

JAIPUR ENGINEERING COLLEGE AND RESEARCH CENTRE DEPARTMENT OF MECHANICAL ENGINEERING

E-Vehicles & Automation (EVA)



E-Vehicle and Automation (EVA)





Jaipur Engineering College and Research Centre

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(A) Research facility (E-Vehicles & Automation)

The COE in E-Vehicles & Automation (COE-EVA) at Jaipur Engineering College & Research Centre, Jaipur aims to be a solution provider to the challenges being faced by E-vehicle industry in India and world at large. To the best of our knowledge, this centre is the first of its kind under the aegis of Rajasthan Technical University, Kota that is focused primarily on E-Vehicles and Automation. COE-EVA dedicates its efforts to provide trained manpower for E-vehicle industry and also aims to develop solutions to India-specific problems of the industry using automation tools like Artificial Intelligence Big Data and Machine Learning. The center realizes that automation in E-vehicles is a field which is still maturing and has lots of potential for research that can benefit the industry. COE-EVA is focused on developing skills and concepts central to the successful adoption of E-vehicles as the primary mode of road transportation.

COE-EVA works on enhancing the technical skill of the participants by providing them opportunities to do hands-on work on E-vehicles and its components. The participants are encouraged to apply automation tools to increase efficiency and performance of these vehicles. Working in close partnership with industries that are engaged in these two areas, COE-EVA has procured multiple training kits that expose students to basic fundamentals of E-vehicles and automation. The centre is equipped with the latest hardware and software (list enclosed) that is currently being used in industries for analysis, design and improvement in performance of E-Vehicles. The facilities provided by COE-EVA for trainees to apply their knowledge for modifying/building their own E-vehicles are state of the art and second to none. The centre engages well qualified faculty and industry professionals who are actively engaged in the area of E-Vehicles and automation.

JECRC foundation and COE-EVA have already conducted numerous off-line and online training programs that have received positive response from the participants (detailed reports enclosed as Annexure # 7.). The centre is spread into approximately 2300 square feet built up area which houses dedicated facilities for hands-on training on E-vehicle and automation as well as fabrication/modification of E-Vehicles. As part of its infrastructure, the centre boasts of multiple two-wheelers that have been used for training students on modification of conventional two wheelers into E-vehicles. The centre also has a Mercedes Benz car that exposes trainees to different sub-systems (e.g. engine, transmission, wheel assembly, steering system, suspension) of four-wheelers and their



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working. This know-how of real world technology helps trainees to generate practical solutions in the field of E-vehicles and automation that can be readily applied to industry. Additionally, COE-EVA also has multiple engines and transmissions system and their sub components of two-wheelers, four wheelers and commercial vehicles. The training provided on these real world equipments helps students to increase efficiency of existing ICengine based vehicles as well.

Utilizing the knowledge gained during multiple trainings at COEEVA, some trainees, who are also students of Jaipur Engineering College & Research Centre affiliated to Rajasthan Technical University (RTU) Kota, are already working on developing an electric two-wheeler by modifying a conventional two-wheeler. The trainees are also working on development of an electric Go-Kart under the guidance and supervision of trainers engaged with COE-EVA. As part of training on automation, CEO-EVA provides software training to participants so that they are able to apply automation concepts on issues related to vehicle autonomous control, wireless charging of electric vehicles (dynamic charging on the road), user and traveler behaviour, modelling of smart grids, energy demand scenarios for EVs and consumer barriers and incentives. As per Bureau of Energy Efficiency (BEE), Ministry of Power, GoI; designated as the nodal agency for Evehicle related charging infrastructure, some of the key challenges facing E-vehicles are range of such vehicles, efficient use of battery power, waiting time during battery charging and recycling and safe disposal of components.

The training provided in automation by COE-EVA will definitely help in developing solutions to these barriers in Evehicle adaptation in India. The predictive maintenance of battery packs using Data science, AI, and big data tools helps in achieving high battery efficiency and operational reliability. Blending advanced electronics training with IoT, data science and Machine Learning; data gathered during E-vehicle operation can be utilized to predict battery life, identify potential degradation/breakdown and their causes, number of charge cycles remaining and fix delays/errors even before they arise. The COE-EVA will also help trainees find meaning placement and fulfilling carrier in one of the most fast developing industry sector. As already stated, this industry is attracting lots of investment from Central and State Governments as well as automobile giants. This is expected to generate a lot of job-opportunities for the youth of the country. But a major problem faced by today's engineers is that they have all the theoretical knowledge but unable to apply that knowledge to solve challenges being faced by the industry. Many a times, they are working on outdated technologies and totally unaware of the latest tools



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being used in industry. Employers are also skeptical of dated paper certificates, and they generally ask potential recruits to demonstrate their hands on skills before hiring them. At COE-EVA, emphasis is given to practical knowledge and trainees are encouraged to work on latest systems and 'get their hands dirty'. This hands-on training, provided at the centre, helps solve the problem of 'bookish knowledge only' and give its trainees a legup over the competition. COE-EVA empowers students to develop skills that which will be appreciated by employers. In summary, COE-EVA will help to improve skills and competitiveness of the students of affiliated colleges of Rajasthan Technical University (RTU), Kota and other trainees in the area of E-vehicles. The centre aims to promote innovative solutions in the field of automation and transfer these innovations in the form of start-ups into the social and economic environment to meet the requirements of the modern era.

(B) List of Equipments with service cost

S.No.	Name	Items Description	Qty	Price/Unit	Total
1	Hero ElectricVehicle	Electric Vehicle	1	45000	45000
2	Working Electric Vehicle	Electric Vehicle	1	55000	55000
3	Digital Multimeter	750 Volts	1	250	250
4	Controllers for 2 wheeler	ECU	1	12200	12200
5	Battery Charger -12 Volts	12 Volts	1	3800	3800
6	Battery Charger - 48 volts	48 volts	1	8500	8500
7	DC – DC Convertor for 2 wheeler		1	12000	12000
8	Tachometers for Motor Testing - 2 Sets	Motor Tester	2	7600	15200
9	TwoWheeler Wiring set with indicators	Two / Four wheeler	1	2750	2750
10	Four Wheeler Car Section	Working car for practical or scanning purpose	1	8 Lakh	8 Lakh
11	Four Wheeler Engine Section	Automatic Transmission	1	90000	90000



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12	Four Wheeler Engine	Four cylinder	1	1.25 Lakh	1.25 Lakh
	Section	Petrol engine			
13	Four Wheeler Engine	Four cylinder	1	1.5 Lakh	1.5 Lakh
	Section	diesel engine			
14	Four Wheeler Engine	Four cylinder	1	1.2 Lakh	1.2 Lakh
1.5	Section	diesel engine	1	75000	75000
15	Four Wheeler	Rear Wheel Drive	1	75000	75000
	Transmission Section	Manual transmission			
16	Four Wheeler	Front Wheel	1	75000	75000
10	Transmission Section	Drive Manual	1	73000	75000
	Transmission Section	transmission			
17	Four Wheeler	Front Wheel	1	75000	75000
1,	Transmission Section	Drive Manual	1	72000	75000
		transmission			
18	Four Wheeler	Manual	1	75000	75000
	Transmission Section	transmission			
19	Four Wheeler	Front wheel Drive	1	1 Lakh	1 Lakh
	Transmission Section	Manual			
		transmission			
20	Four Wheeler auxiliaries	Car engine self	1	75000	75000
	system section	starter motor for			
		engine starting			
21	Four Wheeler auxiliaries	Carburetor	1	50000	50000
22	system section	systems	1	10000	10000
22	Two Wheeler	180 CC engine	1	18000	18000
23	Two Wheeler	160 CC engine	1	15000	15000
24	Two Wheeler	110 CC engine	1	15000	15000
25	Two Wheeler	100 CC engine	1	10000	10000
26	Two Wheeler	125 CC engine	1	15000	15000
27	Two Wheeler	110 CC engine	1	18000	18000
28	Two Wheeler	175 CC Two	1	9500	9500
		Stroke engine			
29	Two Wheeler	125 CC engine	1	9500	9500
30	Two Wheeler	100 CC engine	1	10000	10000
31	Two Wheeler	125 CC engine	1	12000	12000
32	Two Wheeler	150 CC engine	1	12000	12000
33	Two Wheeler	100 CC Two	1	9500	9500
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34	Two Wheeler	125 CC engine	1	12000	12000
35	Two Wheeler	2-Wheeler for	1	35000	35000
		electric working			
36	Power Steering Pump Four Whee		1	6500	6500
37	Turbo Charger	Four Wheeler	1	4300	4300
38	AC Four Wheeler Compressor	Four Wheeler	1	3500	3500
39	Power Brake Booster	Four Wheeler	1	3500	3500
40	TIG Welding Set	200 amps	1	60000	60000
41	MIG/MAG Welding Set	200 amps	1	20000	20000
42	Hand Grinder	Electrice	1	1750	1750
43	Hammer	500 gm	1	140	140
44	Hammer	1 kg.	1	310	310
45	Hand Drill Machine	Electric	1	2200	2200
46	Screw Driver Set		1	450	450
47	Circilp Plier		1	170	170
48	Adjustable Wrench	32 mm	1	400	400
49	Sheet Cutter		1	250	250
50	Allen Key Set		1	350	350
51	T-Tommy	10,11,13 no.	3 Nos.	341	341
52	Pliar		1	210	210
53	T- Spanner Set		1	470	470
54	U - Spanner Set		1	495	495
55	Ring - Spanner Set	6x7 - 30x32	1	813	813
56	Double Ended Spanner Set		1	411	411
57	Bench Vice - 4 Set	5" Jaw Size	4	13920	13920
58	Piller Drill Machine	1/2"	1	11700	11700
59	Power Press	3 METRIC TON	1	7700	7700
60	Tong	12"	1	200	200
61	Chipping Hammer	12"	1	150	150



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(c) Geo Tagged Photos of Equipments







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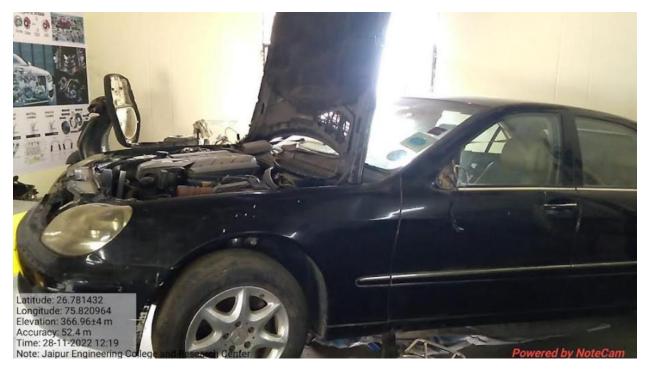


























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(d) Stock Register Details

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