





A

Report on

Workshop

on

"EV and Industry 4.0 Technologies"

October 14 - 19, 2024



Organized by:

Department of Electrical Engineering

&

IE (I) Student Chapter Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur

Submitted by:

Dr. Prateek Kumar Singhal (Associate Professor)
Mr. Tarun Naruka (Associate Professor)
Mr. Vikas Mahala (Assistant Professor & Deputy Head)
Mr. Deepak Saini (Assistant Professor)

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Our Inspiration

"The main factor causing India's backwardness is widespread illiteracy. We must address it as soon as possible if we wish to see the country advance quickly".

-Swami Keshvanand

Over 300 schools, 50 hostels, countless libraries, social service centres, and museums were founded by the illiterate, itinerant, and orphan Swami Keshvanand. He never got a formal education. The desert region's agricultural society was profoundly understood by Swami Keshvanand. He addressed the issues, provided acceptable and rational answers, and described the characteristics of the arid area. Eliminating social problems like as untouchability, child marriage, debt, poverty, backwardness, alcohol misuse, moral decay, etc. was Swami Keshvanand's lifelong goal.

1. ABOUT SKIT

Swami Keshvanand Institute of Technology, Management & Gramothan (SKIT) has been ranked no.1 Engineering Institute in Rajasthan by RTU Kota consecutively for the last five years. The institute was established in the year 2000 by a team of committed professionals and academicians. During all the past years SKIT has emerged as a premier center of technical education not only in Rajasthan but also in Northern India which has been realized through efficient and dedicated faculty members, innovative teaching learning methods, and core value of discipline. The various undergraduate programmes of the institute are accredited by the National Board of Accreditation (NBA).

2. ABOUT DEPARTMENT OF ELECTRICAL ENGINEERING

The Department of Electrical Engineering is distinctly focused towards integrating academics with cutting edge technology in the field of Electrical Engineering. The B.Tech Program has been accredited four times in succession by NBA since 2009. Department is also conducting M. Tech. and PhD Program in Power Systems specialization. All efforts are subtly harnessed with the

aim of preparing the budding engineers to face the challenging dimensions of technical excellence in areas such as Analog & Digital Electronics, Electrical Machines, Control & Automation, Power Systems Design and Power Electronics. The department puts in consistent efforts for field exposure to students through various research-oriented projects taken up for meeting the industry demands. The department offers a perfect blend of electrical, electronics and computer related courses to help students pursue a professional career or higher studies.

3. ABOUT THE WORKSHOP

Clean and green technologies are innovative solutions designed to minimize environmental impact and promote sustainability. These technologies focus on reducing pollution, conserving resources, and improving energy efficiency. Examples include renewable energy sources like solar, wind, and hydropower, which reduce reliance on fossil fuels and lower greenhouse gas emissions. Additionally, advancements in waste management, such as recycling and biodegradable materials, help reduce environmental contamination. The adoption of these technologies is crucial for combating climate change, preserving biodiversity, and ensuring a healthier planet for future generations. By integrating clean and green technologies into industries, transportation, and everyday life, we can build a more sustainable and resilient world.

4. VISION, MISSION & QUALITY POLICY OF THE INSTITUTE:-

Vision

To promote higher learning in advanced technology, management skills and industrial research to make our country a global player.

Mission

To promote quality education, training and research in field of Engineering by establishing effective interface with industry and to encourage faculty to undertake industry sponsored projects for students.

Quality Policy

We are committed to 'achievement of quality' as an integral part of our institutional policy by continuous self-evaluation and striving to improve ourselves. Institute would pursue quality in

- All its endeavors like admissions, teaching-learning processes, examinations, extra and cocurricular activities, industry institution interaction, research & development, continuing education, and consultancy.
- Functional areas like teaching departments, Training & Placement Cell, library, administrative office, accounts office, hostels, canteen, security services, transport, maintenance section and all other services."



Swami Keshvanand Institute of Technology, Management &

Gramothan, Jaipur, Rajasthan-302017



Department of Electrical Engineering

- Workshop materials, components, and tools.
- Experienced industry professionals to conduct sessions.

Budget: A proposed budget plan covering expenses for materials, equipment, refreshments, and guest speakers is as follows:

S.N	Item	Total
1	Expert remuneration	18,000 /-
2 .	Printing and other materials	4,000/-
3	Refreshments	1500/-
	Total	23,500/-

We kindly request your approval and support to organize this workshop in Electrical Engineering Department. This initiative aligns with our commitment to providing a comprehensive and practical education to our students.

Dr. Prateek Kumar Singhal

\$ 04/10/24

Associate Professor, EED & Workshop Coordinator

Dr. Sarfaraz Nawaz

Head-EED

timed Consideration

yes permitted.

Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur

Department of Electrical Engineering

Date 14	14-19 Oct., 2024

Expenditure details

S.No.	Particular	Amount in Rs/-
1	Honorarium (Bill No.1)	18000/-
2	Certificates (Bill No.2)	572/-
	Total	18572/-

Dr. Sarfaraz Nawaz

Head, EE Dept.

5. WORKSHOP BROCHURE:-

Patrons

Shri Raja Ram Meel, Patron, SKIT Shri Surja Ram Meel, Chairman, SKIT

Advisory Committee

Shri Jaipal Meel, Director, SKIT Prof. S. L. Surana, Director (Academics), SKIT Smt. Rachna Meel, Registrar, SKIT Prof. Ramesh Kumar Pachar, Principal, SKIT Prof. R. K. Jain, Dean, SKIT Prof. Sarfaraz Nawaz, Head(EE), SKIT Prof. Anil Choudhary, Head (IT), SKIT Prof. Mehul Mahrishi, Head (CSE), SKIT Prof. Mukesh Arora, Head (ECE & OFA), SKIT Prof. Dheeraj Joshi, Head (ME & IQAC), SKIT Prof. D. K. Sharma, Head (CE), SKIT Prof. Rohit Mukherjee, Incharge, I Year, SKIT Prof. Amber Srivastava, Head (Maths), SKIT Dr. Sharda Soni, Head (Chemistry), SKIT Prof. Brajraj Sharma, Head (Physics), SKIT Prof. Neha Purohit, Head (English), SKIT Prof. Ona Ladiwal, Head (DMS), SKIT Prof. Sangeeta Vyas, Head (OSA), SKIT

Faculty Members

Prof. Dhanraj Chitara Mrs. Deepti Arela Prof. Virendra Sangtani Mr. Jinendra Rahul Dr. Suman Sharma Dr. Pooja Jain Dr. Jyoti Shukla Dr. Sanjeev Kumar Dr. Abhishek Gupta Dr. Ankush Tandon Dr. Bharat Modi Ms. Smriti Jain

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STUDENT COORDINATORS

Mr.Raj Katara II Year (EE Dept., SKIT)

Mohd. Yusuf Sharif 83022 14701 Mr. Vivek Sharma Mr. Avadhesh Sharma Ms.Sadaf khan

> II Year (EE Dept., SKIT) 9460041796

One Week SKIT Hands-On Workshop for Students

"EV and Industry 4.0 Technologies "

14th 19th October, 2024 (06 Days)



Organized by Department of Electrical Engineering. Institution of Engineers (IEI)





Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur- 302017 www.skit.ac.in

About SKIT, Jaipur

Mr. Jitendra Singh

Mr. Ajay Bharadwaj

Mr. Garvit Gupta

Mr. Mahesh Meena



Swami Keshvanand Institute of Technology, Management & Gramothan (SKIT) has been Ranked No.1 Engineering Institute in Rajasthan by RTU Kota consecutively for the last six years. The institute was established in the year 2000 by a team of committed professionals and academicians. During all the past years SKIT has emerged as a premier centre of technical education not only in Rajasthan but also in Northern India, which has been realized through efficient and dedicated faculty members, innovative teaching learning methods, and core value of discipline. The various undergraduate programmes of the institute are accredited by the National Board of Accreditation (NBA). SKIT is only affiliated technical institute in Rajasthan to have earned an A++ grade by National Assessment And Accreditation Council (NAAC).

Department of **Electrical Engineering**

The Department of Electrical Engineering is distinctly focused towards integrating academics with cutting edge technology in the field of Electrical Engineering. The B. Tech. Program has been accredited five times in succession by NBA since 2009 Department is also conducting M. Tech and

PhD Program in Power Systems specialization. All efforts are subtly harnessed with the aim of preparing the budding engineers to face the challenging dimensions of technical excellence in areas such as Electrical Machines & Drives, Control & Automation, Power Systems Design, Power Electronics and MATLAB Applications. The department puts in consistent efforts for field exposure to students through various research-oriented projects taken up for meeting the industry demands. The department offers a perfect blend of Electrical, Electronics and Computer related courses to help students pursue a professional career or higher studies.

About the Workshop

The "EV and Industry 4.0 Technologies" workshop aims to deepen students' understanding of Electric Vehicle (EV) technology, covering design, development, and advancements in power electronics and energy storage. Students will explore the EV market, its types, components (batteries, motors, throttles), and the pros and cons of different technologies.

The workshop provides hands-on training in building and testing battery packs, including Battery Management Systems (BMS), wiring, and connectors. Motor selection, motor controller basics, and sensor testing will also be covered. Additionally, students will learn about government regulations for EVs in India and globally.

The program includes assembling an e-bike and a final exam for validation, ensuring practical application of the concepts learned and enhancing students' technical expertise.

STTP Features:

- · Hands-On Demonstrations: Practical exercises to reinforce theoretical knowledge.
- · Resource Person: Experts from industry sharing their experiences and realworld applications.
- Lab Sessions: Access to well-equipped laboratories for hands-on learning experiences.
- Certificate of Participation: Participants will receive certificates upon successful completion of workshop.
- Target Audience: In-house 2nd year undergraduate students of Electrical Engineering

Workshop Schedule

The training program will be conducted from 14 - 19 October 2024 as per given

Date	Session-I	Session-II
14 - 19	12:30 PM	02:00 PM
October,	to	to
2024	02:00 PM	03:30 PM

6. WORKSHOP SCHEDULE:-

Workshop Schedule

The training program will be conducted from 14 - 19 October 2024 as per given schedule:

Date	Session-I	Session-II
14 - 19	12:30 PM	02:00 PM
October,	to	to
2024	02:00 PM	03:30 PM

7. OBJECTIVE OF THE WORKSHOP:-

The main objectives of the workshop are-

- Understand the structure, function, and classification of electric vehicles (EVs).
- Analyze battery technologies and design custom battery packs for EVs.
- Evaluate and select appropriate motors and motor controllers for EV applications.
- Apply testing methods to assess the performance of EV components.
- Assemble and troubleshoot an operational e-bike as a hands-on project.

8. EXPECTED OUTCOME OF THE WORKSHOP:-

After attending this workshop, participants will be able to:

O1: Explain the types and functions of EV components.

O2: Assemble and test EV battery packs and e-bikes.

O3: Analyze and select appropriate components for building an EV.

O4: Evaluate component compatibility and troubleshoot issues in an EV system.

Table 1: Mapping of Workshop Outcomes with Bloom's level, PO and PSO indicators

Outcome	Bloom's Level	PO Indicators	PSO Indicators
O1	L2	1.1.2, 1.3.1, 1.4.1, 2.1.1, 2.1.2, 2.1.3, 2.2.1, 2.2.2, 2.2.3, 2.2.4, 2.3.1, 2.3.2, 3.1.1, 3.1.3, 3.1.4, 3.1.5, 3.2.3, 6.1.1, 6.2.1, 7.1.1, 7.1.2, 7.2.1, 7.2.2, 12.1.1, 12.1.2, 12.2.1, 12.2.2, 12.3.1, 12.3.2	1.1.1, 1.1.2, 1.1.3, 2.2.1, 2.2.2
O2	L3	1.1.1, 1.1.2, 1.2.1, 1.3.1, 1.4.1, 2.1.1, 2.1.2, 2.1.3, 2.2.1, 2.2.2, 2.2.3, 2.2.4, 2.3.1, 2.3.2, 2.4.1, 3.1.1, 3.1.3, 3.1.4, 3.1.5, 3.2.3, 5.1.1, 5.2.1, 5.2.2, 5.3.1, 6.1.1, 6.2.1, 7.1.1, 7.1.2, 7.2.1, 7.2.2, 12.1.1, 12.1.2, 12.2.1, 12.2.2, 12.3.1, 12.3.2	1.1.1, 1.1.2, 1.1.3, 2.2.1, 2.2.2
О3	L4	1.1.1, 1.1.2, 1.2.1, 1.3.1, 1.4.1, 2.1.1, 2.1.2, 2.1.3, 2.2.1,	1.1.1, 1.1.2,

		2.2.2, 2.2.3, 2.2.4, 2.3.1, 2.3.2, 2.4.1, 3.1.1, 3.1.3, 3.1.4, 3.1.5, 3.2.3, 4.1.1, 4.1.2, 4.1.3, 4.1.4, 4.2.2, 4.3.1, 4.3.2, 4.3.3, 4.3.4, 5.1.1, 5.2.1, 5.2.2, 5.3.1, 6.1.1, 6.2.1, 7.1.1,	1.1.3, 1.2.1, 2.2.1, 2.2.2
		7.1.2, 7.2.1, 7.2.2, 10.1.1, 10.1.2, 10.1.3, 11.1.1, 11.1.2, 11.2.1, 11.3.1, 11.3.2, 12.1.1, 12.1.2, 12.2.1, 12.2.2, 12.3.1, 12.3.2	
O4	L5	1.1.1, 1.1.2, 1.2.1, 1.3.1, 1.4.1, 2.1.1, 2.1.2, 2.1.3, 2.2.1, 2.2.2, 2.2.3, 2.2.4, 2.3.1, 2.3.2, 2.4.1, 3.1.1, 3.1.3, 3.1.4, 3.1.5, 3.2.3, 4.1.1, 4.1.2, 4.1.3, 4.1.4, 4.2.2, 4.3.1, 4.3.2, 4.3.3, 4.3.4, 5.1.1, 5.2.1, 5.2.2, 5.3.1, 6.1.1, 6.2.1, 7.1.1, 7.1.2, 7.2.1, 7.2.2, 10.1.1, 10.1.2, 10.1.3, 11.1.1, 11.1.2, 11.2.1, 11.3.1, 11.3.2, 12.1.1, 12.1.2, 12.2.1, 12.2.2, 12.3.1, 12.3.2	1.1.1, 1.1.2, 1.1.3, 1.2.1, 2.2.1, 2.2.2

Table 2: Workshop Outcomes-PO-PSO mapping

Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2
O1	2	3	2	-	-	3	3	-	-	-	-	3	3	3
O2	3	3	2	-	3	3	3	-	-	ı	ı	3	3	3
О3	3	3	2	3	3	3	3	-	-	2	3	3	3	3
O4	3	3	2	3	3	3	3	-	-	2	3	3	3	3
Average	2.75	3	2	3	3	3	3	-	-	2	3	3	3	3

9. ATTENDANCE OF PARTICIPANTS:-

No. 1	Roll No. 23ESKEE003	Name						19-10-24
2		Abhishek Sharma	14-10-24	15-10-24	16-10-24	17-10-24 P	18-10-24 P	P
	23ESKEE006	Akhii Khandelwal	10	0	0	P	P	P
3	23ESKEE008	Annot Soni	- 6	6	P	P	P	P
4	23ESKEE009	Aryan Soni	0	P	P	P	P	P
5	23ESKEE010	Aryan Yadav	A	A	A	A'	P	A
6	23ESKEE016	Brajesh Kumar Saini		P	P	P	P	P
7	23ESKEE018	Darshan Jangid	P	P	0	P	P	P
3	23ESKEE030	Harsh Vardhan Singh Rajawat	P	D	A	A	A	A
	23ESKEE035	Himmanshu		P	P	6	A	P
0	23ESKEE041	Lokesh Soni	P	P	P	b	P	P
1	23ESKEE046	Mohit Prasad	0	P	0	0	P	P
2	23ESKEE047	Nakul Jain	6	P	P	P	P	P
	23ESKEE054	Pradeep Singh Rajawat	1	P	0	P	P	P
3		Praket Kulhari	0	0	P	P	1	0
4	23ESKEE055	Pratyush Kulhari	0	P	P	0	P	P
5	23ESKEE056		0	P	P	A	P	P
16	23ESKEE057	Pulkit Sharma	P	P	A	0	P	P
17.	23ESKEE060	Rahul Rao	6	P	A	P	P	0
18	23ESKEE061	Raj Katara	P	0	0	P	P	P
10	23ESKEE062	Raman Jangir	P	P		P	-	0
20	23ESKEE066	Sadaf Khan	F	-	B	A	1 0	0
2!	2DESKEEDSS	Sahii Singii	A	P		0	P	P
22	23ESKEE070	Saksham Sharma	P	P	P	0	0	P
23	23ESKEE071	Sakshi Singh	A	0	0	0	P	P
24	23ESKEE072	Shashikant	P	B	P	10	0	A
25	23ESKEE074	Shivam Jangid	P	P	0	0	P	P
26	23ESKEE077	Sneha Burdack	P	F	P	P	D.	P
27	23ESKEE079	Sourabh Poonia	F	-	Fo	8	P-	-
28	23ESKEE080	Sparsh Rastogi	P	0	P	0	P	P
29	23ESKEE081	Srishti Gupta	T T			0	0	P
30	23ESKEE084	Tanishk Yadav	P	P	P	0	1	P
31	23ESKEE086	Ujjawal Pushp	A	P	P	P	P	P
32	23ESKEE087	Updesh Jangid	P	P	P	P	P	P
33	23ESKEE089	Vishakha Sharma	P	P	P	· P	P	P
34	23ESKEE090	Vishal Yadav	P	P	P	P	P	P
35	23ESKEE091	Vivek Rathore	P	P	P	1.6	P	1
36	23ESKEE093	Yuvraj Singh Shekhawat	P	P	P	P	P	1
		Ronit	P	P	P	P	P	9
37								

10. GLIMPSES OF THE WORKSHOP













11. SAMPLE COPY OF CERTIFICATE



Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur



Certificate of Participation

This is to certify that

RAJ KATARA

has participated in "One-week hands-on workshop for students in EV and Industry 4.0 Technologies" held from October 14th - 19th, 2024 organized by Department of Electrical Engineering and IE(I) Student Chapter at Swami Keshvanand Institute of Technology, Management and Gramothan, Jaipur.

Dr. S.L. Surana Director (Academics) SKIT, JAIPUR

Dr. R.K. Pachar Principal SKIT, JAIPUR Dr. Sarfaraz Nawaz Head, EE Dept. SKIT, JAIPUR

12. DAYWISE REPORT OF THE WORKSHOP:-

One week on "EV and Industry 4.0 Technologies" was organized by Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur.

Key Personnel:

Dr. Sarfaraz Nawaz - Head of Department

Coordinators-

Dr. Prateek Kumar Singhal (Associate Professor)

Mr. Tarun Naruka (Associate Professor)

Mr. Vikas Mahala (Assistant Professor & Deputy Head)

Mr. Deepak Saini (Assistant Professor)

Day 1: Introduction to Electric Vehicles:

The workshop began with an overview of the schedule, setting the tone for the upcoming sessions. The session covered the important fundamentals of EV technology, emphasizing the environmental impact and the need for transitioning from conventional vehicles to electric alternatives. Participants were introduced to key concepts such as electric drivetrains, battery efficiency, and the role of EVs in reducing carbon emissions, laying a strong foundation for the rest of the workshop.

Day 2: Fundamentals of EV Design:

On the second day, the focus shifted to the technical aspects of EV design. Experts conducted detailed sessions on battery technology, discussing various types of batteries, their construction, and performance characteristics.

Participants learned about electric motors, power electronics, and the intricate relationship between different components in an EV system. A hands-on demonstration allowed attendees to examine key EV components, enhancing their practical understanding. This day provided a deep dive into the core engineering principles behind EVs, equipping participants with essential knowledge about EV architecture.

Day 3: Charging Infrastructure:

Day three addressed the critical topic of EV charging infrastructure. Participants attended a comprehensive session on the different types of charging stations, including slow chargers, fast chargers, and superchargers. The discussions highlighted the importance of developing robust charging networks to support the growing EV market. A practical demonstration showcased the setup and operation of charging systems, offering participants firsthand experience with charging technologies. This session emphasized the challenges and solutions related to EV charging, fostering a broader understanding of infrastructure requirements.

Day 4: Policies and Market Trends:

The fourth day explored the policies and market trends influencing the EV sector. Participants learned about various government initiatives and policies aimed at promoting EV adoption in India. The session delved into the economic and environmental benefits of EVs, with discussions on subsidies, incentives, and regulatory frameworks. Industry experts joined a panel discussion, providing insights into the future of electric mobility and sharing real-world experiences. This day offered a comprehensive view of the evolving EV landscape, highlighting the role of policy and market forces in driving innovation.

Day 5: EV Simulation and Software:

On the fifth day, the workshop focused on EV simulation and software tools. Participants received training on advanced simulation software used in EV design and analysis. They engaged in real-time simulations, applying theoretical knowledge to practical scenarios. The interactive session allowed attendees to work collaboratively on designing their own EV models, fostering a hands-on learning environment. This day emphasized the importance of simulation in optimizing EV performance and addressing design challenges, preparing participants for future projects in electric vehicle development.

Day 6: Future Innovations and Conclusion:

The final day of the workshop highlighted future innovations in the EV industry. Participants presented their projects, showcasing the knowledge and skills they had acquired throughout the workshop. The session provided a platform for creative ideas and solutions, encouraging participants to think innovatively about the future of electric mobility. The day concluded with the distribution of certificates and a feedback session, where participants shared their experiences and suggestions. This closing session reinforced the workshop's impact, leaving attendees with a deeper understanding of EV technology and its potential to transform the automotive industry.

Feedback and Takeaways:

Participants shared their experiences, highlighting the knowledge and skills gained. Certificates were distributed to all attendees.

Conclusion:

The six-day Electric Vehicle Workshop proved to be a resounding success. It provided participants with valuable insights into EV technology and encouraged them to explore innovative solutions in the field of sustainable transportation.