Report

On

Foundational course

"FUNDAMENTALS OF ELECTRIC VEHICLES"

As a part of

Emerging Technology course

Under

Engineering for sustainable development program

26/02/2021 to 19/03/2021

Organized by

Electrical Vehicle Club, Department of Electrical and Electronics Engineering

In association with

H&S Department

at

KG Reddy College of Engineering & Technology

Submitted by

Srinivas D, Assistant professor, Dept. of Electrical and Electronics Engineering

SK. Syed Hussain, Assistant professor, Dept. of Electrical and Electronics Engineering

Head of the Department

Head of the Department
Humanities & Science
K.G. Reddy College of Engg. & Tech,
Chilkur, Moinabad, R.R. Dist. T.S.

PRINCIPAL 19/3/21

Principal
KG Reddy College of Engineering & Technology
Chilkur (V), Moinabad (M).
R.R.Dist., Telangana.

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Course introduction

Course Name: FUNDAMENTALS OF ELECTRIC VEHICLES

Course duration: 4 - weeks

Organizing Department: Institutions Innovation Council

Collaborations:H & S dept., Center for Innovation and Social Transformation

Course offered by Electrical VEhicle club, Department of Electrical and Electronics Engineering

Venue: F-205,KG Reddy College of Engineering and Technology, Hyderabad

Speaker:K Kalpana, Asst. Prof., Dept. of Mech Engineering, KGRH

S Suresh, Asst. Prof., Dept. of Mech Engineering, KGRH

Engineering for sustainable development:

The Engineering for Sustainable Development is a yearlong co-curricular pro- gram that is designed to introduce freshmen engineering students to the concepts of engineering design, principles of sustainable development and UN's Sustainable Development Goals (SDG's), entrepreneurial thinking, and emerging technologies in multi-disciplinary fields of engineering. The program is designed to help students become ethical and emphatic leaders who will reflect on the impact of engineering work on the environment and sustainability and develop an enhanced sense of social and civil responsibility. As a part of ESD program, a four week foundational course on emerging technologies is conducted. 3D printing is one among the emerging technologies taught as part of ESD. In the first semester 3D printing foundational course and in the second semester 3D printing advanced course is taught for the freshmen students.

Objectives:

- To learn the basics of Electrical Vehicle
- Analyze the concept of Electric vehicle on future scope
- Identifying Real time battery charging management
- Develop the strategies for designing batteries
- Apply the concept of Simulation based system
- Develop the strategies for charging the Electric Vehicle

Outcomes:

- Students has learnt about the basics of Electrical Vehicle
- Analyzed the concept of Electric vehicle on future scope
- Identified Real time battery charging management
- Developed the strategies for designing batteries
- Applied the concept of Simulation based system
- Developed the strategies for charging the Electric Vehicle

Resource Persons:

Dr. T.V.V. PAVAN KUMAR, Associate professor, Officers – Exam branch,

Department of EEE EEE, KGRCET

Mr. Khamruddin Syed, Associate Professor, Head CEED, Department of EEE,KGRCET

Mr. D.SRINIVAS, Assistant Professor of EEE,KGRCET,

Mr. B.Lingam, Assistant Professor of EEE,KGRCET,

Mr. K.Gopala Krishna , Assistant Professor of EEE,KGRCET

Faculty coordinator

Mr. SK Syed Hussain, Assistant Professor,

Department of EEE, KGRCET.

Mr. Srinivas D,

Summary Report of Week - 1

Professor Khamruddin Syed has started Session with an introduction of Electric vehicles ,Due to the problems caused by the gasoline engine on the environment and people, the automotive industry has turned to the electrical powered vehicle. He explains how an electric vehicle works and compares the electric vehicle to the internal combustion engine and hybrid vehicle, provides some of the advantages and disadvantages of the electric vehicle.

Prof. Khamruddin Syed explaining about history of the electric vehicle

Prof. Khamruddin Syed explained about history of the electric vehicle, specifically the lows and highs of production and the reasons for the change. The next section provides a technical description of an electric vehicle, including the parts, their functions, and the theory of operation. The following section describes the hybrid car, including parts, their functions and the theory of operation. Based on this understanding, then compare the internal combustion engine, the hybrid engine, and the electrical engine in terms of efficiency, speed, acceleration, maintenance, mileage, and cost. He concludes with sections on the advantages and disadvantages of the electric vehicle and its future.

After one hour He explained Description of an Electric Vehicle The electric vehicle (EV) is propelled by an electric motor, powered by rechargeable battery packs, rather than a gasoline engine. From the outside, the vehicle does not appear to be electric. In most cases, electric cars are created by converting a gasoline-powered car. Often, the only thing that clues the vehicle is electric is the fact that it is nearly silent.

Students actively participating in the workshop

He conducted one activity to the students by giving one topic on Basic knowledge of Electric vehicles, he given 10 minutes of time to the students, after that students discussed on the topic by forming batches , they shared their knowledge on importance of electric vehicles.

He also explained the Future of the EV Future electric cars will most likely carry lithium-ion phosphate (LiFePO4) batteries that are now becoming popular in other countries. The LiFePO4 batteries are rechargeable and powerful and are being used in electric bikes and scooters. Electric cars will most likely adopt this technology in the future. Another technology that is likely for future electric cars is the increased use of supercapacitors and ultracapacitors for storing and delivering electrical charge. Many of these batteries are currently being used in conjunction with hybrid car prototypes, so these are expected in the electric car future markets as well If the developers of future electric cars can create vehicles with a range of 300 miles per charge, a charging time of five to ten minutes, and safety in operating the vehicles, the market is wide open for them. Researchers are working on improved battery technologies to increase driving range and decrease recharging time, weight, and cost. These factors will ultimately determine the future of EVs.

Summary Report of Week - 2

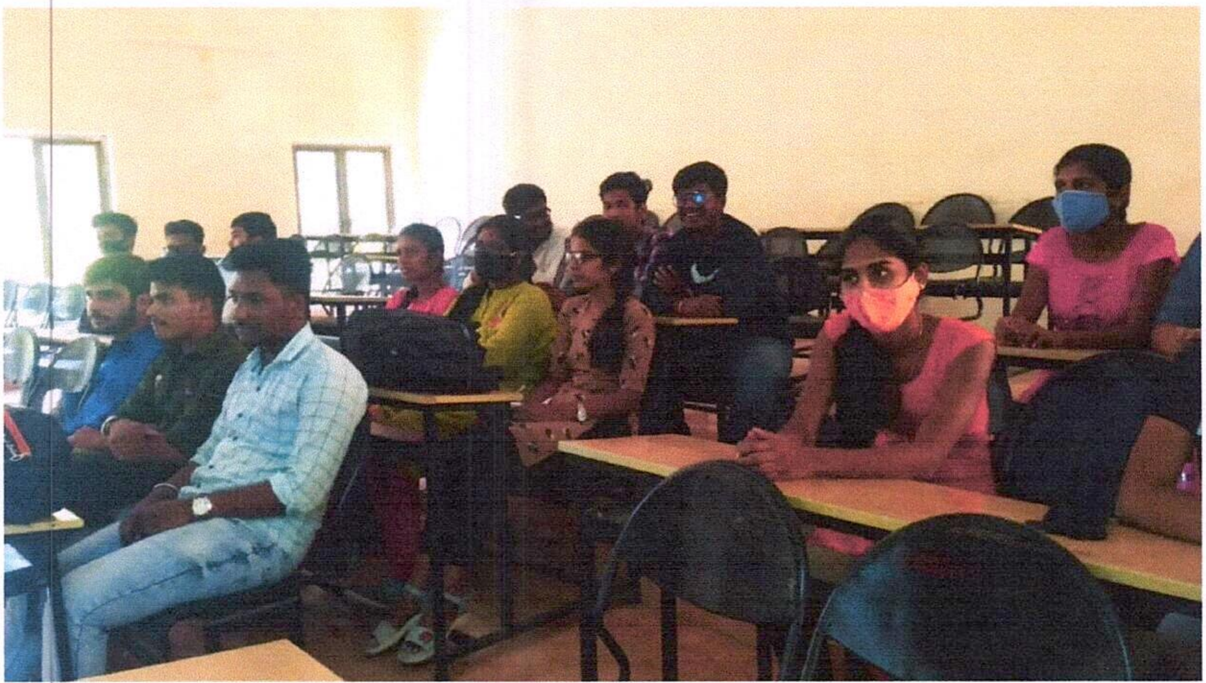
Mr. B.Lingam sir started the session by the introduction of electric-vehicle battery (EVB) (also known as a traction battery) is a battery used to power the electric motors of a battery electric vehicle (BEV) or hybrid electric vehicle (HEV). These batteries are usually rechargeable (secondary) batteries, and are typically lithium-ion batteries. These batteries are specifically designed for a high ampere-hour (or kilowatt-hour) capacity.

Mr. B. Lingam Explaining about Vehicle to Grid Technology.

He is explaining about Electric-vehicle batteries differ from starting, lighting, and ignition (SLI) batteries as they are designed to give power over sustained periods of time and are deep-cycle batteries. Batteries for electric vehicles are characterized by their relatively high power-to-weight ratio, specific energy and energy density; smaller, lighter batteries are desirable because they reduce the weight of the vehicle and therefore improve its performance. Compared to liquid fuels, most current battery technologies have much lower specific energy, and this often impacts the maximum all-electric range of the vehicles.

He explained about The most common battery type in modern electric vehicles are lithium-ion and lithium polymer, because of their high energy density compared to their weight. Other types of rechargeable batteries used in electric vehicles include lead–acid ("flooded", deep-cycle, and valve regulated lead acid), nickel-cadmium, nickel–metal hydride, and, less commonly, zinc–air, and sodium nickel chloride ("zebra") batteries.[1] The amount of electricity (i.e. electric charge) stored in batteries is measured in ampere hours or in coulombs, with the total energy often measured in kilowatt-hours.

Since the late 1990s, advances in lithium-ion battery technology have been driven by demands from portable electronics, laptop computers, mobile phones, and power tools. The BEV and HEV marketplace has reaped the benefits of these advances both in performance and energy density. Unlike earlier battery chemistries, notably nickel-cadmium, lithium-ion batteries can be discharged and recharged daily and at any state of charge. Later on He explained about Types of electric car batteries



Students actively participating in the workshop

Mr. K.Gopala Krishna started the session with the introduction **of Renewable energy** is useful energy that is collected from renewable resources, which are naturally replenished on a human timescale, including carbon neutral sources like sunlight, wind, rain, tides, waves, and geothermal heat. The term often also encompasses biomass as well, whose carbon neutral status is under debate. This type of energy source stands in contrast to fossil fuels, which are being used far more quickly than they are being replenished.

Mr. K. Gopala Krishna explaining about the importance Renewable energy

He is explaining about the importance Renewable energy resources and significant opportunities for energy efficiency exist over wide geographical areas, in contrast to other energy sources, which are concentrated in a limited number of countries. Rapid deployment of renewable energy and energy efficiency, and technological diversification of energy sources, would result in significant energy security and economic benefits. It would also reduce environmental pollution such as air pollution caused by burning of fossil fuels and improve public health, reduce premature mortalities due to pollution and save associated health costs that amount to several hundred billion dollars annually only in the United States. Renewable energy sources, that derive their energy from the sun, either directly or indirectly, such as hydro and wind, are expected to be capable of supplying humanity energy for almost another 1 billion years, at which point the predicted increase in heat from the Sun is expected to make the surface of the Earth too hot for liquid water to exist.

Later he discussed about Different Sources of Energy

- Solar **Energy**. The primary **source** of **energy** is the sun. ...
- Wind **Energy**. Wind power is becoming more and more common. ...

- Geothermal **Energy**. **Source**: Canva. ...
- Hydrogen **Energy**. ...
- Tidal **Energy**. ...
- Wave **Energy**. ...
- Hydroelectric **Energy**. ...
- Biomass **Energy**.

He given brief lecture about **non-renewable resource** (also called a **finite resource**) is a natural resource that cannot be readily replaced by natural means at a quick enough pace to keep up with consumption. An example is carbon-based fossil fuel. The original organic matter, with the aid of heat and pressure, becomes a fuel such as oil or gas. Earth minerals and metal ores, fossil fuels (coal, petroleum, natural gas) and groundwater in certain aquifers are all considered non-renewable resources, though individual elements are always conserved (except in nuclear reactions).

Conversely, resources such as timber (when harvested sustainably) and wind (used to power energy conversion systems) are considered renewable resources, largely because their localized replenishment can occur within time frames meaningful to humans as well.

He explained about Advantages and Disadvantages

Fossil fuels are a valuable source of energy. They are relatively inexpensive to extract. They can also be stored, piped, or shipped anywhere in the world.

However, burning fossil fuels is harmful for the environment. When coal and oil are burned, they release particles that can pollute the air, water, and land. Some of these particles are caught and set aside, but many of them are released into the air.

Burning fossil fuels also upsets Earth's "carbon budget," which balances the carbon in the ocean, earth, and air. When fossil fuels are combusted (heated), they release carbon dioxide into the atmosphere. Carbon dioxide is a gas that keeps heat in Earth's atmosphere, a process called the "greenhouse effect." The greenhouse effect is necessary to life on Earth, but relies on a balanced carbon budget.

The carbon in fossil fuels has been sequestered, or stored, underground for millions of years. By removing this sequestered carbon from the earth and releasing it into the atmosphere, Earth's carbon budget is out of balance. This contributes to temperatures rising faster than organisms can adapt.

Coal is a black or brownish rock. We burn coal to create energy. Coal is ranked depending on how much "carbonization" it has gone through. Carbonization is the process that ancient organisms undergo to become coal. About 3 meters (10 feet) of solid vegetation crushed together into .3 meter (1 foot) of coal!

Peat is the lowest rank of coal. It has gone through the least amount of carbonization. It is an important fuel in areas of the world including Scotland, Ireland, and Finland.

Surface mining is used when the coal is located very near the surface of the earth. To get to the coal, companies must first clear the area. They take away the trees and soil. The coal can then be cut out of the ground more easily. Entire habitats are destroyed during this process.

About half the electricity in the United States comes from coal. It gives power to our lights, refrigerators, dishwashers, and most other things we plug in. When coal is burned, it leaves "by-products" that are also valuable. We use the by-products to make cement, plastics, roads, and many other things.

The workshop has been concluded with vote of thanks by Head of the department Mrs. P. Samyuktha and EV club Coordinator Mr. SK.SYED HUSSAIN, Assistant Professor, EEE department.

Summary Report of Week - 3

Mr. D.Srinivas started the Session with an introduction of battery management system (BMS) is any electronic system that manages a rechargeable battery (cell or battery pack), such as by protecting the battery from operating outside its safe operating area, monitoring its state, calculating secondary data, reporting that data, controlling its environment, authenticating it and / or balancing it.

Mr. Srinivas D Explaining about BMS

A battery pack built together with a battery management system with an external communication data bus is a smart battery pack. A smart battery pack must be charged by a smart battery charger.

Mr. Srinivas explains about BMS may monitor the state of the battery as represented by various items, such as:

- Voltage: total voltage, voltages of individual cells, or voltage of periodic taps
- Temperature: average temperature, coolant intake temperature, coolant output temperature, or temperatures of individual cells
- Coolant flow: for air or fluid cooled batteries
- Current: current in or out of the battery

Later he explains how Electric vehicle systems configured with the existing system: energy recovery

- The BMS will also control the recharging of the battery by redirecting the recovered energy (i.e.- from regenerative braking) back into the battery pack (typically composed of a number of battery modules, each composed of a number of cells).

Battery thermal management systems can be either passive or active, and the cooling medium can either be air, liquid, or some form of phase change. Air cooling is advantageous in its simplicity. Such systems can be passive, relying only on the convection of the surrounding air, or active, utilizing fans for airflow. Commercially, the Honda Insight and Toyota Prius both utilize active air cooling of their battery systems.[2] The major disadvantage of air cooling is its inefficiency. Large amounts of power must be used to operate the cooling mechanism, far more than active liquid cooling.[3] The additional components of the cooling mechanism also add weight to the BMS, reducing the efficiency of batteries used for transportation.

Liquid cooling has a higher natural cooling potential than air cooling as liquid coolants tend to have higher thermal conductivities than air. The batteries can either be directly submerged in the coolant or coolant can flow through the BMS without directly contacting the battery. Indirect cooling has the potential to create large thermal gradients across the BMS due to the increased length of the cooling channels. This can be reduced by pumping the coolant faster through the system, creating a tradeoff between pumping speed and thermal consistency.

He also given brief about Communication

The central controller of a BMS communicates internally with its hardware operating at a cell level, or externally with high level hardware such as laptops or an HMI.

High level external communication are simple and use several methods

- Different types of serial communications.
- CAN bus communications, commonly used in automotive environments.
- Different types of Wireless communications.

The requirements for a BMS in mobile applications (such as electric vehicles) and stationary applications (like stand-by UPSs in a server room) are quite different, especially from the space and weight constraint requirements, so the hardware and software implementations must be tailored to the specific use. In the case of electric or hybrid vehicles, the BMS is only a subsystem and cannot work as a standalone device. It must communicate with at least a charger (or charging infrastructure), a load, thermal management and emergency shutdown subsystems. Therefore, in a good vehicle design the BMS is tightly integrated with those subsystems. Some small mobile applications (such as medical equipment carts, motorized wheelchairs, scooters, and fork lifts) often have external charging hardware, however the on-board BMS must still have tight design integration with the external charger.

Dr. T.V.V Pavan kumar started the session about Simulation modeling is the process of creating and analyzing a digital prototype of a physical model to predict its performance in the real world. Simulation modeling is used to help designers and engineers understand whether, under what conditions, and in which ways a part could fail and what loads it can withstand. Simulation modeling can also help to predict fluid flow and heat transfer patterns. It analyses the approximate working conditions by applying the simulation software.

Dr. T.V.V. Pavan Kumar Explaining about EV Simulation

Simulation modeling allows designers and engineers to avoid the repeated building of multiple physical prototypes to analyze designs for new or existing parts. Before creating the physical prototype, users can investigate many digital prototypes. Using the technique, they can:

- Optimize geometry for weight and strength.
- Select materials that meet weight, strength, and budget requirements
- Simulate part failure and identify the loading conditions that cause them
- Assess extreme environmental conditions or loads not easily tested on physical prototypes, such as earthquake shock load
- Verify hand calculations
- Validate the likely safety and survival of a physical prototype before

He explains how Simulation modelling follows a process much like this:

1. Use a 2D or 3D CAD tool to develop a virtual model, also known as a digital prototype, to represent a design electric vehicle.

2. Generate a 2D or 3D mesh for analysis calculations. Automatic algorithms can create finite element meshes, or users can create structured meshes to maintain control over element quality.
3. Define finite element analysis data (loads, constraints, or materials) based on analysis type (thermal, structural, or fluid). Apply boundary conditions to the model to represent how the part will be restrained during use.
4. Perform finite element analysis, review results, and make engineering judgments based on results.

The use of such mathematical models and simulations avoids actual experimentation, which can be costly and time-consuming. Instead, mathematical knowledge and computational power is used to solve real-world problems cheaply and in a time efficient manner. As such, M&S can facilitate understanding a system's behaviour without actually testing the system in the real world. For example, to determine which type of spoiler would improve traction the most while designing a race car, a computer simulation of the car could be used to estimate the effect of different spoiler shapes on the coefficient of friction in a turn. Useful insights about different decisions in the design could be gleaned without actually building the car. In addition, simulation can support experimentation that occurs totally in software, or in human-in-the-loop environments where simulation represents systems or generates data needed to meet experiment objectives. Furthermore, simulation can be used to train persons using a virtual environment that would otherwise be difficult or expensive to produce.

He explains about Physical simulation refers to simulation in which physical objects are substituted for the real thing (some circles use the term for computer simulations modelling selected laws of physics, but this article does not). These physical objects are often chosen because they are smaller or cheaper than the actual object or system.

Interactive simulation is a special kind of physical simulation, often referred to as a human in the loop simulation, in which physical simulations include human operators, such as in a flight simulator, sailing simulator, or driving simulator.

Continuous simulation is a simulation based on continuous time, rather than discrete time steps, using numerical integration of differential equations.Discrete-event simulation studies systems whose states change their values only at discrete times. For example, a simulation of an epidemic could change the number of infected people at time instants when susceptible individuals get infected or when infected individuals recover.

Deterministic simulation is a simulation which is not stochastic: thus the variables are regulated by deterministic algorithms. So replicated runs from the same boundary conditions always produce identical results.Hybrid Simulation (sometime Combined Simulation) corresponds to a mix between Continuous and Discrete Event Simulation and results in integrating numerically the differential equations between two sequential events to reduce the number of discontinuities.

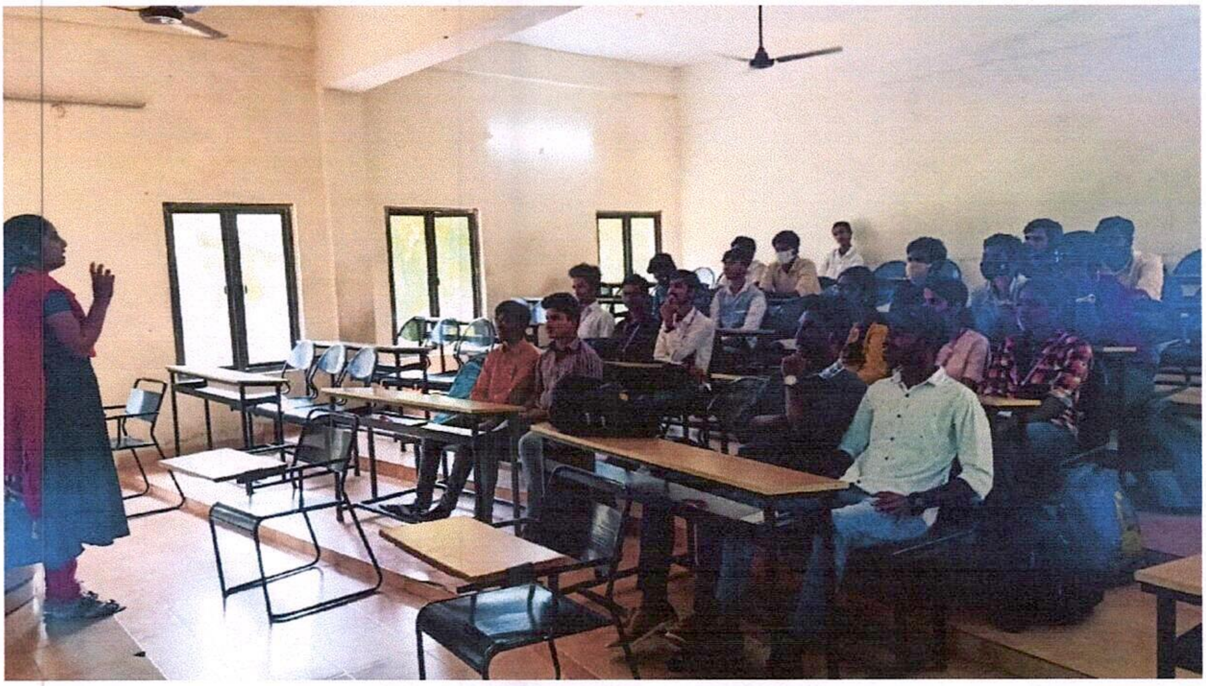
A stand alone simulation is a simulation running on a single workstation by itself.A distributed simulation is one which uses more than one computer simultaneously, in order to guarantee access from/to different resources (e.g. multi-users operating different systems, or distributed data sets); a classical example is Distributed Interactive Simulation (DIS).

Parallel Simulation speeds up a simulation's execution by concurrently distributing its workload over multiple processors, as in High-Performance Computing.Interoperable Simulation where multiple models, simulators (often defined as Federates) interoperate locally, distributed over a network; a classical example is High-Level Architecture.

The workshop has been concluded with vote of thanks by Head of the department Mrs. P. Samyuktha and EV club Coordinator Mr. SK.SYED HUSSAIN, Assistant Professor, EEE department.

Summary Report of Week - 4

Mrs. P.Samyuktha started session with an introduction of An electric bicycle, also known as an e-bike or ebike, is a bicycle with an integrated electric motor used to assist propulsion. Many kinds of e-bikes are available worldwide, but they generally fall into two broad categories: bikes that assist the rider's pedal-power (i.e. pedelecs) and bikes that add a throttle, integrating moped-style functionality. Both retain the ability to be pedaled by the rider and are therefore not electric motorcycles.

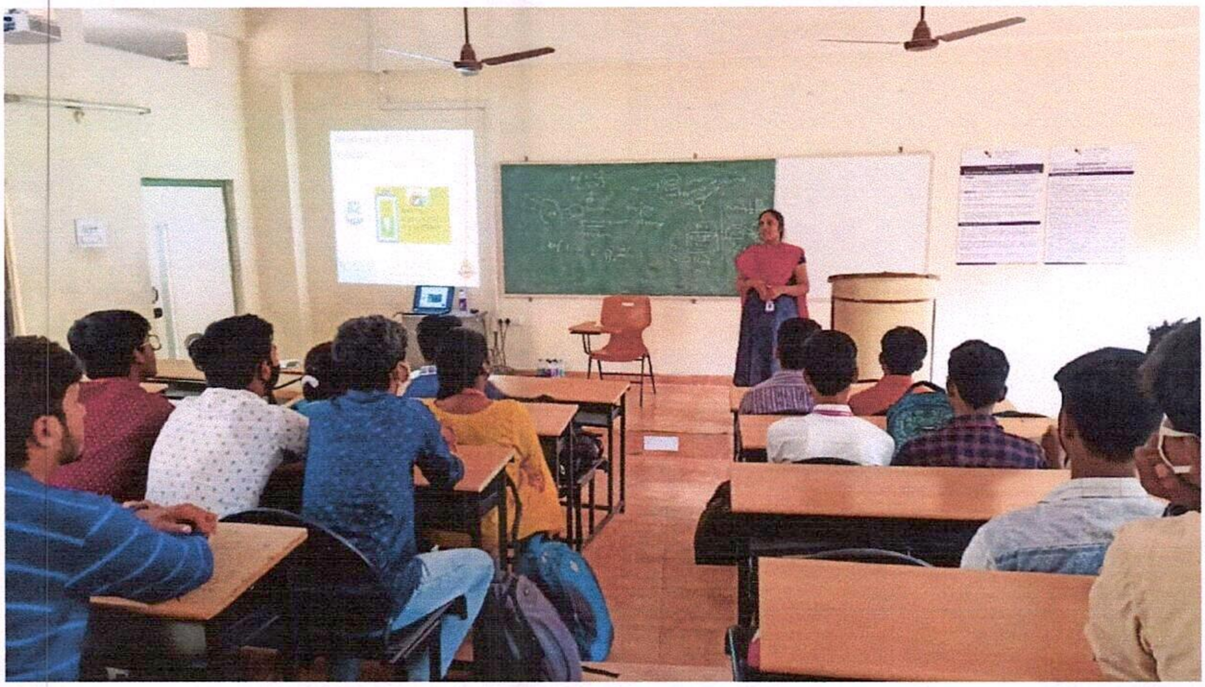


Samyuktha explaining about E-bikes

Samyuktha explained about E-bikes use rechargeable batteries and typically travel up to 25 to 32 km/h (16 to 20 mph). High-powered varieties can often travel more than 45 km/h (28 mph). In some markets, such as Germany as of 2013, they are gaining in popularity and taking some market share away from conventional bicycles,while in others, such as China as of 2010, they are replacing fossil fuel-powered mopeds and small motorcycles. E-bikes function like hybrid electric vehicles since the electric motor combines battery propulsion with another source of electricity but this time by pedal power instead of internal combustion engine power so in some cases the terms used would be hybrid electric bicycle or hybrid pedal-electric bicycle

Mrs. P.Samyuktha explained about types of Depending on local laws, many e-bikes (e.g., pedelecs) are legally classified as bicycles rather than mopeds or motorcycles. This exempts them from the more stringent laws regarding the certification and operation of more powerful two-wheelers which are often classed as electric motorcycles. E-bikes can also be defined separately and treated under distinct Electric bicycle laws.

E-bikes are the electric motor-powered versions of motorized bicycles, which have been in use since the late 19th century. Some bicycle-sharing systems use them



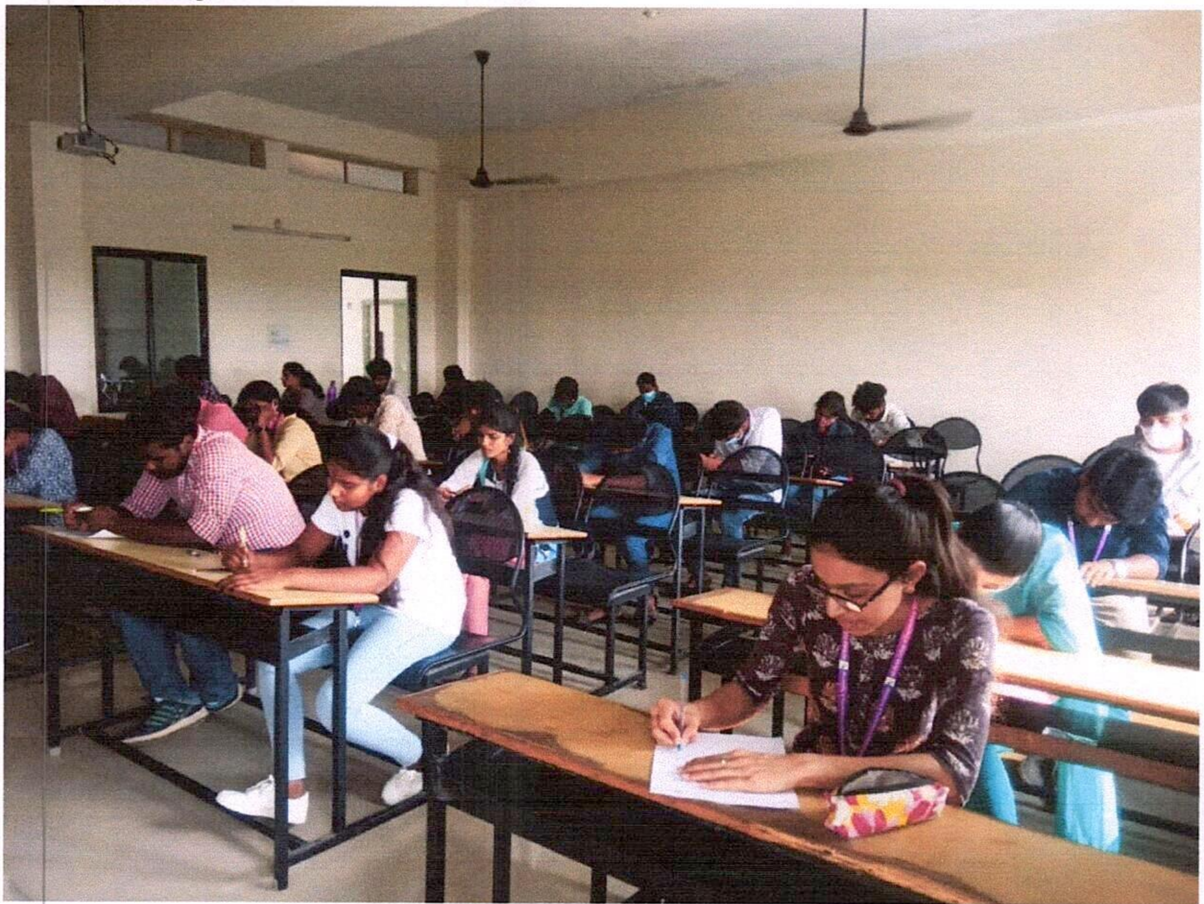
Later Madam explains about Benefits of ELECTRIC VEHICLES:

Electric vehicles are around 3-5 times more efficient than internal combustion vehicles in utilising energy. Even if electric vehicles run on electricity produced from fossil fuels, the overall efficiency of electric vehicles is still higher and the pollution is less, because large thermal power plants are much more efficient than IC engines, and it is easier to control emissions from power plants than vehicle engines.

- Electric vehicles save energy by regenerative braking. Around 30%-70% of the energy used for propulsion can be recovered, with higher percentages applicable to stop-and-go city driving.
- Air quality indices related to India indicate that the air in many cities of India is no longer healthy. Automobile related pollution has been one of the causes for this.
- Aspects related to global warming needs a shift to automobile solutions that reduce / do not produce greenhouse gas emissions. If electric vehicles run on electricity produced from non-polluting sources of energy like hydro, solar, wind, tidal and nuclear, they reduce emissions due to vehicles almost to zero.
- The need to reduce dependency on a fossil-fuel based economy. India's crude oil imports for 2014-15 was 112 billion dollars (approximately 7,00,000 crore rupees). For comparison, the allocation for the Mahatma Gandhi National Rural Employment Guarantee Scheme, in budget 2017-18, is 48,000 crore rupees.

- India can become a global provider for clean mobility solutions and processes that are affordable and scalable.
- People living in some Indian cities are being affected by noise pollution. Some of the Indian cities have the worst noise pollution levels in the world. Electric vehicles are much quieter and may contribute to a reduction in noise pollution levels in the cities.
- Energy efficiency and emission reduction has improved in automobiles. Yet, the growth in total number of vehicles on road, and the resulting total pollution and total energy consumption removed all gains made by betterment in energy efficiency and emission reduction by automobiles. Energy efficiency measures and pollution control measures did not keep pace with the sales growth in vehicles.
- Through smart charging, electric vehicles can help to balance the balance-supply variations in the electricity grid, and provide a buffer against electricity supply failures.
- Electric vehicles have much fewer moving parts as compared to vehicles with IC engines. Thus, being simpler, they are cheaper and easier to maintain.
- Electric motors can deliver high torque at low speeds. As a result, electric vehicles deliver much better performance while starting off and on slopes than IC engine-powered vehicles.

Students Writing Test on EV course :



Visit to the electric vehicle club at KGRCET:

Mrs. P. Samyuktha explaining about Innovative E- bike Developed by EEE Students

Group photo with participants of Foundational Course

The workshop has been concluded with vote of thanks by EV club Coordinator Mr. SK.SYED HUSSAIN, Assistant Professor, EEE department.

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INSTITUTION'S INNOVATION COUNCIL

Engineering for Sustainable Development

EVC

Department of Humanities and Sciecnes

Workshop on Emerging Technologies (Electrical Vehicle)

Attendance Sheet

Date:19-03-2021

S.No	Roll Number	Name of the Student	Signature
1	20QM1A0101	C Venkat Reddy	C.Venkat Reddy
2	20QM1A0302	Ghanate Vijay Kumar	G.Vijay Kumar
3	20QM1A0402	Arige Venkatesh Surender Rahul	Rahul
4	20QM1A0405	Banrapolu Bharath Reddy	Bharath
5	20QM1A0408	E. Ganesh Naik	Ganesh
6	20QM1A0409	Thanmai	Thanmai
7	20QM1A0416	Kancharla Niharika	K.Niha
8	20QM1A0417	Keshannagari Shreya	K. Shreya
9	20QM1A0418	Kompelly Surya Prakash Goud	[illegible]
10	20QM1A0419	Kondapu Veera Venkata Vara Prakash Reddy	Prakash.
11	20QM1A0423	Patan Muzafar	Muzafar
12	20QM1A0424	R. Gnanendhra Sreeman	[illegible]
13	20QM1A0425	R.Pranay Raj	Pranay.
14	20QM1A0426	Rikkala Spoorthi	R.Spoorthi
15	20QM1A0429	Sama.Deepika	Deepika
16	20QM1A0430	Sarikonda Pandurangareddy	Pandu
17	20QM1A0433	T.Usha Rani	T Usha
18	20QM1A0434	Thodeti Mounika	Mounika
19	20QM1A0437	Tulasamolla Bhargavi	T.Bhargavi
20	20QM1A0536	Jalagari Karthik	Karthik
21	20QM1A0539	K Devraj	Devraj
22	20QM1A0556	Md. Sahil	Sahil
23	20QM1A0558	Mohamad Raheem	MD.Raheem
24	20QM1A0559	Mrutunjay Khatua	Mrutunjay
25	20QM1A0590	Suraj Kumar Singh	S.Kumar
26	20QM1A6601	Afjal Ansari	→ ABSENT ←
27	20QM1A6636	Nukapelly Rishank Reddy	N.Rishank

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Engineering for Sustainable Development

EVC

Department of Humanities and Sciecnes

Workshop on Emerging Technologies (Electrical Vehicle)

Attendance Sheet **Date:05-03-2021**

S.No	Roll Number	Name of the Student	Signature
1	20QM1A0101	C Venkat Reddy	C.Venkat Reddy
2	20QM1A0302	Ghanate Vijay Kumar	G. Vijay Kumar
3	20QM1A0402	Arige Venkatesh Surender Rahul	[illegible]
4	20QM1A0405	Banrapolu Bharath Reddy	Bharath
5	20QM1A0408	E. Ganesh Naik	Ganesh
6	20QM1A0409	Thanmai	Thanmai
7	20QM1A0416	Kancharla Niharika	K. Niharika
8	20QM1A0417	Keshannagari Shreya	K. Shreya
9	20QM1A0418	Kompelly Surya Prakash Goud	[illegible]
10	20QM1A0419	Kondapu Veera Venkata Vara Prakash Reddy	Prakash.
11	20QM1A0423	Patan Muzafar	Muzafar
12	20QM1A0424	R. Gnanendhra Sreeman	[illegible]
13	20QM1A0425	R.Pranay Raj	R. Pranay.
14	20QM1A0426	Rikkala Spoorthi	Spoorthi
15	20QM1A0429	Sama.Deepika	S.Deepika
16	20QM1A0430	Sarikonda Pandurangareddy	Pandu
17	20QM1A0433	T.Usha Rani	Usha
18	20QM1A0434	Thodeti Mounika	T. Mounika.
19	20QM1A0437	Tulasamolla Bhargavi	T. Bhargavi
20	20QM1A0536	Jalagari Karthik	→ ABSENT ←
21	20QM1A0539	K Devraj	DevRaj
22	20QM1A0556	Md. Sahil	Sahil
23	20QM1A0558	Mohamad Raheem	MD. Raheem.
24	20QM1A0559	Mrutunjay Khatua	Mrutunjay
25	20QM1A0590	Suraj Kumar Singh	S Kumar
26	20QM1A6601	Afjal Ansari	→ ABSENT ←
27	20QM1A6636	Nukapelly Rishank Reddy	N. Rishank

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Engineering for Sustainable Development

EVC

Department of Humanities and Sciecnes

Workshop on Emerging Technologies (Electrical Vehicle)

Attendance Sheet **Date:12-03-2021**

S.No	Roll Number	Name of the Student	Signature
1	20QM1A0101	C Venkat Reddy	C Venkat Reddy
2	20QM1A0302	Ghanate Vijay Kumar	G Vijay kumar
3	20QM1A0402	Arige Venkatesh Surender Rahul	→ ABSENT ←
4	20QM1A0405	Banrapolu Bharath Reddy	→ ABSENT ←
5	20QM1A0409	Thanmai	G Thanmai
6	20QM1A0416	Kancharla Niharika	→ ABSENT ←
7	20QM1A0417	Keshannagari Shreya	k.shreya
8	20QM1A0418	Kompelly Surya Prakash Goud	[illegible]
9	20QM1A0419	Kondapu Veera Venkata Vara Prakash Reddy	Prakash
10	20QM1A0423	Patan Muzafar	→ ABSENT ←
11	20QM1A0425	R.Pranay Raj	Pranay raj
12	20QM1A0426	Rikkala Spoorthi	R. Spoorthi
13	20QM1A0429	Sama.Deepika	S. Deepika
14	20QM1A0430	Sarikonda Pandurangareddy	Pandu
15	20QM1A0433	T.Usha Rani	usha
16	20QM1A0434	Thodeti Mounika	→ ABSENT ←
17	20QM1A0437	Tulasamolla Bhargavi	→ ABSENT ←
18	20QM1A0536	Jalagari Karthik	→ ABSENT ←
19	20QM1A0539	K Devraj	Devraj
20	20QM1A0559	Mrutunjay Khatua	Mrutunjay
21	20QM1A0590	Suraj Kumar Singh	→ ABSENT ←
22	20QM1A6601	Afjal Ansari	→ ABSENT ←
23	20QM1A6636	Nukapelly Rishank Reddy	→ ABSENT ←
24	20QM1A0408	Estavath Ganesh Nayak.	Ganesh
25	20QM1A0556	Md. Sahil	Sahil

KG Reddy College of Engineering & Technology

(Approved by AICTE, New Delhi, Affiliated to JNTUH, Hyderabad)

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Department of Humanities and Sciecnes

Workshop on Emerging Technologies (Electrical Vehicle)

Attendance Sheet **Date:26-02-2021**

S.No	Roll Number	Name of the Student	Signature
1	20QM1A0101	C Venkat Reddy	C Venkat reddy
2	20QM1A0302	Ghanate Vijay Kumar	G. Vijay Kumar.
3	20QM1A0402	Arige Venkatesh Surender Rahul	[illegible]
4	20QM1A0405	Banrapolu Bharath Reddy	Bharath reddy
5	20QM1A0409	Thanmai	Thanmai
6	20QM1A0416	Kancharla Niharika	[illegible]
7	20QM1A0417	Keshannagari Shreya	K. Shreya
8	20QM1A0418	Kompelly Surya Prakash Goud	[illegible]
9	20QM1A0419	Kondapu Veera Venkata Vara Prakash Reddy	Prakash
10	20QM1A0423	Patan Muzafar	Muzafar
11	20QM1A0425	R.Pranay Raj	Pranay raj
12	20QM1A0426	Rikkala Spoorthi	R. Spoorthi.
13	20QM1A0429	Sama.Deepika	S. Deepika.
14	20QM1A0430	Sarikonda Pandurangareddy	[illegible]
15	20QM1A0433	T.Usha Rani	Usha
16	20QM1A0434	Thodeti Mounika	T. Mounika
17	20QM1A0437	Tulasamolla Bhargavi	T. Bhargavi
18	20QM1A0536	Jalagari Karthik	← ABSENT →
19	20QM1A0539	K Devraj	Devraj
20	20QM1A0559	Mrutunjay Khatua	Mrutunjay
21	20QM1A0590	Suraj Kumar Singh	Skumar
22	20QM1A6601	Afjal Ansari	← ABSENT →
23	20QM1A6636	Nukapelly Rishank Reddy	← ABSENT →

- 20QM1A0558 Mohd. Raheem — MD. Raheem.
- 20QM1A0556 Md. Sahil — Sahil
- 20QM1A0408 Eslavath ganesh Nayak — [illegible]
- 20QM1A0424 R. Gnanendhra Sreeman — [illegible]

KG REDDY
College of Engineering
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Engineering India's Changemakers

Electrical Vehicle Club, Dept. of EEE

In association with H & S Department

CERTIFICATE OF PARTICIPATION

This is to certify that Mr. / Ms. Jalagari karthik *has attended the*

"A FOUR WEEK FOUNDATION COURSE ON FUNDAMENTALS OF ELECTRICAL VEHICLES"

at K G Reddy College of Engineering and Technology from 26th February 2021 to 19th March 2021.

As a part of Emerging Technology Course under Engineering For Sustainable Development Program.

Srinivas D
Coordinator

P. Samyuktha
Chairman

Dr. R. S. Jahagirdar
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CERTIFICATE OF PARTICIPATION

This is to certify that Mr. / Ms. Rikkala Spoorthi *has attended the*

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Srinivas D *Coordinator*	**P. Samyuktha** *Chairman*	**Dr. R. S. Jahagirdar** *Prinicipal*