

# **DESIGN & SIMULATION OF MECHANICAL COMPONENTS IN EV USING CATIA**

*A project report submitted in partial fulfillment of the requirements  
For the award of the degree of*

## **BACHELOR OF TECHNOLOGY IN ELECTRICAL & ELECTRONICS ENGINEERING**

**Submitted by**

**CH SUPREETH  
(20811A0205)**

**G VARSHINI  
(20811A0209)**

**P KEDARESWARI  
(21815A0210)**

**P BHASKAR PRASAD  
(21815A0215)**

**Under the Esteemed Guidance of**

**Mr. K NARAYANA RAO**

**Assistant Professor**



**DEPARTMENT OF  
ELECTRICAL AND ELECTRONICS ENGINEERING**

**AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY**

(Permanently Affiliated to Jawaharlal Nehru Technological University - Gurajada Vizianagaram, AP)

(An NAAC Accredited Institution)

Tamaram, Narsipatnam, Anakapalli-531113

**2020-2024**

# AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

(Permanently Affiliated to Jawaharlal Nehru Technological University - Gurajada Vizianagaram, AP)

(An NAAC Accredited Institution)

Tamaram, Narsipatnam, Anakapalli-531113

## DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING



### CERTIFICATE

This is certify that the project report entitled “**DESIGN & SIMULATION OF MECHANICAL COMPONENTS IN EV USING CATIA**” is a bonafide work submitted by **CH SUPREETH, G VARSHINI, P KEDARESWARI, P BHASKAR PRASAD** in partial fulfillment of the requirements for the award of degree of **Bachelor of Technology** in **Electrical & Electronics Engineering** from **Jawaharlal Nehru Technological University Gurajada Vizianagaram**, during the academic year **2023-2024**.

**Internal Guide**

**Mr. K Narayana Rao**

Assistant. Professor

Dept. of Electrical & Electronics Engg.

Avanthi Institute of Engg. & Tech.

Narsipatnam.

**Dr T Srinivasa Rao**

**Head of the Department**

Dept. of Electrical & Electronics Engg.

Avanthi Institute of Engg. & Tech.

Narsipatnam.

**Head of the Department**  
Department of Electrical & Electronics Engg.  
Avanthi Institute of Engg & Tech.  
Makavarapalem, Visakhapatnam - 531113.

## ABSTRACT

The transition towards electric vehicles has necessitated the development of efficient and robust mechanical components to meet the unique demands of electric propulsion systems. This abstract presents a comprehensive study on the design and simulation of mechanical components tailored for EV applications. The design and simulation of chassis for electric vehicles play a crucial role in ensuring vehicle performance, safety, and efficiency. This paper presents a comprehensive approach to the design and simulation of an EV chassis using CATIA, a powerful computer-aided design software. The process begins with preliminary design considerations, including defining vehicle specifications and selecting appropriate materials to meet structural requirements while minimizing weight. Next, detailed 2D sketches are created using CATIA's sketching tools, which are then extruded or revolved to generate 3D solid models of chassis components. The assembly design phase involves integrating individual components into a complete chassis assembly, considering factors such as component alignment and clearance. CATIA's simulation capabilities are then employed to analyse the structural performance of the chassis under various loading conditions, including static loads, dynamic loads, and crash scenarios. Structural analysis simulations evaluate the chassis' stiffness, strength and durability, identifying areas for optimization to improve performance and reliability. Additionally, aerodynamic analysis simulations may be conducted to optimize the chassis shape and reduce drag, enhancing vehicle efficiency. Through iterative optimization and validation processes, the design is refined to ensure it meets all requirements and passes simulation validation. Detailed engineering drawings and documentation are then created for manufacturing and assembly of the chassis components. Overall, this paper provides a systematic approach to designing and simulating an EV chassis using CATIA, enabling engineers to develop chassis designs that meet performance, safety, and regulatory standards for electric vehicles.