



PAAVAI COLLEGE OF ENGINEERING

(Approved by AICTE | Affiliated to Anna University)

Paavai Nagar, NH-44, Pachal, Namakkal -637 018. Tamilnadu, India.

Ph.No : 04286 - 248658, Email : pceprincipal@paavai.edu.in, Website : <http://pce.paavai.edu.in>

CRITERION 7 - INSTITUTIONAL VALUES AND BEST PRACTICES

7.1 Institutional Values and Social Responsibilities

| | | |
|-------|--|---------|
| 7.1.2 | The Institution has facilities and initiatives for | |
| S.NO. | CONTENT | PAGE NO |
| 4 | Green Campus Initiatives | |
| | (i) Landscaping with Trees and Plants | 3 |
| | (ii) Ban on Plastics | 14 |
| | (iii) Pedestrian Walking Platform | 16 |
| | (iv) Restricted Entry of Automobiles | 18 |
| | (v) Use of E-Vehicle | 22 |



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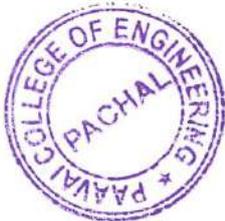
7.1.2 – 4. Green Campus Initiatives

PCE is a leading engineering institution in Namakkal, Tamil Nadu, known for its extraordinary commitment to sustainability and environmentally sensitive methods. A visit to the institution provides a direct experience with not only our amazing infrastructure but also our commitment to fostering an environmentally friendly atmosphere. The well-designed buildings complement the lush natural surrounds, offering a perfect environment for an enhanced teaching and learning experience.

The institutional initiatives for greening the campus areas follows

- Landscaping with Trees and Plants Description
- Ban on Plastics
- Pedestrian Walking Platform
- Restricted Entry of Automobiles
- Use of E-Vehicle

The geo tagged photos of the above mentioned facilities are attached below



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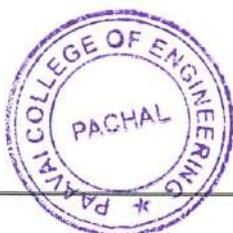
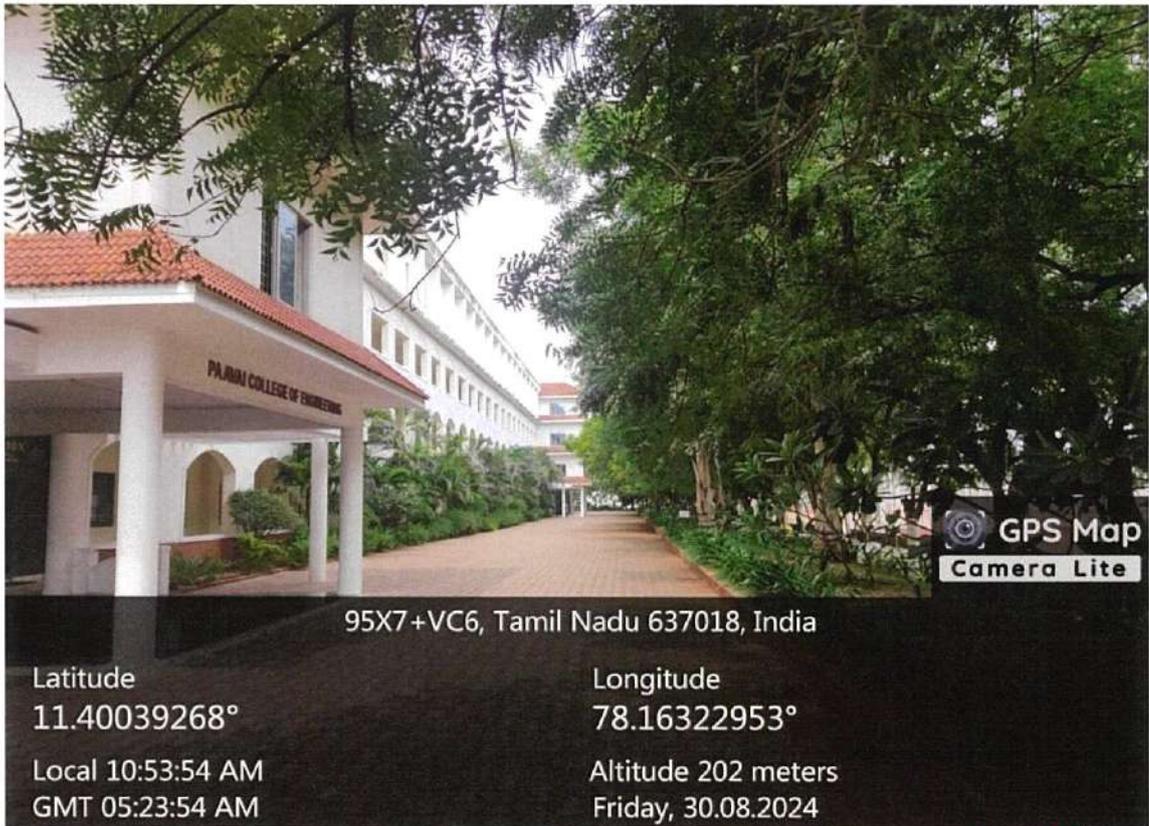
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(i) Landscaping with Trees and Plants:

Within the campus, the institution maintains a clean and green environment. By establishing a distinct estate maintenance wing, the institution ensures the preservation of the environment, it maintains the lawn and plantations by employing gardeners and sweepers.

Our institution is more concerned with keeping a green campus and being environmental friendly, which ensures that **pure oxygen** is available throughout the building. the campus has been made **greener by the addition of more trees**, providing a pleasant environment for students to learn in and faculty members to work in.



Green Campus in Main Block

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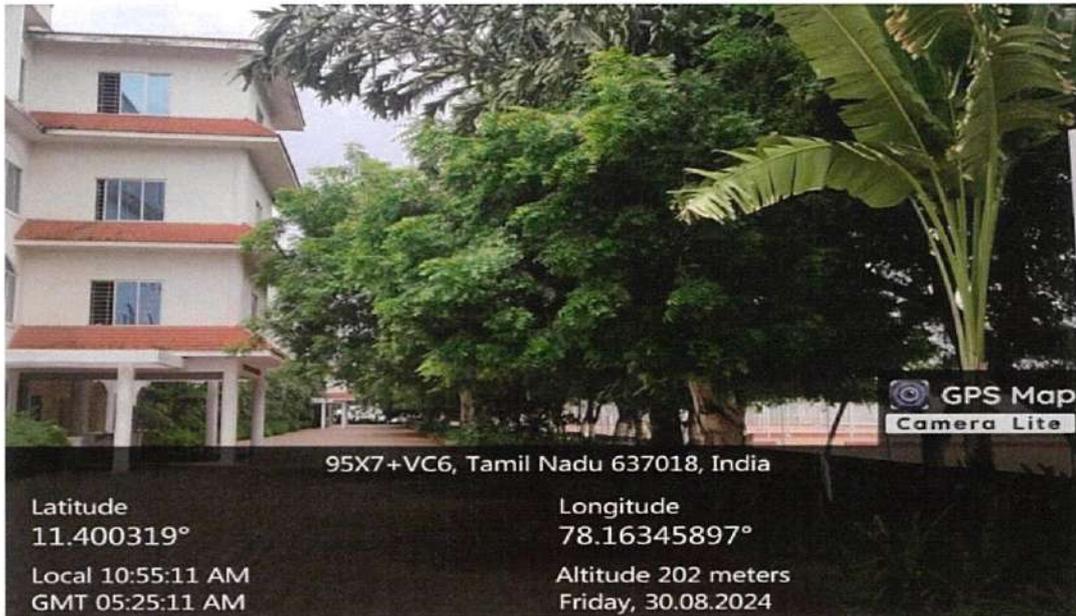


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Green Campus in Main Block



Landscape in front of the Main Block



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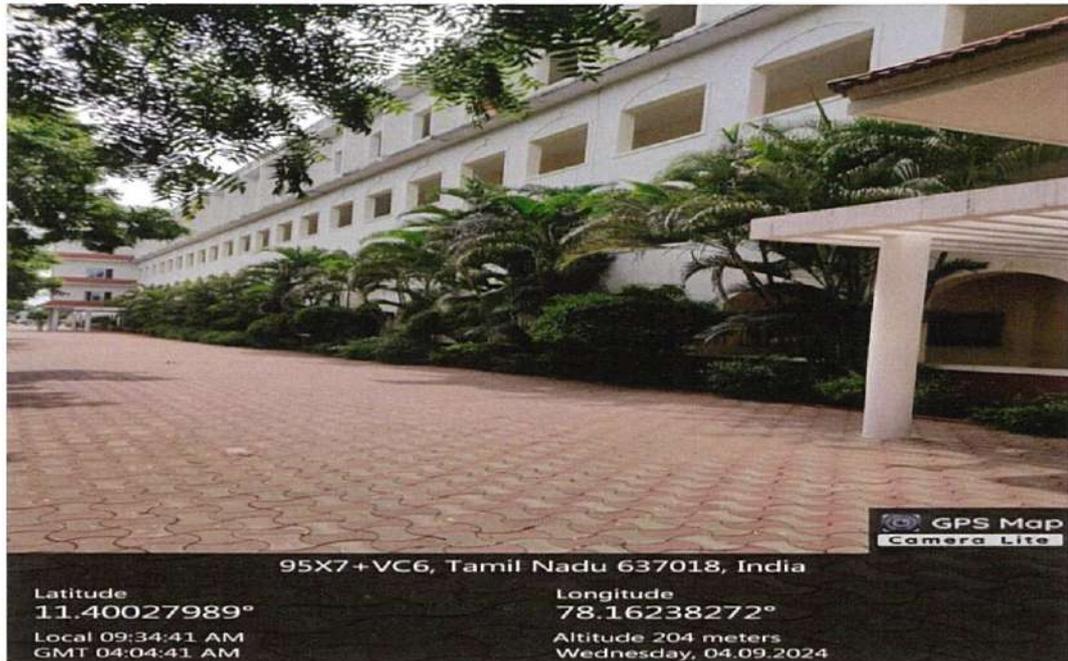


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Landscape in front of the Main Block



Green Campus near Pragati Hall



[Signature]
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95X7+VC6, Tamil Nadu 637018, India

Latitude
11.40028728°

Longitude
78.16341932°

Local 10:54:51 AM
GMT 05:24:51 AM

Altitude 202 meters
Friday, 30.08.2024

Green Campus near College Entrance



C526+5PP, Rd, Paavai Nagar, Pachal, Tamil Nadu 637018, India

Latitude
11.40100775°

Longitude
78.16199505°

Local 11:44:28 AM
GMT 06:14:28 AM

Altitude 202 meters
Friday, 30.08.2024

Greeneries near Automobile Laboratory



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Green Campus near College Entrance



Green Campus in Boys Hostel



Principals
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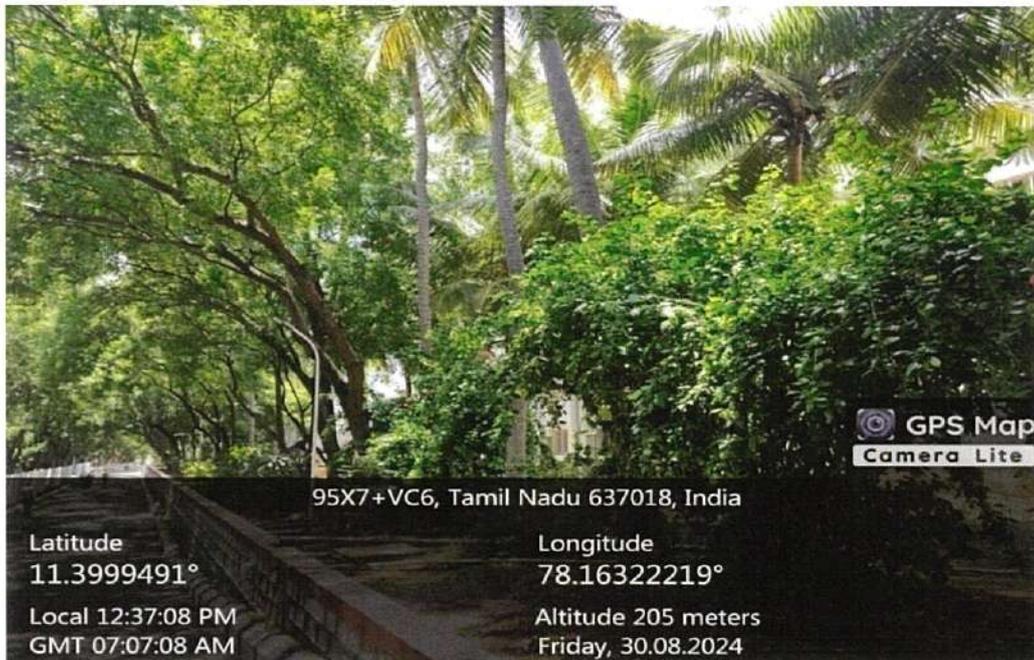
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Namakkal, Tamil Nadu, India
95X7+Q93, Tamil Nadu 637018, India
Lat 11.399483°
Long 78.162983°
30/08/24 01:51 PM GMT +05:30

Green Campus in Girls Hostel



95X7+VC6, Tamil Nadu 637018, India

Latitude
11.3999491°

Longitude
78.16322219°

Local 12:37:08 PM
GMT 07:07:08 AM

Altitude 205 meters
Friday, 30.08.2024

Green Plants and Trees inside the Campus



Handwritten signature
Principal

Paavai College of Engineering,
NH-44, Pachal Namakkal - 637018



PAAVAI COLLEGE OF ENGINEERING

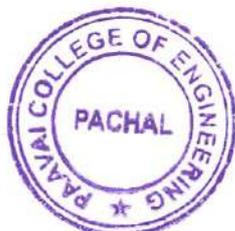
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Green Plants and Trees inside the Campus



Handwritten signature in green ink.

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List of Matured Trees in the College Campus (Only Native Spices):

| S. No. | Location (Wing/Block/Area) | Name of the Tree | Botanical Name | Quantity |
|--------|-------------------------------|-------------------|-------------------------------|----------|
| 1. | In Front Of Main Block | Neem Tree | Azadirachta Indica | 52 |
| 2. | In Front Of Main Block | Fish Tail Tree | Caryota urena | 10 |
| 3. | In Front Of Main Block | Champa | Plumeria obtusa | 27 |
| 4. | In Front Of Main Block | Areca Palm | Dypsis lutescens | 14 |
| 5. | In Front Of Main Block | Weeping Fig | ficus benjamina | 14 |
| 6. | In Front Of Main Block | Traveller Palm | Ravenala madagascariensis | 1 |
| 7. | Near Saraswathi Statue | Arjun Tree | Terminalia arjuna | 10 |
| 8. | Near Saraswathi Statue | Guava Tree | Psidium guajava | 2 |
| 9. | Near Saraswathi Statue | Tree-of -Heaven | Alianthus altissima | 10 |
| 10. | In Front Of Workshop | Neem Tree | Azadirachta Indica | 54 |
| 11. | In Front Of Workshop | Coconut Tree | Cocos nucifera | 5 |
| 12. | In Front Of Workshop | Fish Tail Palm | Caryota urens | 4 |
| 13. | Near Globe | Areca Palm | Dypsis lutescens | 4 |
| 14. | Near Globe | Fox Tail Palm | Wodyetia bifurcata | 4 |
| 15. | Near Globe | Umbrella Tree | Heptapleurum actinophyllum | 2 |
| 16. | Behind Main Block | Neem tree | Azadirachta Indica | 11 |
| 17. | Behind Main Block | Coconut tree | Cocos nucifera | 32 |
| 18. | Behind Main Block | Indian beech tree | Pongamia pinnata | 10 |
| 19. | Behind Main Block | Champa | Plumeria obtusa | 52 |
| 20. | Behind Main Block | Pomegranate tree | Punica granatum | 2 |
| 21. | Behind Main Block | Gooseberry tree | Phyllanthus acidus | 1 |
| 22. | Amirthavarshini | Indian beech tree | Pongamia pinnata | 6 |





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| S. No. | Location (Wing/Block/Area) | Name of the Tree | Botanical Name | Quantity |
|--------|-------------------------------|---------------------------|------------------------|----------|
| 23 | Amirthavarshini | Bamboo tree | Bambusa vulgaris | 2 |
| 24 | Amirthavarshini | Brazilan orchid tree | Buhinia forficata | 5 |
| 25 | Amirthavarshini | Fox tail palm | Wodyetia bifurcata | 36 |
| 26 | Amirthavarshini | Chinese banyan | Ficus microcarpa | 12 |
| 27 | Amirthavarshini | Neem tree | Azadirachta Indica | 20 |
| 28 | Amirthavarshini | guava tree | Psidium guajava | 4 |
| 29 | Amirthavarshini | Lemon tree | Citrus limon | 4 |
| 30 | Amirthavarshini | Banana tree | Musa paradisiaca | 29 |
| 31 | Amirthavarshini | Pomegranate tree | Punica granatum | 2 |
| 32. | Amirthavarshini | Jungle geranium | ixora coccinea | 92 |
| 33. | Amirthavarshini | Mango tree | Mangifera indica | 4 |
| 34. | Behind Saraswathi Statue | Lemon tree | citrus limon | 1 |
| 35. | Behind Saraswathi Statue | Pear tree | Pyrus communis | 1 |
| 36. | Path To Additional Block | Wild Indian almond | Sterculia foetida | 23 |
| 37. | Path To Additional Block | Almond tree | Prunus dulcis | 2 |
| 38. ' | Sachin Tower | Neem tree | Azadirachta Indica | 20 |
| 39. | Sachin Tower | Coastal she-oak (sapling) | Casurina equisetifolia | 32 |
| 40. | Near Boys Canteen | Coastal she-oak(sapling) | Casurina equisetifolia | 29 |



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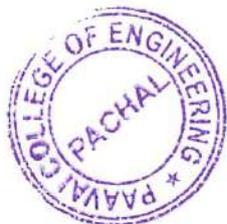
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| S. No. | Location (Wing/Block/Area) | Name of the Tree | Botanical Name | Quantity |
|--------|-------------------------------|--------------------------|----------------------------|----------|
| 41. | In Front Of Workshop | Champa | Plumeria obtusa | 26 |
| 42. | Behind Main Block | Christmas tree | Araucaria columnaris | 1 |
| 43. | Amrithavarshini | Christmas tree | Araucaria columnaris | 1 |
| 44. | Amrithavarshini | Coastal she-oak(sapling) | Casurina equisetifolia | 54 |
| 45. | Amrithavarshini | Copperpod | Peltophorum pterocarpum | 23 |
| 46 | Path To Additional Block | Copperpod | Peltophorum pterocarpum | 20 |

List of Non Flowering Shrubs:

| S. No. | Location (Wing/Block/Area) | Name of the Shrubs (Non flowering) | Botanical Name | Quantity |
|--------|-------------------------------|--|-------------------|----------|
| 1. | In front of main block | Sky flower | Duranta erecta | 43 |
| 2. | Near boys canteen | Song of india | Dracaena reflexa | 9 |
| 3. | Near boys canteen | Golden panthos | Epipremnum aureum | 20 |



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List of Flowering Shrubs:

| S. No. | Location (Wing/Block/Area) | Name of the Flowing Shrubs | Botanical Name | Quantity |
|--------|-------------------------------|-------------------------------|-------------------------------|--------------|
| 1. | In front of main block | Spider lily | hymenocallis littoralis | 587 |
| 2. | In front of main block | Pin wheel flower | Tabernaemontana divaricata | 5 |
| 3. | Near saraswathi statue | Oleander | Nerium oleander | 2 |
| 4. | In front of workshop | spider lily | hymenocallis littoralis | 748 |
| 5. | Near globe | spider lily | hymenocallis littoralis | 64 |
| 6. | Near globe | Chinese ixora | ixora chinensis | 3 |
| 7. | Near globe | odontonema | odontonema strictum | 5 |
| 8. | Behind main block | Chinese ixora | ixora chinensis | 5 |
| 9. | Behind main block | Jasmine | jasminum | 10 |
| 10 | Behind main block | Hibiscus | hibiscus rosa-sinensis | 4 |
| 11 | Amrithavarshini | spider lily | hymenocallis littoralis | 842 |
| 12 | Amrithavarshini | Sweet indrajao | Wrightia tinctoria | 92 |
| 13 | Amrithavarshini | Oleander | nerium oleander | 5 |
| 14 | Amrithavarshini | Tulasi | ocimum tenuiflorum | 6 |
| 15 | Amrithavarshini | Turkey berry | solnum torvum | 1 |
| 16 | Near Boys Canteen | Spider Lily | Hymenocallis Littoralis | 95 |
| 17 | Sachin Tower | Chinese Ixora | Ixora Chinensis | 1 |
| 18 | Sachin Tower | Spider Lily | Hymenocallis Littoralis | 2 |
| 19 | In Front of Main Block | Glory bower | Volkameria inermis | 100+(approx) |



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(ii) Ban On The Use Of Plastics:

Sustaining cleanliness is the essential part of healthy living because it is hygiene and helps us to develop our personality by keeping us clean externally and internally. PCE decides to go **plastic-free** in the campus. **There are no plastic cups, plastic plates and spoons** instead of that we are using steel glasses, plates and spoons inside the campus. We had “**Plastic free zone**” to create awareness among the community as whole to stop the pollution and leave behind a green and pollution free place for our future generations.



Say No to Plastic

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Plastic Give a Helpful Hand,
but they are Polluting our Land

SAY NO TO NO PLASTIC

A Step Towards Better Tomorrow

GPS Map
Camera Lite

C526+5PP, Rd, Paavai Nagar, Pachal, Tamil Nadu 637018, India

| | |
|--------------------------------------|--|
| Latitude 11.40012454° | Longitude 78.16241702° |
| Local 12:35:57 PM GMT 07:05:57 AM | Altitude 202 meters Wednesday, 18.09.2024 |

Say No to Plastic

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(iii) Pedestrian Friendly Pathways:

Campus has sufficient space for parking vehicles. Roads inside the campus are well maintained. **Pedestrians can walk safely through the campus through walk friendly pathways. Entry of vehicles inside the campus is restricted.** Security people are assigned duties on every turn and crossing to the campus.



Pedestrian Friendly Pathways



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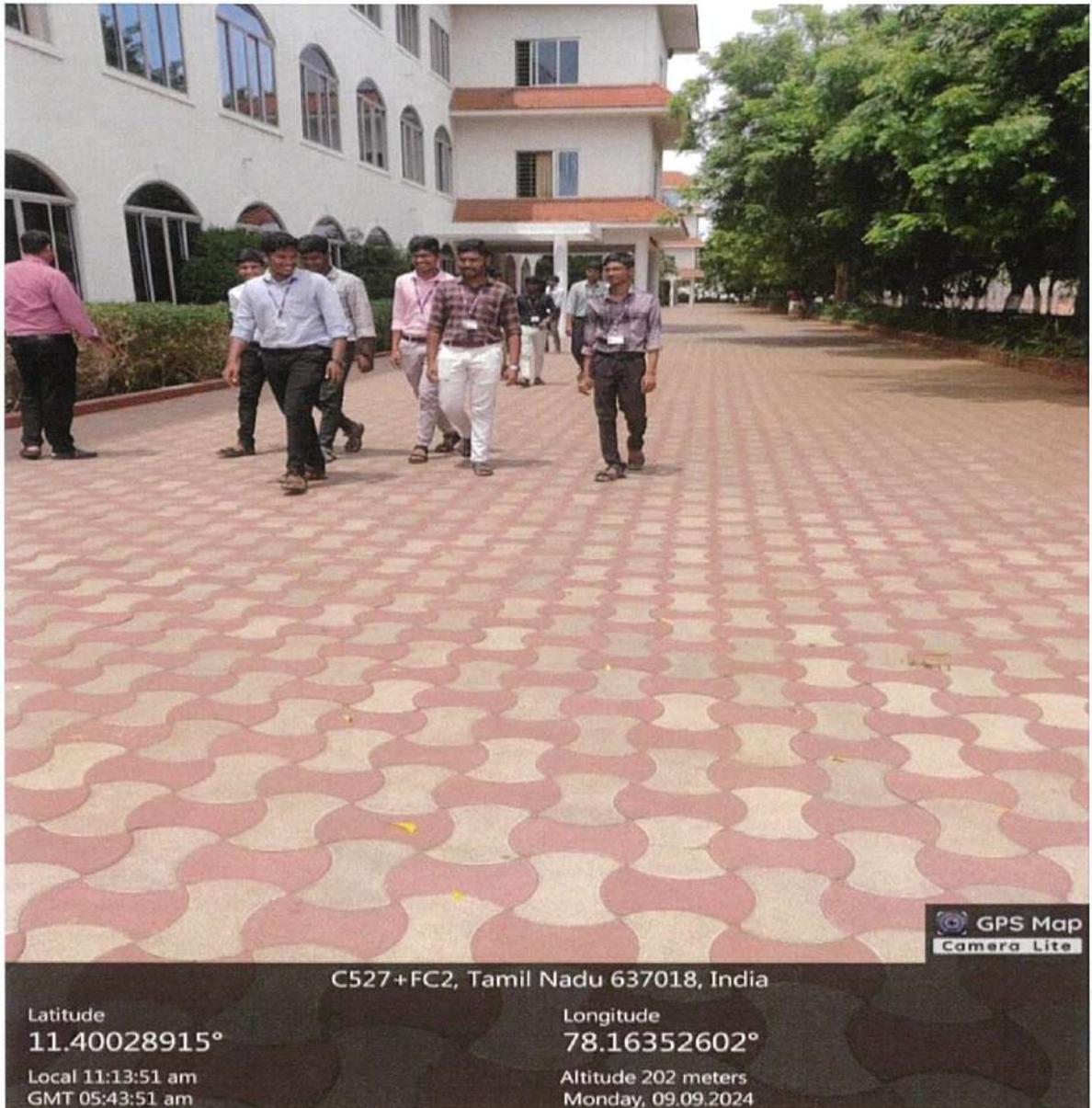


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C527+FC2, Tamil Nadu 637018, India

Latitude
11.40028915°
Local 11:13:51 am
GMT 05:43:51 am

Longitude
78.16352602°
Altitude 202 meters
Monday, 09.09.2024

Pedestrian Friendly Pathways



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(iv) Restricted Entry for Automobiles:

There is a separate parking lot and plenty of space for automobiles at the college's main entrance. The college provides transportation for faculty and students. **The institute encourages staff and students to take the college bus for safety, security, fuel saving, and pollution reduction.** Furthermore, 80 percent of day scholar students ride campus buses to and from class every day. **The college buses are inspected for pollutants by an accredited organization. This certificate's validity and periodicity were randomly validated. Two-wheelers and four-wheelers are permitted to park only provided they are pollution-free.**



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Two Wheeler Parking



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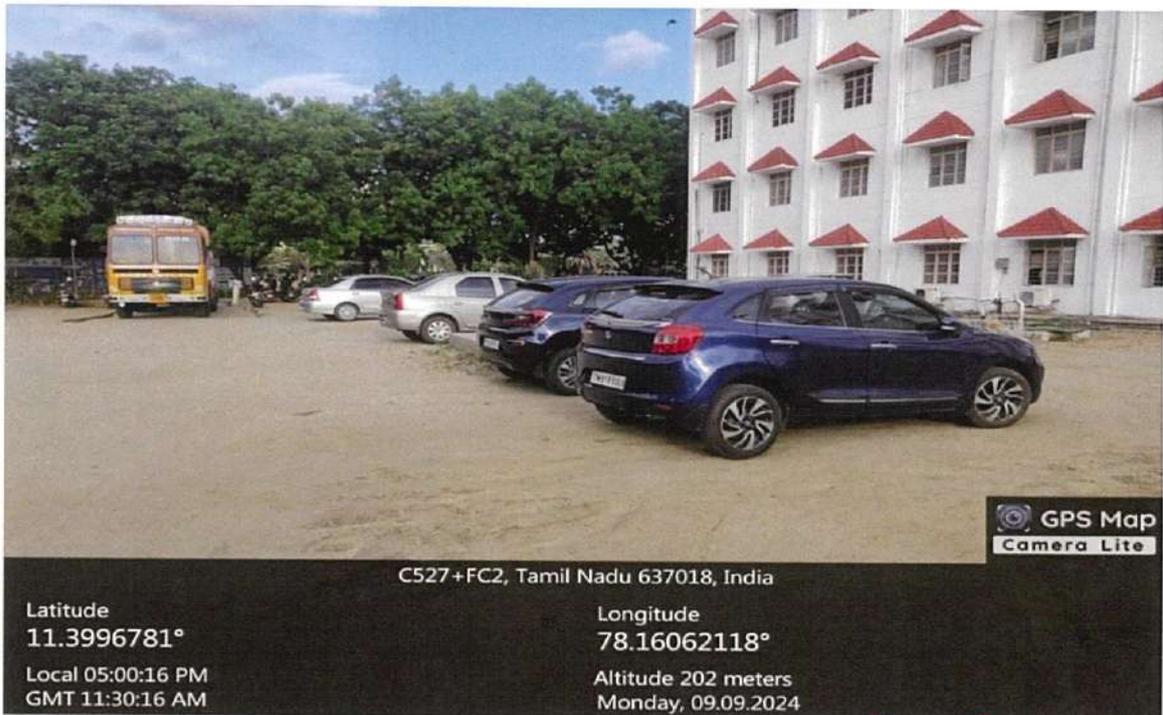


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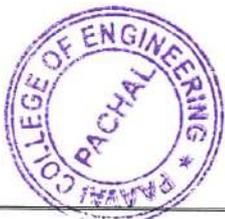
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Car parking

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GPS Map
Camera Lite

C527+FC2, Tamil Nadu 637018, India

Latitude
11.40154081°
Local 02:39:25 PM
GMT 09:09:25 AM

Longitude
78.16162101°
Altitude 202 meters
Tuesday, 10.09.2024



GPS Map
Camera Lite

C527+FC2, Tamil Nadu 637018, India

Latitude
11.40145207°
Local 02:38:56 PM
GMT 09:08:56 AM

Longitude
78.16171605°
Altitude 202 meters
Tuesday, 10.09.2024

Bus yard

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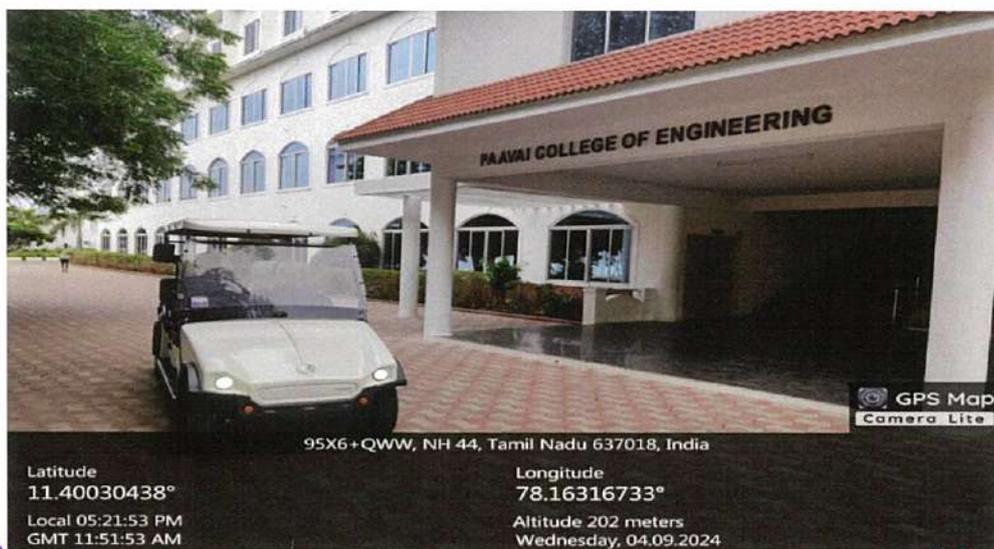
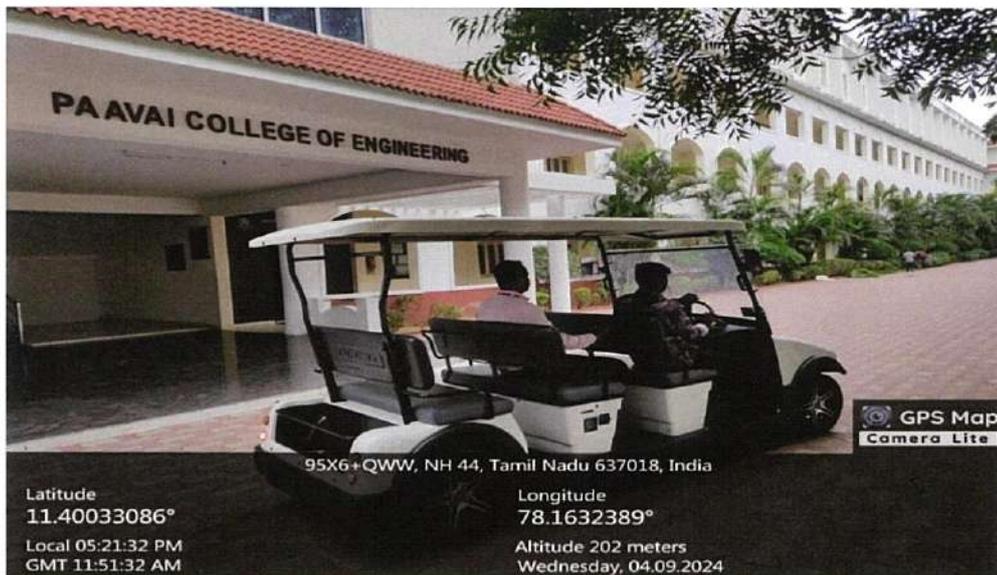
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(v) Use of E-Vehicles:

PCE providing a pollution-free atmosphere by introducing the battery powered automobile service all over the campus. Battery powered vehicles are operated with posted speed limits within this campus for pick and drops the students and teachers from parking area to college campus.



Battery Powered Vehicle inside the Campus

Principal 22

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PCE students have design and manufactured solar charged battery vehicles for pick and drop the students and teachers from parking area to college campus. These vehicles can charge both solar power and charging power station. The charging power station is used to charge both electric operated four wheeler and two wheelers.



E-Cycle



E-Bike



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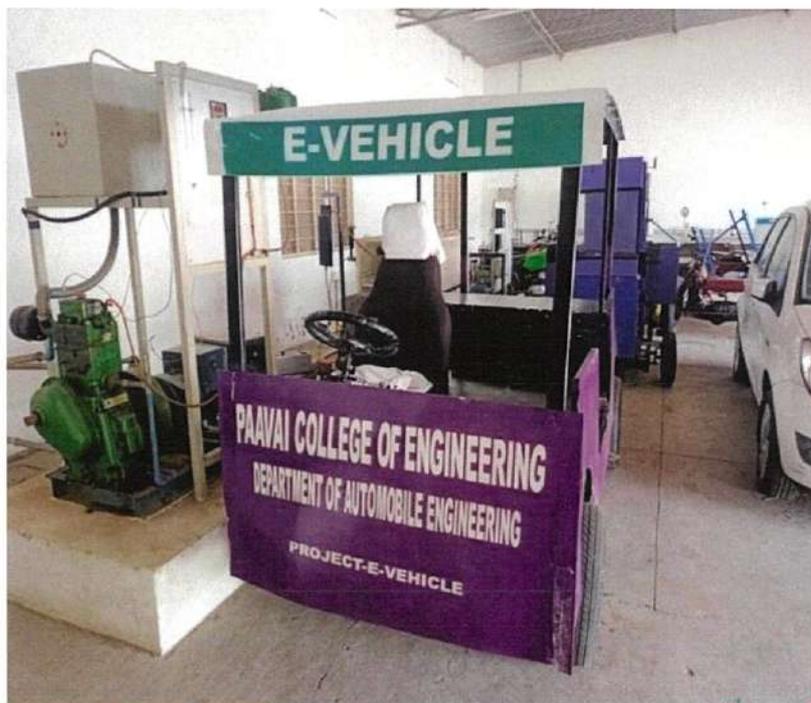
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E- Cart



E-Vehicle



Handwritten signature in green ink.

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FABRICATION OF MINI ELECTRICAL-CART

ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report on "FABRICATION OF MINI ELECTRICAL CART" is the bonafide work of "HARIHARAN.K, MOHAMED FAIZAL HAQ.S, MOKESH.R, THILAKSUNDAR.N.S" who carried out the project work under my supervision.

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ABSTRACT

The rapid urbanization and increasing environmental concerns have led to a growing demand for sustainable transportation solutions. In response to this, the development of electric vehicles has gained significant attention. This paper presents the design and development of an electric cart (E-Cart) tailored for urban mobility. The E-Cart is envisioned as a compact, lightweight, and environmentally friendly vehicle suitable for short-distance transportation within urban areas. The design process involves considerations for energy efficiency, aerodynamics, safety, and user comfort. Additionally, the integration of smart technologies enhances the functionality and usability of the E-Cart. The proposed E-Cart aims to provide an efficient and eco-friendly alternative to conventional modes of urban transportation, contributing to the reduction of greenhouse gas emissions and promoting sustainable urban mobility. The project is about mini electric cart. It has 750 watt traction motor for high performance because there is initial power loss in normal conventional motor. The power can be distributed by lithium-ion battery with direct to direct convertor. This direct to direct convertor is used in this vehicle for electronic accessories. Battery is used to charging and discharging of battery. The direct to direct controller can be used to control the supply of electric energy to electric components.

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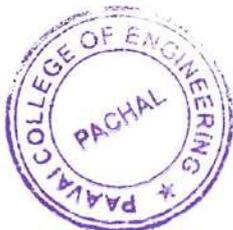
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CHAPTER 8 SPECIFICATIONS AND COST ESTIMATION

Table No 8.1 E-Cart Specification

| Motor | |
|--------------------|--------------------------------|
| Type | Direct Current Brushless Motor |
| Voltage | 48V |
| Power | 750W |
| Propeller Sprocket | 16 |
| Axle Sprocket | 30 |
| Battery | |
| Type | Lithium-ion |
| Capacity | 30Ah |
| Voltage | 48V |
| Charger | 6A |
| Tires | |
| Diameter | 22 inch |
| Convertor | |
| Type | DC to DC |

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| | |
|--------------|------------|
| Power | 24V-48V |
| Frame | |
| Length | 84 inch |
| Width | 48 inch |
| Height | 66 inch |
| Brake | |
| Type | Drum Brake |
| Load | |
| Capacity | 200 kg |
| Speed | |
| With load | 22 km/hr |
| Without load | 15 km/hr |



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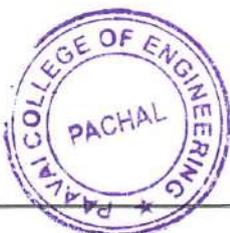
MATERIALS COST

Table No 8.2 Materials Cost

| SL.NO | DISCRIPTION | COST (Rupees) |
|-------|----------------|------------------|
| 1 | Battery | |
| 2 | Charger | 28000 |
| 3 | DC Motor | 4000 |
| 4 | Frame | 5000 |
| 5 | Shaft | 2600 |
| 6 | Speedometer | 1500 |
| 7 | Plywood | 600 |
| 8 | Steering Wheel | 2500 |
| 9 | Wheel | 1100 |
| 10 | Chain Drive | 3200 |
| 11 | Bearing | 2600 |
| 12 | Bearing | 2800 |
| 13 | Fiber Glass | 1500 |
| 14 | Painting | 4500 |
| 15 | Suspension | 2000 |
| | Side Mirror | 1100 |
| Total | | 63000 |

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CHAPTER 6 WORKING PRINCIPLE

The Cart vehicle is an electric vehicle which contains the battery, DC motor, shock absorbers, and wheel. The whole set up is mounted on the chassis frame which is made up of mild steel material. The steering geometry of the vehicle consists of Ackermann steering mechanism shown in figure 6.1. Also, have coupled a ball bearing with the rear and front wheel along with steering. Whenever the vehicle is switched ON the power will be generated from the battery which will be used to run the DC motor. The motion of DC motor is transmitted to rear wheel using chain and sprocket. When personal vehicle (cars, bikes) is not available, use this technology as an urban mobility vehicle, thus eliminating all kinds of pollution.

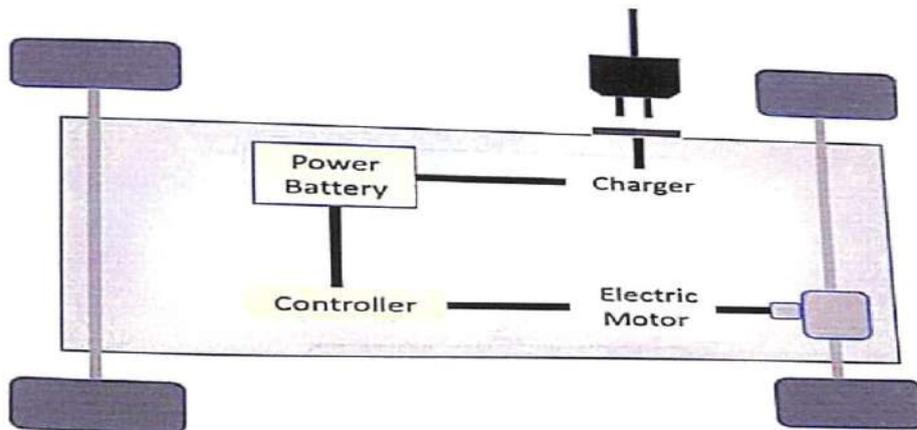


Figure 6.1 2D Layouts of Model

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CONCLUSION

The electric cart project successfully demonstrates the feasibility and benefits of using electric vehicles for transportation. Through careful design, implementation, and testing, the project highlights the efficiency, sustainability, and potential cost savings of electric carts compared to traditional gas-powered vehicles. Additionally, it provides valuable insights into the integration of renewable energy sources and the development of eco-friendly transportation solutions for various applications. Overall, the project contributes to the advancement of green technology and promotes a more sustainable future.

- **Environmental Impact:** Emphasize the reduction in greenhouse gas emissions achieved by using an electric cart.
- **Cost Savings:** Highlight potential savings on fuel costs compared to gas-powered carts.
- **Performance:** Discuss the efficiency and power of your electric cart design.
- **Future Potential:** Briefly touch on the growing trend of electric vehicles and the role your cart plays in that movement.



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FABRICATION OF ELECTRICAL CAR

ANNA UNIVERSITY:: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report "FABRICATION OF MINI ELECTRIC CAR" is the bonafide work of "NAVEENKUMAR.K.R" who carried out the project work under my supervision.

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ABSTRACT

Today with growing population the number of vehicles is increasing drastically. This growth has led to increase in air pollution. Automobile sector is the major contributor towards air pollution. Electric vehicle is eco-friendly for nature and then user friendly for human beings, so that this one is the growing sector in automobile sector. In order to reduce pollution, through this growing segment, this project aims towards designing Electric car which is environment friendly as it causes no pollution. The project is about mini electric car. It has 900 watt traction motor for high performance because there is initial power loss in normal conventional motor. Also differential unit is provided to distribute power while turning and in different road conditions. The power can be distributed by lithium-ferro phosphate battery with direct to direct convertor. This direct to direct convertor is used in this vehicle for electronic accessories. Battery is used to charging and discharging of battery. The direct to direct controller can be used to control the supply of electric energy to electric components. The power transmissions can be made from the motor to differential by the spur gear. The results show that the e-car performance is well in terms of energy efficiency, distance range, and safety, with great potential by this improvements on the vehicle and its helps for further improvemets.

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CHAPTER 6 COST ESTIMATION

| S.NO | MATERIAL | QTY | COST |
|-------------------|----------------|-----|--------------|
| 1 | Vehicle Body | 1 | 6000 |
| 2 | Motor | 1 | 2500 |
| 3 | Controller | 1 | 1500 |
| 4 | Battery | 1 | 8000 |
| 5 | Charger | 1 | 1000 |
| 6 | Convention Kit | 1 | 1000 |
| 7 | Tooth Gear | 2 | 1200 |
| 8 | Fibre Sheets | 2 | 2000 |
| 9 | Steel Pipe | 6 | 1200 |
| 10 | Paint | 0.5 | 600 |
| Total cost | | | 25000 |

Table No: 6.1. Cost Estimation



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4.6 Working Principle

This vehicle is an electric vehicle which contains the battery, DC motor, shock absorbers, wheel. The whole set up is mounted on the chassis frame which is made up of mild steel material. The steering geometry of the vehicle consists of Ackermann steering mechanism is shown in figure 4.4. Whenever the vehicle is switched ON the power will be generated from the battery which will be used to run the dc motor. The motion of dc motor is transmitted to rear wheel using chain and sprocket. When personal vehicle (cars, bikes) is not available, use this technology as an urban mobility vehicle, thus eliminating all kinds of pollution.

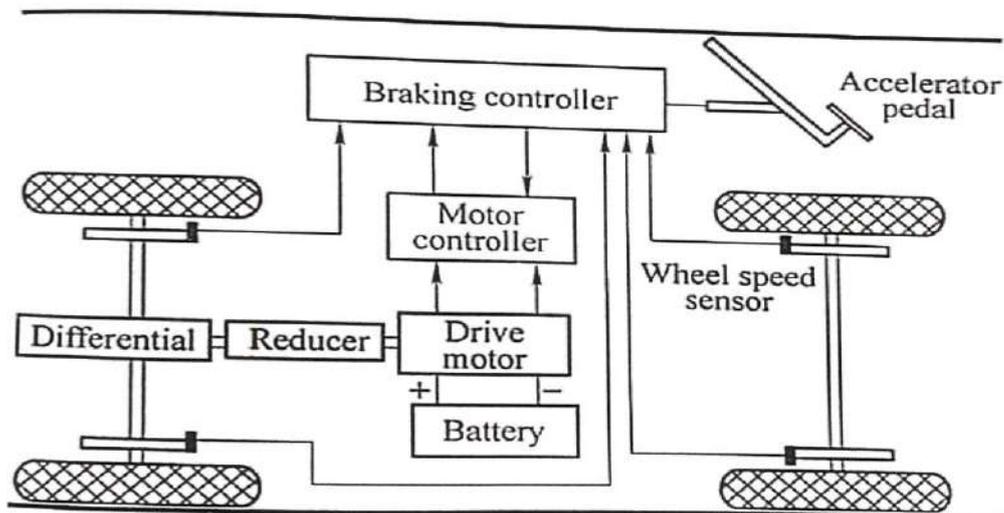


Figure No:4.4 Layouts of Electric Car



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CHAPTER 7 CONCLUSION

Introducing of electric cars, is the fuel price of petrol and diesel cars is increasing day by day, in this condition we must not waste fuel by this kind of actions and by using of fuels the carbon emission is exhaust form the vehicle. This carbon content is harmful for our environment. This may cause global warming, ozone depletion and all so increase the chance of acid rain. Traveling for small distance in IC Engine vehicle can waste the usage of fuels due to the sudden stopping and starting. So we planned to reduce this kind of fuel wastage by an electric car. Car Fabricated by us is of a self-designed, self-assembled type with least expenses and decent power. The omni car chassis was reused as a base for e-car. In electric cars using LFP batteries offer many advantages over other types of batteries. These benefits include high energy density, long cycle life, and enhanced safety features. As a result, LFP batteries are becoming an increasingly popular choice for electric car manufacturers looking to develop more efficient, reliable, and safe electric vehicles. According to calculations, it is able to sustain weight and speed achieved around 20-40 kmph. It can be concluded that an electric car with a range of 60-70 km and a speed of 20-30 kmph can be developed using a Lithium Ferro Phosphate battery. However, the range and speed limitations of the car may pose a challenge for long-distance travel and highways. In this we can nearly achieve the goal as said that the vehicle will be at the speed of 20-40 kmph and the range will go on nearly 60-70km. In future, the improvements of electric vehicle will go on to the convention kit and other power components of electric vehicle.

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