Estd. 2008.

NSRIT

NADIMPALLI SATYANARAYANA RAJU INSTITUTE OF TECHNOLOGY

(AUTONOMOUS)

(Approved by AICTE, New Delhi & Permanently Affiliated to JNTUGV, Vizianagaram)
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NAAC 'A' GRADE

No: NSRIT/CIRCULAR /2023-24/003 December 19, 2023

Industry Institute Linkage (IIE)

Notification on the launch of Industry Driven One Credit Course on

Introduction to Hybrid electric Vehicle design using Matlab and Simulink

This is to inform all the students of second and third year of Electrical and Electronics Engineering that the IIE is launching a one-credit course on "**Introduction to Hybrid Electric Vehicle Design using Matlab and Simulink**" with its collaborating partner **SKILL LYNC** during January 02 – 06, 2024. Interested students can register their names and the course duration is more than 30 hours through offline mode with assignments. Attendance in all the five days is mandatory along with assessment. On successful completion of the course, the students will be awarded with one-credit. Here is the syllabus pertaining to the above-mentioned course as enclosed for a better understanding regarding the deliverables and outcomes. **Dr. Amaleswari, faculty of EEE** will be the course coordinator. In case if any other students of other programs are interested, consideration will be there based on the availability of seats, normally the total strength is restricted to 60 only. The last date for registration with the course coordinator is Dec. 25, 2023.

IIE (Lead) 19/12/23

Director 19/12/2023

Copy to:

a. The Secretary and the Treasurer for kind information
b. The Principal for kind information
c. All HoDs for kind information to inform the interested students to register with course coordinator
d. The HoD (EEE) for necessary action to forward the name list to the office of CoE and IIE (Lead)
e. Faculty Concerned with a request to coordinate and update necessary details in the website
f. File

Day	Topic	Learning Objectives	Category
1	Introduction to EV	-Overview of Automotive Industry and product engineering -Transportation system problem & solutions -Current status and future trend -How do I start learning? -Scope of EV	Delivery
	HEV Powertrain and Architecture	-Introduction to conventional ICE engine vehicles, difference between ICE vehicles and EV, What is HEV and PHEV -Hybrid electric vehicles and its subsystems -Hybrid electric vehicle architecture -Series hybrid, Parallel hybrid, Series-parallel	Delivery
	EV architecture and components	EV architecture and components -Overall block diagram - Driving cycle & Forces acting on a vehicle,Energy and power Calculations	-Delivery -Design & Calculation
	Overview of simulink:	Simulink Overview (commonly used blocks, continuous library, dashboard library, discontinuous library) Simulink Overview (discrete library, logic & bit operations library, look up tables library, math operations library, model verification library, model-wide utilities library,ports & sub systems library, signal attributes library, signal routing library) Simulink Overview (sinks library, sources library, string library, user defined functions library)	Hands on
	Waveforms of elementary input signals & Trigonometric functions	Basic waveforms (ramp function, pulse function, stair step function, retracting stair step function) Blocksets in simulink (overview) Cosecant function, secant function, cotangent function, applications of trigonometric functions, simulink model of amplitude modulated wave using MATLAB function.	Hands on
2	Mathematical modelling of system using differential equation	Simple mathematical equations,Solver configurations,Scope -study in detail	Hands on
	Mass Spring Damper system	Differential Equations: spring-mass-damper systems (transfer function, laplace transform, forcing function, natural frequency, damping coefficient, damping ratio, damped frequency).	Hands on
	Introduction to control systems in Simulink	Explanation of simulink model to implement the control gain 'K' to understand the closed loop system behaviour with state feed back gain 'K'	Hands on
3	Introduction to Battery technology	Types of battery: Lead acid - NiMH - Lithium-ion Construction of the battery pack	Delivery
	Datasheet reading	Understanding datasheet parameters,Calculation of battery capacity,energy density total voltage and power	Design & Calculations
	EV chargers	Different Modes of EV Charging	Delivery
	Electric motors	Types of electric motors used in electric vehicle application with model examples	Delivery
4	Simulation Demo		
	Hands on	Matlab demonstration of simulink model of a DC motor	Simulation demo
	Hands on	Driver Glider model	Simulation demo
	Hands on	Total tractive force required acting on vehicle modelling	Simulation -Hands on
	Discussion	Battery pack construction/Charge and discharge characteristics	Simulation -Hands on
5	Live -hands on	Energy analysis of a two wheeler with different drive cycles and battery pack rating	Simulation demo
		Design and development of 4W and performance analysis using different drive cycle	Simulation-Hands on
		Design and development of 4W and performance analysis using different drive cycle	
		Break	
		Battery equivalent circuit modelling	Simulation -Hands on
		CCCV charcateristics analysis	Simulation Hands on
		Queries	