



**ARYA College of Engineering (ACE)**

Previously Known as Arya Institute of Engineering & Technology (AIET)

(Affiliated to RTU  
Approved by AICTE, New Delhi)

**Office of the Center of Excellence (COE) in E-Mobility Research & Skill Development**

(Recognized by RTU, Kota)

# Centre of Excellence (CoE) in “E- Mobility Research & Skill Development”



**IQAC COORDINATOR**

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SP-40, Industrial Area (RIICO) Delhi Road,  
Kukas, Jaipur-302038 (Raj.)



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## The Practice

Arya Institute of Engineering and Technology – AIET has established state of the Art Lab to Create an Ecosystem for the Research, Innovation, Skill development, and Entrepreneurship for Green Mobility.

### **Vision:**

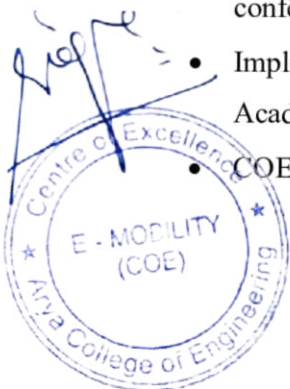
Create an Ecosystem for the Research, Innovation, Skill development, and Entrepreneurship for Green Mobility.

### **Mission:**

- To Create a strong association of expertise with verity of experiences and facilities for Research and Innovation to exchange knowledge, ideas, solutions to Industry and Academia.
- To Conduct technical programme such as training, workshops, internships, seminars, conferences, expert talks, schools and FDPs in relevant areas.
- To Implement NEP (National Education Policy) and filling the gap between Industry and Academia.
- To Make the cost-effective EV-Car.

### **Objectives and Relevance of the Proposed COE:**

- COE will create an Ecosystem for Research, Innovation, Skill Development, and Entrepreneurship for Green Mobility.
- Creating a strong association of expertise with verity of experiences and facilities for Research and Innovation to exchange knowledge, ideas, solutions to Industry and Academia.
- Conduct technical programme such as training, workshops, internships, seminars, conferences, expert talks, schools and FDPs in relevant areas.
- Implement NEP (National Education Policy) and filling the gap between Industry and Academia.
- COE will provide best world class practices for Design, Research & Prototyping.



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## Technical Novelty and Utility:

As a National E-Mobility Mission 2020, there is faster adaption and manufacturing of Hybrid and Electric Vehicles in India. This is a green initiative of Arya College of Engineering (ACE) to contribute towards reducing pollution & technology development in Hybrid and Electric Vehicles. Now, if we consider the future needs of EV/HEV Vehicles, students and researchers must have a visible approach towards E-mobility and innovations. The government is promoting electric vehicles, the automobile industry will be in need of skilled manpower in this sector. The research parameters for E-Mobility viz. Battery, Motor, Power Electronics, Chargers, and Simulation. We believe that the research is more successful when its results are directly proportional to end-users. This will provide more visibility to learning and approach towards the research activities.

## Specific Thematic Focus:

Though electric vehicle technology is expected to lead the automotive powertrain architecture in the coming decades, various barriers currently hinder their acceptance into the automotive market. These barriers are generally categorized into battery technology, vehicle performance, charging infrastructure, consumer behaviour, and government support.

## Strategy to Provide Scientific Mentorship /Skill development /startups of young engineering /Professional students under the centre:

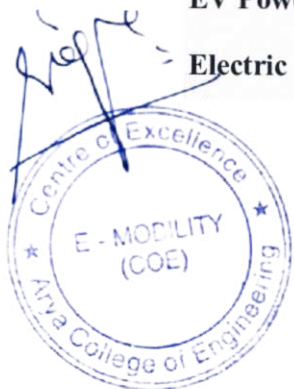
Electric and hybrid vehicle technologies will require significant investment over the coming years to make switching from ICEs an even more attractive option. This includes performing innovative research and development projects to improve energy storage systems, electric motors, power electronics, and vehicle charging infrastructure.

### Hybrid and EV Energy Storage Systems

### Electric Vehicle Motor Systems

### EV Power Electronics Systems

### Electric Vehicle Charging Infrastructure



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## Learning Objectives:

Under the COE, participants will be able to:

1. Define and analyse fundamental electrochemistry of battery operation and performance requirements for HEV, PHEV, EREV and full electric vehicle applications.
2. Estimate the size of a cell to meet a specific requirement.
3. Create a cradle-to-grave, or cradle-to-use list of materials used in any type of automotive battery.
4. Compute the temperature response of battery cell and pack assemblies for a simple model.
5. Describe the functions performed by a Battery Management System (BMS).
6. Explain different approaches to estimating state of charge, state of health, power and energy.
7. Apply the operation of brushless dc and induction motors to HEV and EV vehicles.
8. Define the torque speed curves for motors and the application to electric and hybrid electric vehicles.
9. Describe the features of buck, boost, and Transformer converters.
10. Compare and contrast the various industry and regulatory standards for hybrid vehicle components, batteries, and charging systems.
11. Describe the main hybrid and electric vehicle development considerations and performance requirements for various vehicle system.
12. Identify how to define key vehicle system requirements and select and size system components that best meet those requirements.



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## Tools & Machinery of Electric Vehicle Manufacturing Unit

### EV-Workshop

S. No.	Name	Qty	S. No.	Name	Qty
1	Mig Welding Machine	1	68	File Square	1
2	Pipe Bending Machine	1	69	Hammer 2-3 Kg	1
3	Power Hexa	1	70	Ball pin hammer	1
4	Milling Machine	1	71	Chipping Hammer	1
5	SS30 orbit sander	1	72	Crosspin Hammer	1
6	Sander paper	50	73	Plastic Small Hammer	1
7	DW801 100 mm toggle sag dewalt	1	74	Soft Hammer	2
8	SDH600 13 mm precussion drill	1	75	Sheet Cutter Big	1
9	Lathe Machine 3 Jaw	1	76	Hexa	1
10	Lathe Machine 4 Jaw	1	77	Chiesel	1
11	Single Point Cutting Tool	1	78	Revit gun	1
12	Parting Tool	1	79	POP Rivet 5/32-1/2	1 pkt
13	Boring Bar 3/16	1	80	Silicon gun	1
14	Tool Holder 3/8 GERMAN	1	81	Combination Plier 8"	1
15	Tool Bit 3/16*3	1	82	Grip plier	1
16	Tool Bit 3/8"	1	83	Holesaw 1"	1
17	Milling Cutter	1	84	Holesaw 1.5"	1
18	Radial Drill Machine	1	85	Big Screw Driver	2
19	Grinding Machine Bench Type	1	86	8 MM Self Screw Bit	1
20	Arc Welding Machine	1	87	Self screw bit	1
21	Mig Wire 0.8 MM-Lp-Kg	2 Kg	88	L&N key set	2
22	Soldering wire 60/40 Gage 250 Gm	1	89	Ratchet Set	1
23	Soldering Paste-LP	2	90	Tool Box	1
24	Welding Shield	1	91	Spanner (Hook)	1
25	Specs Black	2	92	Ring Spanner	
26	Leather apron	1	93	30*32	1
27	Leather h gloves	1 set	94	27*30	1
28	Lated coted cotton gloves	2 set	95	25*28	1
29	Chop Saw	1	96	21*23	1
30	Safety goggles	3	97	20*22	1
31	Specs White	7	98	18*19	2
32	Boring Bar	1	99	16*17	2
33	Marking Tool	1	100	12*13	1
34	Measuring Tape	2	101	Fix Spanner	

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35	Anger Finder	1
36	Vernier Digital	1
37	Vernier Analog	1
38	Scale 2Ft	1
39	Scale 1Ft	4
40	Devider	1
41	Tri Square	2
42	Protector	1
43	Spirit Level	1
44	Tap Handle	1
45	Tap Set 12 MM	1 Set
46	Tap Set 10 MM Left	1
47	Tap Set 10 MM	1 Set
48	Tap Set 8 MM Left	1
49	Tap Set 8 MM	1 Set
50	Tap Set 6 MM	1 Set
51	Hss Tape set 5 MM	1
52	Drill Bit 3 MM	5
53	Drill bit 4 MM	1
54	Drill Bit 5 MM	5
55	Drill Bit 6 MM	7
56	Drill Bit 7 MM	4
57	Drill Bit 8 MM	6
58	Drill Bit 9 MM	3
59	Drill bit 13 MM	1
60	Drill Bit 16 MM	1
61	Drill Bit 19 MM	1
62	Taper drill 4-32 MM	1
63	File Triangular Small	2
64	File Triangular Big	2
65	File Half Round	1
66	File Round	2
67	File Flat	2

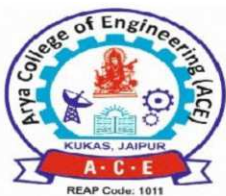
102	30*32	1
103	27*30	1
104	25*28	1
105	24*27	1
106	21*23	1
107	20*22	1
108	18*19	1
109	16*17	2
110	Bench Wise	2
111	G Clamp 4"	2
112	C clamp 6"	2
113	Envil	1
114	Jack	1
115	Wire Brush	1
116	Oil Can	1
117	Pvc Matt	8 SQF
118	Extension Board	3
119	Battery 12V	1
120	Charger 60V Lead Acid	1
121	Charger 12V	1
122	Steel grip tape roll Black	30
123	4" cutting wheel	50
124	4" Flap wheel	20
125	Welding Road	3
126	4" Cutting wheel polymac	50
127	4" Flap wheel 60 grit LP	30
128	14" Metal cutting wheel	1
129	Flap disc 4"	20
130	4" Cutting wheel green polymac	75
131	4" DC wheel Polymak	2
132	2608601668 Flap wheel 60 grit b	22
133	Mounted stone polished set	1 set (5P)



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Battery Manufacturing Lab		
S. No.	Name	Qty
1	Welding Machine Battery Spot	1
2	Battery Charger 24V 6Amp	1
3	Battery Charger 48V 6Amp	1
4	Battery Charger 60V 6Amp	1
5	IR Testing Machine	1
6	Resistance Testing Machine	1
7	Multimeter Meco	1
8	Heat Gun	1
9	Soldering Gun Stanley 30 Watt	1
10	Soldering Gun 35 Watt	1
11	Safety Glasses	1
12	Safety Gloves	1 Set
13	Measuring Tape Maxtra	1
14	Scale 12"	1
15	Combinaation Plier	1
16	Soft Hammer	2
17	Sheet Cutter	1
18	Wire Cutter	1
19	Wire Striper	1
20	Screw Driver 903	1
21	Screw Driver 904	1
22	Screw Driver 905	1
23	Plier Nose Tapriya	1
24	Scissor Inco	1
25	Cleaning Brush 2"	1



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