

## ATAL – FDP

18<sup>th</sup> December, 2023 to 23<sup>rd</sup> December, 2023

### ALTERNATE FUELS & ELECTRIC VEHICLE

#### 18.12.2023 (DAY -1, MONDAY)

The early morning inauguration was done in the presence of the Vice Chancellor – GTU Dr Rajul Gajjar & Principal LDCE, Dr C S Shangavi. It was also blessed by the Prof Dr Ragesh Kapadia, HoD of Automobile Engineering Department & OSD, CTE Gandhinagar. Mostly all the participant have done the registration before 9.30 and in a very short period of time the opening ceremony concluded with kind words from all the dignitaries. Prof Dr Ketan Badgujar, HoD Electrical Department has delivered the vote of thanks and motivated the participants and the audiences of the function.



The first session was delivered by the Dr Absar Lakdawala on Biofuels for Compression Ignition engine, Performance, emission and life cycle analysis. Professor Absar has shared his experience on the research based on various biofuels and its effect on the material and

analysis based on engine. He explained in detail about selection of optimum biodiesel blend MDMD techniques, Water in oil emulsification analysis, corrosion analysis, tribological analysis & life cycle analysis – long run endurance test as per standards. The participants were happy to learn about the new technology and felt motivated for the new area of research. Before the start of the next session of Dr R G Kapadia on Article Discussion Engine performance with LRME at varying compression ratio, the participants have been invited for the queries. After lunch session, Prof Dr R N Patel has delivered the talk on Study on tribological behaviour of biodiesel, his session started with introduction to the various biodiesel. He explained thoroughly influenced oxygenated fuel, parametric optimization of engine operating parameters, life cycle analysis based on tribological properties of the engine. He also described for wear prediction. With a short break of tea, the last session of the day was delivered by Prof Dr R J Jani, coordinator. He demonstrated with lab technician Maulik Solanki about use of hydroxygen in Bajaj 100 CC Discover bike. Participants have taken full advantage of the hands on practise by driving in both the modes of operations.





**19.12.2023 (DAY - 2, TUESDAY)**

The morning session with the Prof Dr Ragavan K from IIT Gandhinagar has been more interactive with all the participants. He made the clear funda of the various participants for

the selection of motor to the selection of the drive including 5Ws of the selection criterion of the electric vehicle. He explained all the necessary working principle with logics and excellent gestures. Prof Dr D U Panchal has delivered lecture on the Reflective Journal. Participants came to know about the concept of the reflective Journal, difference between technical and reflective journals, types of reflections and appropriate reflective text. After the lunch, Prof Dr Surendrsingh Kachhwaha of PDEU Gandhinagar. He made the participants aware about the government policies, Bioethanol production techniques, small scale bioethanol production techniques with its properties, 5-Es Analysis of bioethanol plant (energy, economic, exergy, exergoeconomic & environment) & bioethanol as flexi-fuel in gasoline engine. The lab session with vehicle dynamics in calculation and design of Electric Vehicle was conducted by Prof Mazar Shaikh. All participants were made clear about the vehicle design fundamentals using software tools.

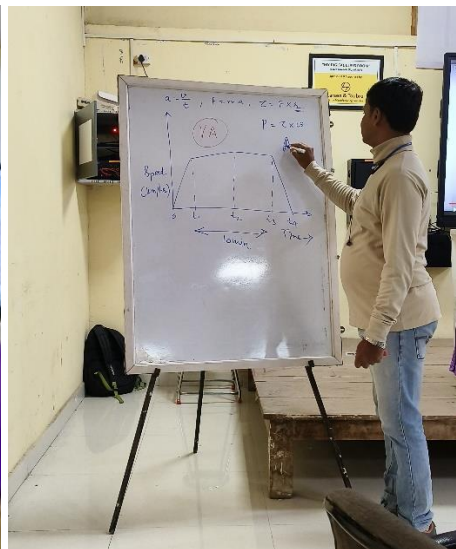




### 20.12.2023 (DAY - 3, WEDNESDAY)

The need of energy & its cost for charging the electric vehicle was taken care by the expert Renison Macwan Who is the technical consultant at CapGemini. He has demonstrated the mobile applications developed by the students team of L D College of Engineering during the corona period. The solar and its usage for EV charging was nicely explained by him He also explained the energy trading and EV charging. Prof Dr Vimal Patel has introduced the electric and Hybrid Vehicles, their designs and represented the survey of the same with its cost analysis which are available in the market. After lunch, Prof Dr Hitesh Panchal from GEC Patan described about real-world experimental work of different nano particles along with biodiesel blended with diesel. He discussed the combustion efficiency, emission reduction, improved ignition characteristics, stability and oxidization resistance, heat transfer enhancement, fuel optimization, lubrication properties, synergies with biodiesel, nano catalysis and thermal conductivity enhancement. The last session of the day was a lab session on the Battery Technology & charging of the Electric vehicle by Dr C D Upadhyay the co-coordinator of the training program. He used various MATLAB tools and made the participants to work on the battery design and explained various charging methods available in the market as per the standard. He also explained the various infrastructure rules of the government to establish the charging station and gave assignment for motor selection of given vehicle by calculating the different resistance.





## 21.12.2023 (DAY - 4, THURSDAY)

Prof Dr D B Jani, Associate Professor of Mechanical Engineering Department, GEC Dahod was the first speaker on the 4<sup>th</sup> day of the FDP. He explained the first generation, second generation & third generation of biofuel production scenario in India. He also explained the production policy in India for Green Hydrogen. He has delivered the highly rich information on Green Hydrogen in Indian Context. He covered project undertaken by central government and the respective states as per Indian Biofuel Policy. The HoD of Electrical, Dr Ketan Badgujar has made the participants more aware about the standards for the IEC 62660-1, IEEE 519 and made the electrical pollution system restrictions, legal objections for the charging and discharging. He also talked about the hurdles in implementing the standards in the various locations. The Industrial visits at Charge+Zone (Janmarg Charging Station) & the Solance Industries. The participants were taken to the sites by bus. **(Please find the separate reports on Industrial Visits – Annexure A & B).**



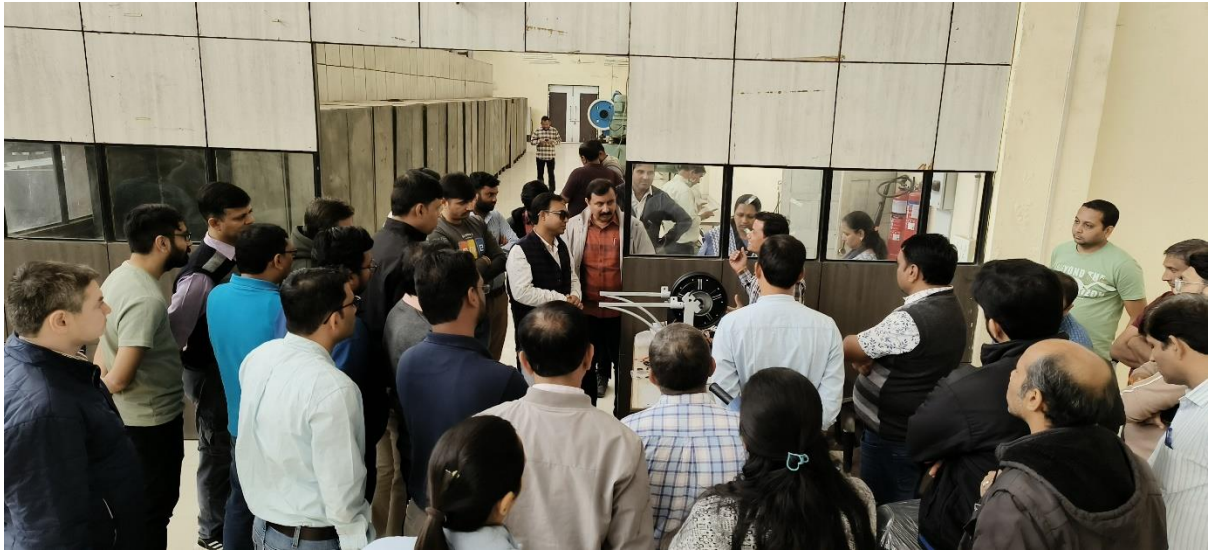


### **22.12.2023 (DAY - 5, FRIDAY)**

The industrial person from the Raj Sales Corporation has made the delivery on the Battery Technology, Battery Management Systems in the Electric Vehicle. He has also cleared the same with the need of the new protection technology in the battery systems. MCQ session with the participants have been more excited and a quiz kind of session and conducted by Prof Kalpesh V Vaghela. Mostly all the participants have made the wonderful participants on all the questions and sometimes it had been a great discussion on the need of biofuel, need of batteries and the Vehicle to Grid interaction of the power system. After lunch, the session was delivered by Prof Dr S N Pandya professor on the various power converters used in the Electric Vehicles, He overviewed about the various converters DC-DC, DC-AC, AC-DC & AC-DC, also the latest converters used in the EVs for the drives. The bidirectional converters along with standards have been discussed with participant interactions. Teaching practises and the methods of delivering the expertise have been delivered by Prof Dr V B Patel who is assistant professor of LDCE, Ahmedabad. He also discussed on the challenges in the 21<sup>st</sup> centuries for the education along with NEP 2020.









### **23.12.2023 (DAY - 6, SATURDAY)**

After the visit at iACE Gandhinagar (please find the separate report about the industrial visit – Annexure C), The session after the lunch was delivered by the local expert Dr P D Patel on additives and making the control on emission of NO<sub>x</sub>. The need of NO<sub>x</sub> has been the objective of the expert session. He explained his research work during his PhD period having the title Experimental investigation on reduction of NO<sub>x</sub> emission of CI engine fuelled by biodiesel.

The exam has been taken and the feedback forms have been filled up after the tea break. The oral feedback and the appreciations have been received from the participants. Some of them are:

- It was great to have such an interactive and hands on training program for EVs.
- The visits were fruitful as many technical parameters have been discussed.
- The food and the hospitalities are excellent.
- The experts have shared the material timely.
- Schedule was maintain strictly and speaker management was done nicely.

**ANNEXURE – A**  
**REPORT**  
**INDUSTRIAL VISIT**  
**CHARGE+ZONE (Janmarg- BRTS charging station, Naranpura)**  
**21<sup>st</sup> December, 2023**

It was the 4<sup>th</sup> day of the training and after lunch around 1.15 we reached the charging station of the e-buses. All the participants including the organizers prof (Dr) R J Jani and Dr C D Upadhyay have made the necessary formalities at the gate and the visitor bus entered into the charging location. The participants have been greeted by the engineer Mr Karan Prajapati and given the brief introduction of the organization structure and the working principles of the charging management. He also made the strict instruction regarding the safety of the visitors. We were divided into two different groups and the two electrical buses were thoroughly explained by the engineers and the operators of the Charge+zone. The following introduction and learning had happened at the site:

- Working voltage and power ratings of the substation and each charging station (Total of 16+20 working stations)
- The voltage and current ratings of the charging stations (740-760 V, 100-125Amp).
- The procedure for the costing and making the billings for the charging.
- The data management and the interfacing of the computer systems with the charging points.
- E-bus driver trainings and the operator training procedures.
- Testing of earthing/cable discharging/malfunction alarm systems of the charging stations.

At the end, we have taken a brief question answer session at the floor and found motivated for the charging infrastructure maintained by the Janmarg. Lastly Dr Upadhyay thanked the Charge+Zone team for the support and cooperation.



**ANNEXURE – B**  
**REPORT**  
**INDUSTRIAL VISIT**  
**Solance Industries (Changodar, Ahmedabad)**  
**21<sup>st</sup> December, 2023**

After the visit of the Charge+Zone, our bus has been directly driven to the Solance Industries which is located in Changodar (Ahmedabad – Rajkot Highway). The participants and the organizers have reached to the site visit at around 3.30 pm and after formalities at the entry, Mr Chirag who is also the Quality in charge has delivered the welcome speech with the organization chart, procedure of battery manufacturing and made the participant aware about the various products of the Solance, As the industry is huge, we were divided into the three groups. All the three groups have understood the various technicalities of the battery systems, battery technology and some of the automotive needs of the battery (Lead Acid Battery). The highlights of the same is as under:

- Lead collection, making the moulding, formation of the grid for the batteries using the automatic foundries with the temperature control and manufacturing details.
- The brushing and the painting section along with the box manufacturing to have the battery section.
- The online production with the various quality test – during the manufacturing process and manual stages of the grid balancing, drilling & auto soldering has been visited.
- The health of the workers, safety and manufacturing optimization techniques as per the Japan code of conduct has been visited.
- The participants have visited all the points of the manufacturing as per the production flow and made the complete awareness about the lead-acid battery.
- Quality testing (Mechanical, Chemical & Electrical tests) carried out in the presence of the participants.
- The dispatch of the batteries and the stores of the raw material have been visited.

At the end around 6.00 pm, the DM Mr Naresh sir, Hardikbhai and the Chirag sir has attended, heard the question and answer of all the participants. It was a good discussion on the need of the battery technology, its development and the future of the same. At last Dr Upadhyay thanked the Solance family on behalf of ATAL & LDCE.



## **ANNEXURE – C**

### **REPORT**

#### **INDUSTRIAL VISIT**

**iACE (international Automotive Center of Excellence)**

**(Maruti-Suzuki Training Center, Gandhinagar)**

**23<sup>rd</sup> December, 2023**

**iACE is a government funded training centre located in Gandhinagar. We have reached early on 23<sup>rd</sup> December, 2023 and taken the morning breakfast over there. The technical warm-up started itself with a cup of tea and huge excitement for the visit from the participants. The working, the management and the various courses offered by iACE has been explained in detail. The session ended with curiosity and a fantastic visualization of the skill needed in the automobile industries including the e-mobility. The visit has made some key touching with:**

- **How ICE-engine works with individual cut sections of the various models of cars – eco, swift, Fortuner, TATA Nexon and Prius.**
- **The chassis to the wiring and braking to the speeding of vehicle have been demonstrated.**
- **The painting, the repairing, the welding, the manufacturing and the all mechanical tasks related to automobile industries have been thoroughly explained and made.**
- **The robotic section for the hazardous tasks have been explained.**
- **The 3-D printing, scanning have been represented by the authority.**
- **The autotronics section with hands on kits and simulation is explained – how to increase the power of the engine, estimation of the power ratings of electrical utilities, Braking, lights, protection – safety bags operation and the controllers used in vehicle.**
- **Section EV also visited**

**In the end the question and answer session was taken by Dr R J Jani sir and the Director of iACE. The visit ended with a wonderful paid lunch at iACE. Dr R J Jani had concluded the visit at around 2.45 pm with a note of thanks to all representatives of iACE.**







