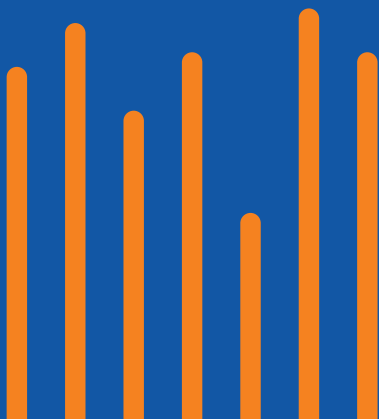




# E-BUS SYSTEM PLANNING & OPTIMIZATION





The transportation is transforming  
& we need to get ready  
- James Campbell

# PROGRAM OVERVIEW

The country's first electric vehicle training programme, aiming to cover all main areas of EV design and integration. This 5-month curriculum is globally approved by the Automotive Skills Development Council (ASDC). Industry experts from across the world will participate in Live Online sessions that will be interactive and incorporate industry-relevant, real-time projects.



### Hands-on Model-based Systems Engineering

Practice sessions on EV Fleet Planner tool



### Online Training Sessions (Live And Self-paced Formats)

Video Recordings (with 1 Year of LMS access)



### Industry Expert Trainers

Professionals worked on global e-Mobility consulting projects



### In-lab Practical On Hardware Model

Hardware characterization, modeling, and simulation



### Capstone Project On Real Topic

Work on a project, get it evaluated by experts, get recommended by them



### Industry Valued Certification

Joint certificate by Automotive Skills Development Council (ASDC) with online proctored assessment



### Networking

Meet & network with your fellow cohorts



### Placement Assistance

Preparation Support, Mock Interviews, Resume Building & Mentorship by Industry Experts



## KEY OUTCOMES OF THE PROGRAM

- ▶ Holistic understanding of the e-Bus system, and its components
- ▶ Learn e-Bus, Battery and Charging Technology selection, overall system requirements planning, and economics
- ▶ Unique hands-on modeling for realtime problem solving and building future scenarios for desired e-Bus operations using Excel and EV Fleet Planning tool
- ▶ Understand route and network planning considerations
- ▶ Understand performance parameters for e-Bus System Optimisations
- ▶ Know the impact of route characteristics, loading, weather and loading on e-Bus performance
- ▶ Learn optimizing e-Bus fleet and charging operations
- ▶ Build skills on Capex and Opex optimization and calculating TCO

# LEARN FROM THE GURUS



**Rahul Bagdia**  
(BHTC & Research Assistant  
at University of Michigan)



**Vikrant Vaidya**  
(TATA Motors, General Motors,  
Jaguar - Land Rover)



# EVACAD ALUMNI WORKING ON VARIOUS ROLES AT



WORLD  
RESOURCES  
INSTITUTE



THE INTERNATIONAL COUNCIL  
ON CLEAN TRANSPORTATION



Alliance for an  
Energy Efficient  
Economy



DAIMLER



Olectra



TATA

SWITCH

TATA MOTORS



Ashok Leyland



Urban Mass Transit  
Company Limited



Global  
Green Growth  
Institute



深圳巴士集团  
SHENZHEN BUS



THE COUNCIL



Institute for Transportation  
& Development Policy



The Fiji Government



URBAN  
CATALYST



The Commonwealth



National Institute of Urban Affairs



HOLIDAYS | INTERCITY | CITYBUS | RENTALS



# GLOBALY ACCREDITED JOINT CERTIFICATE BY AUTOMOTIVE SKILLS DEVELOPMENT COUNCIL (ASDC)

The certificate is framed in gold and contains the following elements:

- Logos:** EVACAD (top left), Skill India (top center), and ASDC (top right).
- Title:** Certificate
- Text:** "This is to certify that Allison John has successfully cleared the assessment for the online/blended digital course on 'Applied EV Design & Integration'"
- Signatures:** Arindam Lahiri (Chief Executive Officer, ASDC) and Rahul Bagdia (Managing Director, pManifold EV Academy).
- Metadata:** Date of Issuance: 05-05-2022; System Identification Number: XXXXXXXX3463.
- QR Code:** Located at the bottom right, with the number (253)89070467051090000081250 below it.

# CAPSTONE PROJECT TOPICS

- To model one disruption over the base case and provide mitigation plan (using EVFleetPlanner© tool)

- ▶ Uptake of New Technology or Regulatory Deployment, and its effect on e-Bus operations
- ▶ Planning e-Bus system in case of Road Blockages
- ▶ Effect of Battery Degradation on systems planning for e-Buses
- ▶ Planning e-Bus system for Abnormally high passenger loading
- ▶ Planning e-Bus system for Breakdown - Bus/Charger
- ▶ Seasonal disruption and battery aging over life cycle
- ▶ Bus charger breakdown and inadequate manpower availability

- For any city of a country and one intracity route for public transport, to execute the following steps...

For a 9m OR 12m Non-A/C OR A/C e-Bus planning,

- ▶ Data collection & energy modeling
- ▶ Charging schedule & fleet plan
- ▶ TCO with appropriate regional assumptions
- ▶ One disruption identified and provided with mitigation plan



## WHO IS THIS PROGRAM FOR

Anyone and everyone who wants to learn more about the advancement of the e-Mobility sector and to upskill to get their career aligned with it.

- ▶ EV enthusiasts
- ▶ Bus Fleet Operators
- ▶ Professionals working in transport planning domain
- ▶ Product development professionals at OEMs (EV / ICE)
- ▶ Public Transport Authority staff

### • Industry Profile

- ▶ Automotive | EV Fleet Operations | Manufacturing | with any amount of experience in the mobility / transport planning domain



A photograph showing a close-up of several people's hands gathered around a wooden table. One person is holding a pen over a document, while others have their hands clasped or resting on the table. The background is blurred, showing an office or meeting environment.

## ELIGIBILITY

This programme is tailored to help you improve your EV fleet planning and system engineering skills as a student, recent graduate, or working professional with following expertise.

### • 0-3+ years of experience with educational background of

- ▶ Bachelors in Planning
- ▶ Bachelors in Architecture
- ▶ Bachelors in Transportation Engineering
- ▶ Masters in Urban / City Planning
- ▶ Masters in Transport Planning
- ▶ Masters in Architecture
- ▶ B.E./ B. Tech.
- ▶ M.E./ M.Tech.
- ▶ Research Scholar/ Doctorate



## SPECIALIZED ROLES ONE CAN APPLY FOR

This programme is tailored to help you improve your engineering skills as a student, recent graduate, or working professional with following expertise.

- ▶ Transport planning Analyst / Manager
- ▶ Project Lead for e-Mobility planning / Research
- ▶ Transport Planner
- ▶ Transport Economist
- ▶ Planning Analyst / Assistant
- ▶ Transit Innovator
- ▶ Project Manager-Transportation
- ▶ Logistics Manager
- ▶ Transport Engineer
- ▶ Program Manager - Logistics
- ▶ Transportation Manager
- ▶ Transportation Specialist



# ADMISSION PROCESS AND FEES

Our Admission Process ensures that you are the right candidate for this program. We also make sure our batches form relevant teams within, to carry out the assignments and to work collectively on our precisely designed Capstone projects.



## Fees Structure

- ▶ **Total Fees - INR 55,900**
  - Full payment
    - ▶ Admission fees - INR 5,000
    - ▶ Balance fee payment - INR 50,900



## OUR GURUS



### MR. RAHUL BAGDIA

MD, pManifold EV Academy

Academics: Dual Masters in Robotics & Control from University of Michigan, Ann Arbor, US

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20+ years of extremely diverse global experience in various industries like energy & utilities, electric vehicles, health & life sciences, banking & finance and education. Has worked with Government of India for Electric Vehicle Program Management Cell in areas of policy making, EV infrastructure development, distribution networks and power generation. He has been instrumental in supporting Policy and Technical Standards Development for Electric Vehicles for various countries.

# MR. VIKRANT VAIDYA

CEO, pManifold EV Academy

Academics: Master in Energy Systems Engineering  
from University of Michigan, Ann Arbor, US



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20+ years of experience in vehicle development & integration - IC Engine, Hybrid Electric as well as Battery Electric Vehicles - for global platforms of Tata Motors, General Motors, Jaguar-Land Rover and Groupe PSA's upcoming BEV for emerging markets. Expertise in product development through powertrain-vehicle integration, model-based controller development and powertrain-in-vehicle calibration. A recruiter & technical trainer for 10+ years & has three records of the invention in hybrid powertrain, battery controls & repurposing.



# MR. DIPANKAR DEBNATH

Asst. Prof., Electrical Dept., IIT Kharagpur

Academics: M.E. from IEST Shibpur, West Bengal  
& B.E. from NIT Agartala, Tripura

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6+ years of teaching experience in the area of Electrical Engineering. His research interest includes design of integrated power electronic converter topologies, solar photovoltaic based standalone/off-grid systems for rural areas, multi-functional inverter for grid integration of renewable energy sources, study of micro-grid, motor and motor controller design for EV, etc.

## MR. HEMANT PADHYE

Director, Pro Business Innovations

Academics: MBA from Pune University & BE in Mechanical from Nagpur University



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33+ years' experience in Automotive/Powertrain Industry. Electric Vehicle and Electric Drives Domain Expertise including EV Integration. Launched 45+ major automotive programs in last 20 years (Passenger Cars and Powertrains). Experienced in RCA & FMEA.



## MRS. ABHANSHA SOMVANSHI

Consultant, Transport Planning, pManifold

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4+ years' experience in the field of urban planning, transport planning and e-Mobility for public transportation, strategic planning for urban transport, public transport systems planning and traffic modelling, feasibility projects for urban transport.

## MR. SHEKHAR MALANI

MD, Devise Electronics

Academics: MS in Electrical Engg. – Control Systems, University of Southern California



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20+ years of diverse experience in automotive powertrain industry. 10+ EV powertrain system integration project. 20+ Embedded products developed across multiple domains. Experience in engine, vehicle, aftertreatment and power-train controls for multiple emission regulations, and electric vehicles. Expertise in Vehicle Controllers, System Functional Safety, Charging protocols and telematics, High Voltage safety

# WHAT OUR LEARNERS **HAVE TO SAY...**

“ My whole experience during this course was excellent and will surely assist me greatly as I try to contribute towards electrifying Fiji's public transport. The trainers and course content was excellent and the overall presentation of theory and practical scenarios was well balanced to further enhance understanding and ability of participants to relate the scenarios to their own specific country or city.

**-Razik Khan,**  
Sr. Technical Officer, Land Transport Authority, Gov. of Fiji

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“ It provided an enhancement in my overall knowledge for electric buses and operations. Course is well-structured focusing on theoretical as well as real ground practical cases. The knowledge gained can be further utilized in the work carried on ground for electric bus adoption and operations.

**-Mahak Dawra,**  
e-Mobility Program Associate, World Resource Institute

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“ I greatly realized my ambition of becoming an expert in e-bus modeling. I have gained experience in data collection, modeling and even calculating the TCO. With this knowledge and skills, we can now achieve sustainable transport for Kenya which is a priority for the government.

**-Joshua Odour,**  
R&D Engineer, Knights Energy

# WHAT OUR LEARNERS **HAVE TO SAY...**

“The training program was well structured with a mix of theory and modeling sessions. It definitely gave valuable insights with respect to electric bus planning and scheduling. I particularly enjoyed the team project as it involved working with actual duty cycles and passenger loading, It was a good platform for peer interaction. Many thanks to the trainers.

**-Amruta Kulkarni,**  
Jr. Technical Expert - Public Transport, GIZ

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“Overall, I've gained a lot of knowledge with regards to e-Bus Systems and planning, at first it was difficult for me as I had no prior knowledge of the basic concepts and fundamentals. But the course helped me to understand how the feasibility study on e-Buses in Zimbabwe was conducted as I now understand the processes.

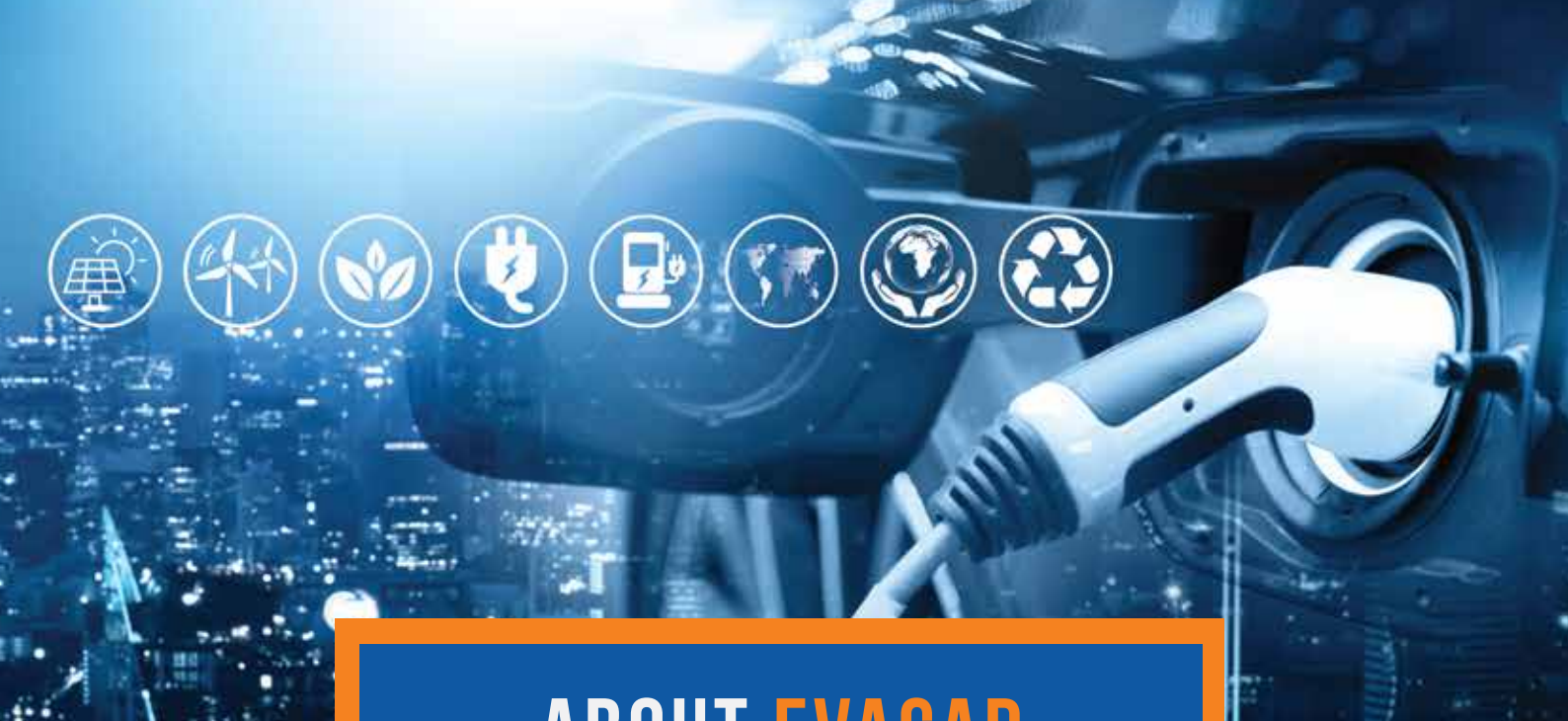
**-Lisa Mare,**  
Project Coordinator, Mobility for Africa

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“I had an exciting learning experience that was full of practical case studies from running e-bus projects. As students, we were given time to participate and ask questions for clarity whenever we needed to. The overall delivery by the training facilitators was good.

**-Zebediah Chintaha,**  
Technical lead, Central Mechanical Equipment Department of Zimbabwe





## ABOUT EVACAD

A team of business experts that formulated **EVACAD** has more than **150 years** of combined experience with **e-Mobility**. With joint certification from the **Automotive Skills Development Council (ASDC)**, our programmes now have global recognition. Being a brainchild of pManifold, we set our courses and knowledge content to high standards. Our applications and practise-based learning programmes are designed to help you develop your current skill set while staying relevant to industry standards and procedures utilised by the top business players around the globe.

pManifold is a strategic research and consulting firm founded in **2010**, that is facilitating the development and growth of the smart and clean tech markets in the **energy, e-mobility, solar, LVDC, environmental, and urban sectors**. For quicker reforms, a better customer experience, and profitable market expansion, it is assisting businesses and industries in innovating and changing their solutions, services, and business models. Its work and clientele are located all over the world, including in **India, the ASEAN Nations, the USA, Europe, and other places**.

I believe the Auto industry will change more in the next 5-10 years than it has in the last 50.

- **Mary Barra**

(CEO and Chairman - General Motors)



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