KALINGA INSTITUTE OF INDUSTRIAL TECHNOLOGY

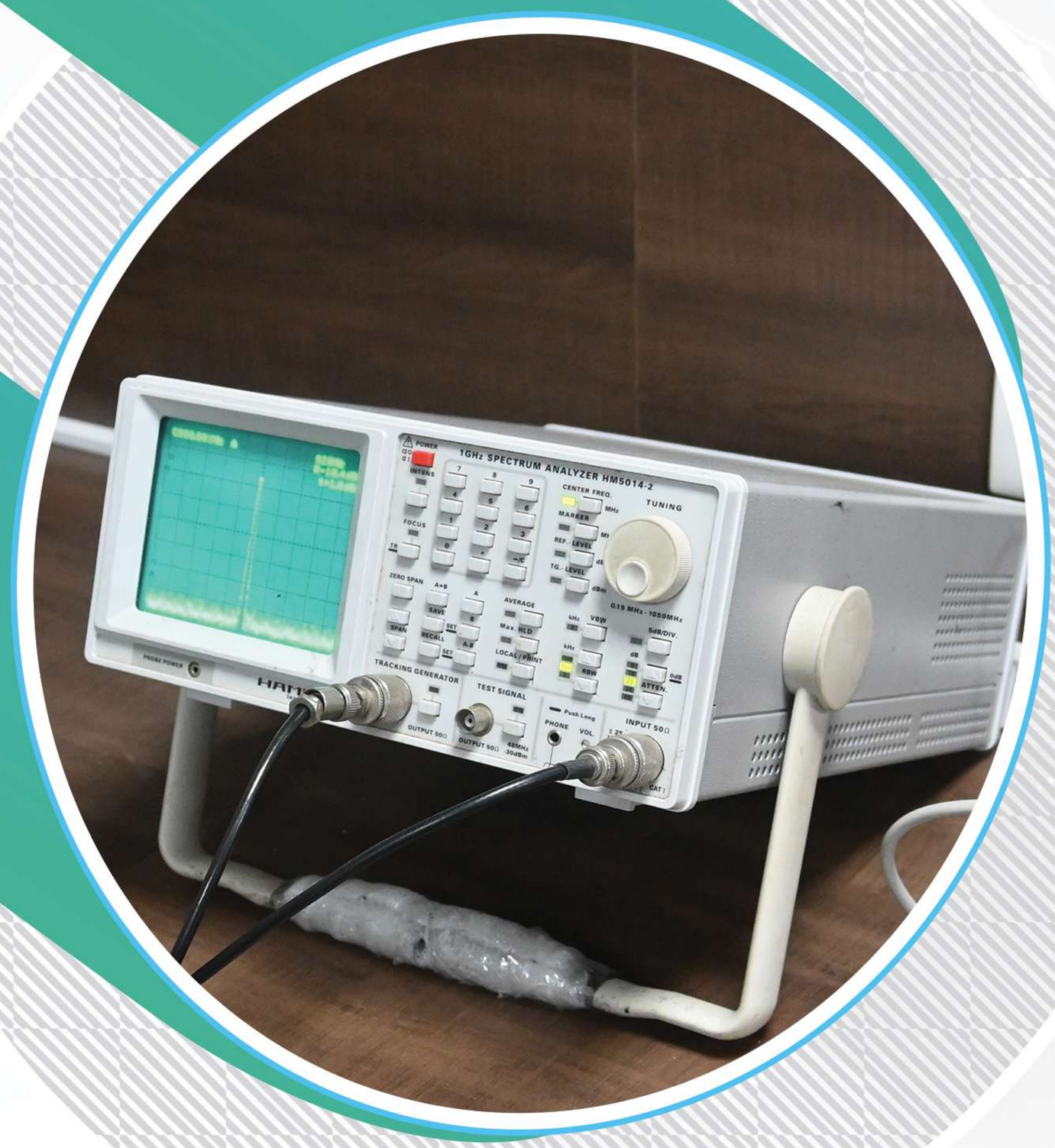
Deemed to be University U/S 3 of the UGC Act, 1956

Established : 1997

SCHOOL OF ELECTRONICS ENGINEERING

Real-time design of **EV & Autonomous vehicles** using MATLAB/ Simulink

SUMMER TRAINING 2025



COURSE OBJECTIVE

This course covers essential concepts of Vehicle Dynamics and Control using Simulink, focusing on modeling, simulation, and control strategies for vehicles. It also introduces Battery Management System (BMS) implementation techniques like SoC estimation and cell balancing. The course further provides hands-on experience in real-time hardware integration using Arduino, Raspberry Pi, and STM32 platforms. In addition, it covers Sensor Fusion and ADAS algorithm development, with a special focus on Lane Detection using MATLAB/Simulink.

- CERTIFICATES ON COMPLETION
- HYBRID MODE TRAINING
- 20 HOURS | 40+ PROJECT

COURSE OUTCOME

EV Dynamics

Understand EV Dynamics & Control Implementation in Simulink

BMS Application

Understand and apply Battery Management System (BMS)

Prototyping Platforms

Development & Testing, Real-Time Prototyping using Arduino, Raspberry Pi, and STM32

ADAS Development

Understand Sensor Fusion & ADAS Algorithm Development.

COURSE FEE

KIIT Affiliation	Rs. 4000/-*
Other Affiliation	Rs 5000/-*

*No Fooding & Lodging

INSTRUCTORS

- Dr. Ganaraj P S
- Dr. A. K. Pati

MODULE DESCRIPTOR FOR THE COURSE

MODULE 1

Introduction to MATLAB & Simulink for EV & ADAS:

Introduction to MATLAB Environment & Basics, Simulink & Model-Based Design, Fundamentals of Electric Vehicles (EV), Simulink Implementation of Basic EV Model, Vehicle Dynamics using Simulink, Introduction to ADAS Systems.

MODULE 2

Getting Started with Embedded Hardware Integration with MATLAB/Simulink:

Overview of Arduino, Raspberry Pi, and STM32 with MATLAB, Installation of Hardware Supporting Packages in MATLAB/Simulink, Implementing PID Control on Arduino, Speed Control of a DC/BLDC Motor with development board, Interfacing STM32 with MATLAB for motor speed Control.

MODULE 3

Interfacing of sensors and BMS:

Sensor Fusion Techniques in Simulink, Introduction to Battery Management Systems (BMS), Understanding different parameters of BMS, Battery Charging & Discharging Simulation, State-of-Charge (SoC) & State-of-Health (SoH) Estimation methods, Balancing of batteries

MODULE 4

Real-time Implementation of BMS and Computer vision for autonomous vehicles:

SoC Estimation with STM32 using Simulink, Cloud interfacing of Raspberry Pi with Simulink, Cloud-based development of SoC Estimation, Object Detection using OpenCV/MATLAB for autonomous vehicles, Camera-Based Lane Detection Using Raspberry Pi.