Model Evaluation Metrics	• grab raw data, clean it and make it ready for building machine learning models • Identify the suitable task to be performed on data for useful model development • Apply suitable algorithm on the data to develop models Use suitable metrics to come up with the most suitable model for solving a particular task
Module -3 : Deep Learning and Natural Language Processing	
3.0 Deep Learning Concepts 3.1 Artificial Neural Network 3.2 Deep Neural Networks 3.2.1 Convolutional Neural Network 3.2.2 Recurrent Neural Network 3.2.3 OpenCV, Tensorflow, Keras 3.2.4 Introduction to Generative Adversarial Networks(GAN) 3.3 Natural Language Processing Methods 3.3.1 Basics of text processing 3.3.2 Lexical processing 3.3.3 Syntax and Semantics 3.3.4 Parts of Speech Tagging 3.3.5 Applications like Sentiment Analysis, Text Classification, Text Summarization, Document	After completion of this module the participants will be able to • Solve AI problems involving unstructured data. • Implement solutions for image related problems using Deep Learning • Implement solutions to text related problems using NLP

Clustering, Document Similarity, Web Crawling etc.	
Module-4 : AI Platforms & Reinforcement Learning	
4.0 Introduction to AI/Cognitive platforms 4.1 Reinforcement Learning and its applications in AI	After attending this module the participants will be able to • use popular AI platforms to solve AI based problems • use reinforcement learning to solve AI related problems
Module-5 : Project	
5.0 The participants will be doing an industry relevant project using real data.	After completion of the project • Participants will be able to formulate the right problems that can be solved using the data available at hand. • Design the solution • Implement it using latest AI tools and methods.

Click here for General Terms and Conditions – Applicable to all courses

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