**MSME-TOOL ROOM, HYDERABAD**
**(CENTRAL INSTITUTE OF TOOL DESIGN)**
(A Government of India Society,Ministry of MSME)
Balanagar, Hyderabad, PIN - 500037. Ph No.040-23771959
Website: www.citdindia.org

Central Institute of
Tool Design

**Crash Course Description (ESDM)**

## Certificate Program on Neural network implementation by using Verilog

**Description: -**Neural network implementation by using Verilog that involves designing and programming a neural network model on a hardware platform such as FPGA. Verilog is a hardware description language that can be used to describe the structure and behavior of digital circuits. Neural networks are computational models that can learn from data and perform tasks such as classification, regression, and recognition.

**Take Away :-** After Completion of this course, the trainee will have hands on expertise in the following areas:

➢ Specification: Defining the functionality, interface, and performance requirement of the circuit.
➢ Architecture: Designing the overall structure and organization of the circuit, such as the number and type of modules, registers, buses, and control signals.
➢ RTL design: Describing the behavior and logic of each module using a hardware description language (HDL), such as Verilog.
➢ Synthesis:   Converting the RTL description into a gate-level netlist, which is a list of logic gates and their connections.

**Eligibilit**y: Pursuing/Completed Diploma (ECE/ECM/EEE)/BSc/MSc (Electronics)/B.Tech/BE/ME/M.tech (Electronics/ECE/EEE/VLSI/Embedded).

**Duration:-** 10 days. Every day 2 hrs. online Class.

**Fees :-** Rs 3000/- (GST Included)

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<u>**Crash Course Description (ESDM)**</u>
**Certificate Program on AI-driven Battery Management System for EV's**

**<u>Description: -</u>**

➢ Lithium-ion battery pack (LiB) is a major component within the car: its efficiency is a key factor for an increased car autonomy and for an extended pack life. Moreover, LiB requires a careful management and control to ensure its safe operation, to be performed by an embedded system called Battery Management System (BMS).

➢ One of BMS's critical tasks consists of inferring battery's internal state from external measurements. Such state includes State of Charge (SoC), (remaining energy) and State of Health (SoH), (capacity performance of the current cell compared to its original condition.)

➢ LiB states cannot be directly measured and several methods are available nowadays which compute SoC and SoH based on the theoretical model of the battery and on external measurements of voltage, current and temperature.

➢ The most widely used techniques usually rely upon an electrical equivalent circuit which is analytically solved with the measurements of external physical measurements.

➢ This course focus on how ML-Machine Learning (LSTM Neural Networks) can be used at low frequency sampling and using few physical quantities (Current, Voltage, Temp) to estimate battery health (SOH) and charge (SOC) with a very high precision without ever applying more expensive analytical techniques.

➢ This course focus on how engineers develop BMS algorithms and software by performing system-level simulations.

➢ Model-Based Design enables you to gain insight into the dynamic behavior of the battery pack, explore software architectures, test operational cases, and begin hardware testing early, reducing design errors.

➢ With Model-Based Design, the BMS model serves as the basis for all design and development activities, including desktop simulation of the design's functional aspects, formal verification and validation to industry standards, and code generation for real-time simulation and hardware implementation.

## At a glance:-

- Level: Introductory
- Language: English
- Mode of Teaching: Online & Offline
- Duration: 3 weeks
- Price: Rs: 1,770/- (GST Included)
- Class: 2 hours per day
- Eligibility: Pursuing/Completed (Diploma (ECE/ECM/EEE) /B.Tech/BE/ME/M.tech (Electronics/ECE/EEE)/BSc/MSc (Electronics))
- Batch Commencement: Every Month First and Third Wednesday

## What you'll learn:-

- Monitor cell voltage and temperature.
- Estimate state-of-charge (SOC) and state-of-health (SOH) by using ML
- Limit power input and output for thermal and overcharge protection.
- Control the battery charging profile
- Estimate the Battery Remaining useful Life (RUL)
- Deploy on to SPC584 Discovery Board.

## Ways To Take This Course:

- Log on to Citd Facebook or Citd LinkedIn or Citd Instagram
- Log on to www.citdindia.org
- On the Home page rights side down please click on Crash Courses In ESDM, LCA & Industry 4.0 Departments.
- You will find Notification and Registration Form links on the page.
- To know about Course details please click on Notification link.
- To take registration please click on Registration Form link and follow the instructions on the page.
- For this course you have to choose ESDM Department.
- For Offline registration Please call to front office desk phone No: - 040-29561793 or Mobile No: +91- 9908211787 or what's app No: +91-9908211787.

Sd/-
Principal Director