**Website Outline for Centre of Excellence in e-Mobility**

**1. Home**

* **Introduction**
  + Brief introduction to the Centre of Excellence in e-Mobility.

The Centre of Excellence in e-Mobility, housed within the School of Engineering & Technology at CHRIST (Deemed to be University), Kengeri Campus, is a pioneering initiative in collaboration with Decibels Lab Pvt. Ltd. Originally established as the E-Mobility R & D Centre in 2018, it was funded by Safran Engineering Services and IEEE. With this support, the Centre has evolved into a premier hub for innovation and research, now recognized as the Centre of Excellence in e-Mobility by CHRIST (Deemed to be University).

Our Centre focuses on key areas critical to the advancement of e-mobility, including:

* **Energy Storage Systems**
* **Advanced Powertrain Technologies**
* **Software-Driven Vehicles**
* **Sustainable Transportation**

We are dedicated to providing comprehensive training for students, researchers, and industry professionals. Our academic offerings include an M.Tech in Storage Materials with a specialization in Battery Management Systems, PGDM courses in Electric Vehicle Technology, and a variety of certification courses.

In addition to educational programs, the Centre engages in consultancy services within its focus areas and supports startups through incubation at the Innovation and Incubation Centre (IIIC) at CHRIST University. Our mission is to drive forward the future of e-mobility through cutting-edge research, education, and industry collaboration

* + Mission and vision statements.

**Vision**

Energizing a new era of Electric Mobility through education, innovation, and collaborative excellence.

**Mission**

Dedicated to propelling the future of sustainable transportation, the center fosters innovation, encourages knowledge sharing, and promotes industry collaboration. It offers a dynamic platform for students, researchers, and industry leaders to explore, develop, and implement cutting-edge e-mobility technologies.

**Objectives**

* •To develop proof of concepts, innovative solutions and subsystems in E-Mobility.
* To conduct training in Electric Vehicle technologies in collaboration with industries.
* To develop Vocational and Skill development courses on E-Mobility.
* To develop a blended learning platform on Electric Vehicle Technology, catering to students, researchers and industry professionals, and offering comprehensive training modules for academia and industry needs.
* To provide consultancy to electric mobility companies and to participate in product development.
* To promote Startups in E-Mobility.
* **Welcome Message**
  + Message from the Director/Head of the Centre.

### Welcome Message

Welcome to the Centre of Excellence in e-Mobility at CHRIST (Deemed to be University). As Head of the Centre, I am delighted to invite you to explore the innovative and transformative world of e-mobility with us.

Since our inception as the E-Mobility R & D Centre in 2018, we have continuously evolved, driven by our commitment to excellence in research, education, and industry collaboration. Our partnership with Decibels Lab Pvt. Ltd. and support from Safran Engineering Services and IEEE have been instrumental in this journey.

At the Centre of Excellence in e-Mobility, we focus on critical areas such as Energy Storage Systems, Advanced Powertrain Technologies, Software-Driven Vehicles, and Sustainable Transportation. Our goal is to equip students, researchers, and industry professionals with the knowledge and skills needed to lead in the rapidly advancing field of e-mobility.

We offer a range of programs, including M.Tech in Storage Materials with a specialization in Battery Management Systems, PGDM in Electric Vehicle Technology, and various certification courses. Additionally, our consultancy services and startup incubation support further our mission to foster innovation and sustainable solutions.

Thank you for visiting our website. We look forward to collaborating with you and advancing the future of e-mobility together.

Warm regards,

**Dr. Parag Jose C**  
Head, Centre of Excellence in e-Mobility  
CHRIST (Deemed to be University)

* **Latest News and Updates**
  + Upcoming events, seminars, workshops, and conferences.
  + **(This will be scrolling)**

**2. About Us**

* **Leadership Team**
  + Profiles of the Director, key faculty members, and administrative staff.
  + Dr. Parag Jose C, Head- Centre of Excellence in e-Mobility
  + Dr. Pragash K, Department of Electronics & Communication Engg., SoET
  + Dr. Harish Kumar, Department of Mechanical Engg., SoET
  + Dr. Venkataswamy R, Department of Electrical & Electronics Engg., SoET
  + Prof. Haneesh K.M, Department of Electrical & Electronics Engg., SoET
  + List of students involved.
* Team Lead Aaron Abraham EEE

### Range Extension in Batteries in Cold Conditions

### Aswath M.Tech

### 5 members

### Battery Characterisation & Digital Twinning

### Geno P. M.Tech

### 5 members

### Adaptive Driver Assistance & Communication Systems

### Athira M.Tech

### 5 members

### Digital Twin of E-2W

### Sahana, RM

### 5 members

### V2G and G2V Onboard Charger

### Hrudhya Kurian , Ph.D

### 5 members

### Virtual Driving & Connected Vehicles

### New Team

### 5 members

* **Advisory Board**
  + List of advisory board members and their profiles.
  + Dr. Fr. Sony J Chundattu, Director ,School of Engineering & Technology
  + Dr. Raghunandan Kumar, Dean, School of Engineering & Technology
  + Dr. Mary Anitha, Associate Dean, School of Engineering & Technology
  + Fr. Shijin P.J, Assistant Director, School of Engineering & Technology
  + Dr. Joseph X Rodrigues, HOD, Department of Electrical & Electronics Engineering

**3. Research and Innovation**

* **Research Areas**
  + Electric Vehicles (EV) technology.
  + Battery and Energy Storage Systems.
  + Charging Infrastructure.
  + Smart Grids and Renewable Energy Integration.
  + Autonomous and Connected Vehicles.
* **Projects**
  + Ongoing research projects with brief descriptions.

### Range Extension in Batteries in Cold Conditions

This project focuses on improving battery performance in cold environments. It involves developing technologies and methods to maintain battery efficiency and extend the driving range of electric vehicles (EVs) when exposed to low temperatures.

### Battery Characterisation & Digital Twinning

This project aims to create detailed models of battery behavior through advanced characterisation techniques. By developing digital twins, which are virtual replicas of physical batteries, it enables real-time monitoring, predictive maintenance, and optimization of battery systems.

### Adaptive Driver Assistance & Communication Systems

This project is dedicated to enhancing vehicle safety and driving experience through adaptive driver assistance systems. It involves the integration of advanced communication technologies to enable vehicles to interact with each other and with infrastructure, improving overall traffic management and reducing accidents.

### Digital Twin of E-2W

This project focuses on creating a digital twin for electric two-wheelers (E-2W). The digital twin serves as a real-time virtual model that mirrors the physical vehicle, enabling better performance tracking, predictive maintenance, and optimization of vehicle parameters for enhanced efficiency and user experience.

### V2G and G2V Onboard Charger

This project explores the development of bidirectional charging systems that support Vehicle-to-Grid (V2G) and Grid-to-Vehicle (G2V) functionalities. It involves creating onboard chargers that allow EVs to both draw energy from the grid and supply energy back to it, facilitating better energy management and grid stability.

### Virtual Driving & Connected Vehicles

This project aims to advance virtual reality driving and enhance connectivity in vehicles. It involves developing digital twin technologies for realistic driving simulations and enabling vehicles to communicate with each other and with infrastructure, improving the accuracy of driving models and the efficiency of transportation systems.

* **Publications**

|  |  |
| --- | --- |
| **No** | **Publications** |
| 1 | Kurian, H., & Jose, P. C. (2023). "LCLC Based AC-DC Single-Stage Resonant Converter with Natural Power Factor Correction" in 2023 IEEE 3rd International Conference on Sustainable Energy and Future Electric Transportation (SEFET), August 9, 2023, pp. 1-6. |
| 2 | Kurian, H., & Chacko, P. J. (2023). "On-board Converter for Electric Vehicle Charging Using LCLC Resonant Topology" in 5th International Conference on Energy, Power & Environment (IECEPE 2023), June 2023. |
| 3 | Chacko, P. J., & Meikandasivam, S. (2021). "An Optimized Energy Management System for Vehicle to Vehicle Power Transfer Using Microgrid Charging Station Integrated Gridable Electric Vehicles" in Sustainable Energy, Grids and Networks, Volume 26 Issue -1, April 2021. |
| 4 | Chacko, P. J., Haneesh, K. M., & Rodrigues, J. X. (2021). "Error-State Extended Kalman Filter Based Sensor Fusion for Optimized Drive Train Regulation of an Autonomous PHEV" in Electric Vehicles and the Future of Energy Efficient Transportation, December 2020. |
| 5 | Steben Babu  , Rahul Santhosh PM , Rishin Mathew  , Muhammed Nazim ,Parag Jose C , Haneesh K.M(2022) Electric Vehicle Drivetrain Optimization Strategy Using Genetic Algorithm, Sustainable Energy and Clean Technologies Jointly Organized by Department of Chemical Engineering and Department of Electrical Engineering, Pandit Deendayal Energy University, Gandhinagar on September 2 - 4, 2022 |
| 6 | Abhinand Nair, Parthiv Shaji,Nived T, Parag Jose Chacko, Haneesh KM.(2022). Deep Neural Network approach for Brake Blending in Autonomous Vehicles for Automatic Cruise Control. Sustainable Energy and Clean Technologies Jointly Organized by Department of Chemical Engineering and Department of Electrical Engineering, Pandit Deendayal Energy University, Gandhinagar on September 2 - 4, 2022 |
| 7 | Jose Thomas, Allen Thomas, Akhil Biju, Aswin Mathew, C. Parag Jose & Haneesh K.M (2020) “A GPS- Gradient mapped Database based Fuzzy Energy Management Systems for Series- Parallel Hybrid Electric Vehicle in Lecture Notes in Electrical Engineering, 2020. vol 665, Chapter-38 . |
| 8 | Parag Jose C. & S. Meikandasivam, (2020). “Optimization & Validation of Intelligent Energy Management System for Pseudo Dynamic predictive regulation of Plug-in Hybrid Electric Vehicle as Donor Clients” in e-Transportation, Volume 3 Issue -1, February 2020. |
| 9 | Aswin Mathew, Rohit Babu, Mikhil Philip, Galvin Joseph, Parag Jose C and Haneesh K. M (2020) : “Hybrid Renewable Road Side Charging Station with I2V Communication Functionality” in Lecture Notes in Mechanical Engineering. |
| 10 | Parag Jose C, Haneesh K.M. & Joseph Rodrigues, (2021). “Error-state Extended Kalman Filter Based Sensor Fusion for Optimized Drive Train Regulation of an Autonomous PHEV” in Electric Vehicles and the Future of Energy Efficient Transportation. |
| 11 | Parag Jose C & Haneesh K.M, (2019) “Modelling and Analysis of Split Parallel Hybrid Electric Vehicle based on 14 Degrees of Freedom” in the International Journal of Innovative Technology and Exploring Engineering (IJITEE), Volume-8 Issue-5, March 2019. |
| 12 | Parag Jose C & Haneesh K.M (2019), “Fuzzy Based Controller for Bi-directional Power Flow Regulation for Integration of Electric Vehicles to PV based DC Micro- Grid” in the 2019 International Conference on “Data Science and Communication”; 01 - 02 March, 2019 held at CHRIST (Deemed to be University), Bangalore, (INDIA). |
| 13 | Parag Jose C. & S. Meikandasivam (2019). “NSGA-II Based Optimization Approach For Intelligent Load Sharing In Plug-In Hybrid Vehicles ” in International Journal on Scientific & Technology Research, Volume 8 - Issue 10, October 2019. |

* **Collaborations**
  + Partnerships with industry, other academic institutions, and research organizations.
  + Decibels Lab, Mahindra Electric, Safran Engineering Services **(LOGOs)**

**4. Academic Programs**

* **Degree Programs**
* M.Sc in Storage Materials with a specialization in Battery Management Systems,.
* PGDM in Electric Vehicle Technology
* **Courses Offered**
  + Master certification program on Battery Management Systems
  + Master certification program on Electric Powertrain
  + Micro Specialization courses on EV Systems

**5. Events**

* **Workshops**
  + Upcoming and past workshops organized by the Centre.
* **Seminars and Lectures**
  + Guest lectures, webinars, and seminar series.
* **Conferences**
  + Details of conferences hosted or co-hosted by the Centre.
* **Competitions**
  + Hackathons, coding competitions, and other student engagement activities.

**6. Industry Engagement**

* **Partnerships**
  + List of industry partners and collaborators.
* **Internships and Placements**
  + Information on internship opportunities and placement support.
* **Consultancy Services**
  + Consultancy services offered to industry partners.

**7. Facilities**

* **Laboratories**
  + Overview of the labs and research facilities.
* **Equipment**
  + Key equipment and resources available for research and teaching.
* **Equipment Info**

**Li-ion cell testing lab, 5V,10 mA 8Ch**

* Equipment Code : **COE/24-25/CBT-1**
* Make : **Hioki**
* Model : **MLB-PML-P300**
* Institution :  **School of Engineering & Technology, Christ University- Kengeri Campus**
* Department : **Centre of Excellence in e-Mobility**
* Funding Agency Details :
* Pooling of Equipment slot :   **No**
* Last AMC Done :
* Reference Website :
* Description : **• Voltage CV Output Range 25mV-5V**
* **Output range/channel: Range1: 5mA-1A; Range2: 1A-6A; Range2: 6A-12A**
* **CV cut-off current: Range1: 2mA; Range2: 12mA; Range3: 24mA**
* **Power Per Channel Output Power 60 W**
* **Min data recordinterval:100ms**
* **Min voltage change:10mV**
* **Min current change: 2mA; 12mA; 24mA**
* **Data recording Frequency: 10Hz**
* **Voltage and Current Testing Sample 4-wire connecting**
* **Max cycles 65535**

##### **Usage Rate:**

| **S.NO.** | **USERS CATEGORY** | **RATE (UNIT HOUR) & (IN RUPEES)** |
| --- | --- | --- |
| 1 | Academic (External)\* | Rs.1500 per hour +18% GST |
| 2 | Academic (Internal but different department/lab)\*\* | Rs.500 per hour +18% GST |
| 3 | Academic (Internal)\*\*\* | Rs.300 per hour +18% GST |
| 4 | Industry User | Rs.2000 per hour +18% GST |
| 5 | National Research Lab User | Rs.1500 per hour +18% GST |
| 6 | Start-ups Company | Rs.2000 per hour +18% GST |

IMPEDANCE ANALYZER

* Equipment Code : **COE/24-25/CBT-2**
* Make : **Hioki**
* Model :
* Institution : **School of Engineering & Technology, Christ University- Kengeri Campus**
* Department : **Centre of Excellence in e-Mobility**
* Funding Agency Details :
* Pooling of Equipment slot :   **No**
* Last AMC Done :
* Reference Website :
* Description :
* **Measurement modes LCR mode, Continuous measurement mode (LCR mode / Analyzer mode), Analyzer mode (Sweeps with measurement frequency and measurement level, temperature characteristics, equivalent circuit analysis)**
* **Measurement parameters Z, Y, θ, Rs (ESR), Rp, Rdc (DC resistance), X, G, B, Cs, Cp, Ls, Lp,**
* **D (tanδ), Q, T, σ (conductivity), ε (dielectric constant)**
* **Measurement range 100 mΩ to 100 MΩ, 10 ranges (All parameters are determined according to Z)**
* **Display range Z, Y, Rs, Rp, Rdc, X, G, B, Ls, Lp, Cs, Cp, σ, ε :**
* **±(0.00000 [unit] to 9.99999G [unit], Absolute value display for Z and Y only**
* **θ : ±(0.000° to 180.000°), D : ±(0.00000 to 9.99999)**
* **Q : ±(0.00 to 99999.9), Δ % : ±(0.0000% to 999.999%)**
* **T : -10.0°C to 99.9°C**
* **σ, ε :±(0.00000f [unit] to 999.999G [unit]**
* **Basic accuracy Z: ±0.05% rdg. θ: ±0.03°**
* **Measurement frequency 1 mHz to 200 kHz (5 digits setting resolution, minimum resolution 1 mHz)**
* **Measurement signal level Normal mode:**

##### **Usage Rate:**

| **S.NO.** | **USERS CATEGORY** | **RATE (UNIT HOUR) & (IN RUPEES)** |
| --- | --- | --- |
| 1 | Academic (External)\* | Rs.1500 per hour +18% GST |
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| 5 | National Research Lab User | Rs.1500 per hour +18% GST |
| 6 | Start-ups Company | Rs.2000 per hour +18% GST |

**More to ADD**

* **Innovation Hub**
  + Information on the innovation and incubation center.

 **Purpose and Vision**: The Innovation Hub aims to foster creativity, research, and development in various technological fields. It serves as a catalyst for transforming innovative ideas into viable products and solutions.

 **Facilities and Resources**: Equipped with state-of-the-art laboratories, prototyping tools, collaborative workspaces, and access to cutting-edge technology, the center provides an ideal environment for innovation and experimentation.

 **Support for Startups**: The incubation center offers comprehensive support to startups, including mentorship, business development resources, funding opportunities, and access to a network of industry experts and investors.

 **Collaborative Environment**: Encourages collaboration among researchers, entrepreneurs, and industry professionals. Regular workshops, seminars, and networking events are organized to foster knowledge exchange and partnership building.

 **Focus Areas**: The center focuses on a wide range of areas such as renewable energy, electric mobility, smart cities, digital transformation, and advanced materials, promoting interdisciplinary research and innovation.

 **Commercialization Pathways**: Assists in the commercialization of new technologies by providing guidance on intellectual property rights, market analysis, and strategies for bringing products to market.

 **Community Engagement**: Engages with the broader community through educational programs, hackathons, and innovation challenges, inspiring the next generation of innovators and fostering a culture of innovation.

 **Sustainability and Impact**: Emphasizes sustainable development and social impact, encouraging projects that address global challenges and contribute to the betterment of society.

**8. News and Media**

* **Press Releases**
  + Official announcements and press releases.
* **Media Coverage**
  + Articles, interviews, and media features about the Centre.
* **Gallery**
  + Photo and video gallery of events and activities.

**9. Contact Us**

* **Location and Address**
  + Centre of Excellence in e-Mobility
  + 5th Block , Ground Floor
  + School of Engieering & Technology
  + CHRIST (Deemed to be University)
  + Kanmanike, Kumbalagodu, Kengeri
  + Bangalore-560074
* **Contact Information**
  + Phone numbers, email addresses, and social media links.
* **Feedback and Inquiries**
  + Online form for feedback and inquiries.

**10. Alumni**

* **Success Stories**
  + Profiles of successful alumni and their contributions to the field of e-Mobility.
* **Alumni Network**
  + Information on the alumni network and how to stay connected.