Post Graduate Program in Electric Vehicle Design & Development

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----------Start----------

Hi, thanks for showing interest in our Post Graduate Program in Electric Vehicle Design & Development Program. It was great talking to you. Here are the details regarding the course.

Duration of the course

Full time: 12 months
Part time: 24 months

In this program, you will learn the below course

This Post Graduate program has 4 tracks, with 27 courses in total.

#Co-Branded Certificate with MathWorks Students who complete Mathworks training (optional) and clear the assessment test will get the Skill-Lync certificate co-branded with MathWorks.

Track 1 focuses on automotive embedded systems and their programming through software development.

1. Embedded C Essentials
2. Fundamentals of Embedded Systems
3. AVR Bare Metal Programming
4. Software Verification and Validation and System Testing for Hand Code
5. Device Drivers and Serial Communication Protocols
6. Introduction to C++
7. Introduction to Automotive Cybersecurity and Vehicle Networks
8. Linux Driver Development

Track 2 focuses on Gain expertise in system engineering by working on model-based software development and its testing for automotive applications.

1. Introduction to Model-Based Development using MATLAB and Simulink
2. Embedded C Essentials
3. Software Verification and Validation and System Testing for Model-Based Development
4. Introduction to Automotive Embedded Systems and AUTOSAR
5. Introduction to Automotive Cybersecurity and Vehicle Networks

Track 3 focuses on Understanding EVs at system and subsystem levels: work on powertrain architecture, component sizing and its control with MATLAB & Simulink.

1. MATLAB Basics
2. Simulink Basics
3. Introduction to Hybrid Electric Vehicle using MATLAB and Simulink
4. Introduction to Control of Electric Vehicle
5. Li-ion Battery System design in EV & ES
6. Fuel cell and Ultra capacitor for EV using MATLAB & Simulink

Track 4 focuses on Power electronics as a major technology as part of the EV powertrain. Learn about the DC-DC converter, inverter & rectifier circuits used in EV applications.

1. MATLAB Basics
2. Simulink Basics
3. Simulation and Design of Power Converters for EV using MATLAB and Simulink
4. Design Concepts of Power Electronic Converters for Industries
5. Fundamentals of DC-DC converters
6. AC-DC Rectifiers, Harmonics and Related Standards
7. Advanced PCB Design using Altium
8. Electric Motor design using Ansys Maxwell

Software

1. C Programming
2. C++
3. STM32CubeIDE
4. MATLAB**
5. Simulink**
6. LDRA Design Suite
7. Mbed Simulator
8. ANSYS Maxwell
9. Stateflow
10. Linux toolchains
11. LT Spice
12. Altium Designer
13. Embedded Linux
14. AVR ATMega328
15. SimulIDE
16. Microchip Studio
17. Arm Cortex M4 STM32-
18. CAN Protocol
19. LDRA Tool Suite

**Licensed version of MATLAB and Simulink provided for 6 months.

Projects

Track 1: (Projects onEmbedded Software)

1. User interfaces for working with “Sets
2. Finite State Machine for Aircraft Landing Gear System
3. Interfacing a 16*2 LCD with 2 Arduino using (I2C) communication protocol
4. Measuring the distance to an object using ultrasonic sensor

5. DC Motor Control Using L293 Driver
6. Interfacing HC-SR04 Ultrasonic Sensor with Atmega328p
7. Static Code Review analysis
8. Dynamic Analysis – White box testing:
9. Write driver for I2C and use USB logic analyzer to analyze the I2C frames
10. Write a CAN driver for STM32 Controller and analyze CAN data frames in loopback mode or Connect two STM32 hardware to verify data exchange
11. Proper logging of CAN data
12. Binary search for a given signal
13. Programming an attack terminal
14. Developing a full-featured character device driver as a loadable module
15. Design and development of a web-based temperature control system using Beaglebone
16. IT Inventory Management
17. Automobile maintenance System

Track 2:(Projects onModel Based Development)

1. Vehicle Direction Detection
2. Adaptive Cruise Control
3. User interfaces for working with “Sets”
4. Finite State Machine for Aircraft Landing Gear System
5. TFT Cluster Speedometer Display
6. Coolant Temperature Meter Software Component Development
7. Traffic Jam Assist Feature in MATLAB Environment
8. Highway Assist – Lane Changing Assist
9. Proper logging of CAN data
10. Binary search for a given signal
11. Programming an attack terminal

Track 3:(Projects onEV System Design)

1. Traveling Salesman Problem Using MATLAB
2. Speed Control of a Direct Current (DC) Motor
3. Modeling of Electric Vehicle Using DC Motor Drive
4. Design of Electric Powertrain
5. Modeling an Electric Vehicle with Li-ion battery
6. Electric Rickshaw modeling
7. Estimating the Voltage-based SOC of the Battery using 1 RC Model in MATLAB
8. Project-Based on a Real-world Scenario
9. Fuel Cell Electric Vehicle Development
10. Energy Management Technique

Track 4:(Projects on E Drive System)

1. Traveling Salesman Problem Using MATLAB
2. Speed Control of a Direct Current (DC) Motor
3. Preparation of Converter Design report
4. Design an interleaving DC/DC converter system for a data center application
5. Design and development of DC/AC H-bridge inverters for microgrid applications
6. Loss Calculation of a DC/DC Converter using MATLAB
7. Modeling of 3 Phase Inverter for Electric Vehicle Application
8. Design of DC-DC SEPIC Converter

9. Design of MPPT Controller
10. Design and Simulation of Three-phase Uncontrolled and Controlled Rectifier Circuits for the Given Design Parameters
11. Design and Simulation of a Closed Loop Single-phase High-power Factor Rectifiers
12. Create a Project Workspace for MIC33030
13. Create a project workspace for Arduino Mini
14. Startup behavior analysis of an induction motor
15. Simulation in ANSYS Maxwell and report creation

Hardware Table

S.No	ITEM NAME	Buying Option
1	STM32 Nucleo-64 development board with STM32F334R8	https://www.digikey.in/en/products/detail/stmicroelectronics/NUCLEO-F334R8/4835707?s=N4IgTCBcDaIHIFcDGAbApgewAQDEDMeALAEoAclAugL5A
2	USB Logic Analyze 24M 8CH, MCU ARM FPGA DSP Debug Tool	https://www.electronicscomp.com/usb-logic-analyze-24m-8ch-mcu-arm-fpga-dsp-debug-tool?gclid=CjwKCAjw_L6LBhBbEiwA4c46ulYj5o_5pCE8-IlXQj5hzwzXGze0zRneaJa0gi0f8TJYMaK5gKF4QxoCfBQQAvD_BwE
3	Official Arduino Sensor Kit	https://www.electronicscomp.com/official-arduino-sensor-kit?search=Arduino%20sensor%20ki
4	Stepper Motor	https://www.electronicscomp.com/stepper-motor-5v-unipolar-india?search=stepper
5	ULN2003 Stepper Motor Driver	https://www.electronicscomp.com/uln2003-stepper-motor-driver-board
6	Beagle Bone Black (optional for Skill-center course)	https://www.electronicscomp.com/beaglebone-black-rev-c?gclid=CjwKCAiAtouOBhA6EiwA2nLKHxmRbyIsPY-sDb8Zx037h18jF0vz55_K1i3kYIkugLMzC0RYxac4-RoC6NAQAvD_BwE

Must Watch
https://youtu.be/GcQYjq6yggM

Demo videos
1. https://www.youtube.com/watch?v=E0cIpeAR78s&t=178s
2. https://www.youtube.com/watch?v=Ax6s4jGh-MM&t=1s
3. https://www.youtube.com/watch?v=tpDyT29BunQ

4. https://www.youtube.com/watch?v=-Nsd8P-7LUI
5. https://www.youtube.com/watch?v=dbVDehm6gxA
6. https://www.youtube.com/watch?v=GcQYjq6yggM
7. https://www.youtube.com/watch?v=4EvfydX6zHM
8. https://www.youtube.com/watch?v=3qqu-RsjVZ8
9. https://www.youtube.com/watch?v=-bZaqU0qTHY
10. https://www.youtube.com/watch?v=DNY6TImHsk8&t=2s
11. https://www.youtube.com/watch?v=5e_egVme2fQ&t=1s
12. https://www.youtube.com/watch?v=BE9S8PUE2p4
13. https://www.youtube.com/watch?v=vKo34TFY3yc

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