



Industry Survey EHEV Course

Conducted By:
Department of Electrical Engineering

Vishwaniketan
Survey No-52 office Mumbai-Pune Expressway Kumbhivali,
Tal- Khalapur, Maharashtra 410203.
Mobile: +91 9762051751

Principal
Vishwaniketan's (I MEET)

About Vishwaniketan

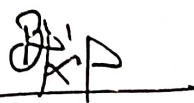
Vishwaniketan is an educational non-profit trust established in 2012-13. Its sole objective is to establish itself as centre of excellence in education. Currently, it runs Engineering, Architecture & Design professional courses. Vishwaniketan is a brain child of a CTIF Global Capsule which has offices in 22 countries. Institute has its educational philosophy developed on Project Based Learning philosophy & practice. Institute has developed four different PBL models which have been practiced in its institutions since inception.

Engineering & Architecture courses are affiliated to University of Mumbai & approved by competent statutory bodies, whereas the design course is affiliated to Teesside University, UK. Vishwaniketan has collaborations with 16 International Universities through which it has been connected globally. In the last 4 years the institute has sent over 800 students from and across India to International universities. We aim to create competent design professionals who can create novel products and solve social and National issues keeping global context in mind.

We at Vishwaniketan firmly believe that education has no boundaries. The best possible learning experience provided to the student helps them transform themselves into ideal global citizens. Vishwaniketan believes not only in this philosophy but has also taken major positive steps towards achieving this goal by implementing international programs

We are part of the European Commission's Programme: EPLUS -Erasmus+ Capacity Building in Higher Education, CENTRAL Project (Capacity building and ExchaNge towards attaining Technological Research and modernizing Academic Learning- CENTRAL) and

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General Information about you:

Name of the company : Baba Automobile Pvt Ltd.
Address of the company : Head office -> 19, Nand vihar, Pratap Nagar Sector-3
Tank Road Juyawar - 30203
Business Sector of the Company : Training / Electric Vehicle Conversion / COE
Name of Authority/Personnel : _____
Designation : Director / Founder
Years of experience : 6 to 7 year (establish in 2015)
Educational Qualification : B.Tech - Mechanical Engineer
Mobile Number : 8769 405920
Email ID : mr. nimesh baba @ gmail. com

Survey Form

Section 1: Industry's Expectation

Do you think the syllabus designed for EHEV Course is suitable for the industry?

Yes / No ✓

Please elaborate your reason

- only have EV & HEV Syllabus. Need to update PHEV (Plugin hybrid Electric Vehicles).
- Need to add more topic to understand the working of EV.
- "Practical should be added."

1. Do you think that EHEV Course Contents are sufficient to make the students industry-ready?

Yes / No ✓

Please elaborate your reason

- Add BMS (Battery Management System)
- Add plugin hybrid Electric Vehicle (PHEV).
- Add Thermal cooling system for Battery Cooling system or motor cooling system.
- Add "Regenerative Breaking System" topic to understand the EV charging while driving.



In line with the recent trends in your industry, what do you feel should be imperative in the EHEV Course ?

- How to select BLDC motor, Battery packs, Controller, increase Battery Range, Decrease EV price.
- Conversion of Petrol/Diesel ~~Electric~~ Vehicle into Electric.
- How to Manufacture BMS, Controller and Battery Packs in Made in India.

2. Kindly mention the technology/software which is being used in your industry?

- a. Catia
- b. Autocad
- c. _____

3. Kindly mention the technology/software which you feel is going to be in-use in your industry in the next 5 years?

- d. Made in India Battery pack (to reduce the lithium import).
- e. _____
- f. _____

4. Are you willing to participate in the development process of the EHEV Course ?

Yes / No

Please tick how you want to participate:

<input checked="" type="checkbox"/>	Industry support (Access to industry labs, summer and winter training to students, etc)
<input checked="" type="checkbox"/>	Equipment
<input checked="" type="checkbox"/>	Curriculum (participation in the development of curriculum)
<input checked="" type="checkbox"/>	Value Added Program for students and teachers (Short training, etc)
<input checked="" type="checkbox"/>	internship to the students
<input checked="" type="checkbox"/>	Working along with students on problems
<input checked="" type="checkbox"/>	Capstone projects
<input checked="" type="checkbox"/>	Interactions with students (Expert talks, mentorship, etc)

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Section 2: Nature of the Student

1. In your opinion who should be faculty or student base for this EHEV Course ?

Education (Please tick one)	Work Experience (Please tick one)
<input checked="" type="checkbox"/> Graduate from any stream	A person with at least 3 years work experience
<input type="checkbox"/> Only for Graduate from Technical stream	A person with at least 2 years work experience
<input type="checkbox"/> Only for Graduate from Technical stream (Diploma Graduates)	A person with at least 1 years work experience
<input type="checkbox"/>	<input checked="" type="checkbox"/> Work Experience does not matter

2. What could be essential prerequisite skills and knowledge base for this curriculum?

Please mention the prerequisite skills:

Please tick the prerequisite knowledge base:

<input checked="" type="checkbox"/>	Technical knowledge
<input type="checkbox"/>	Digital background
<input type="checkbox"/>	ICT knowledge
<input checked="" type="checkbox"/>	Business background
<input type="checkbox"/>	Any Other (Please Mention)



VISHWANIKETAN

3. In your opinion what should be the knowledge or skill a EHEV Technical Expert should possess?

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Section 3: Teaching Learning Methodology

1. How would you see Teaching Learning and Practical's for such a curriculum? Please tick

<input type="checkbox"/>	Traditional Teaching Methods
<input checked="" type="checkbox"/>	Project Based Learning
<input type="checkbox"/>	Online modules
<input type="checkbox"/>	Case Studies

2. What is a good combination for a blended learning approach?

Face to Face learning	Online modules
70% <input checked="" type="checkbox"/>	30% <input checked="" type="checkbox"/>
60%	40%
50%	50%
40%	60%

3. Do you feel that the students working in EHEV Course should work closely with industries for hands-on and multifold learning in the form of : (Please tick)

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<input checked="" type="checkbox"/>	Internship ✓
<input type="checkbox"/>	Industry specific project
<input type="checkbox"/>	Industry specific research
<input checked="" type="checkbox"/>	Short term trainings
<input checked="" type="checkbox"/>	Workshops
<input type="checkbox"/>	Any Other Please Specify _____

Dr. Prof. Sharvari Sane

HOD,

Dept of Electrical Engineering

ViMEET, Khalapur



Stamp and Signature of

concerned Industry Person



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Semester IV								
Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Pract.	Tut.	Theory	TW/Pract.	Tut.	Total
EEC405	Electric and Hybrid Electric Vehicle	03	-	-	03	-	-	03

Examination Scheme								
Theory					Term Work/Practical/Oral			Total
Internal Assessment			End Sem Exam	Duration of End Sem. Exam	Term Work	Pract.	Oral	
Test-I	Test-II	Average						
20	20	20	80	03 Hrs	-	-	-	100

Course Objectives	<p>The course is aimed:</p> <ol style="list-style-type: none"> To learn the history of electric hybrid electric vehicles (EV & HEV) and emphasize the need and importance of EV-HEV for sustainable future. To study the fundamental concepts and principles of electric and hybrid electric vehicles drive train topologies To develop a thorough understanding of the key elements of EV/HEV: Electric Machines for Propulsion Applications and Energy Sources To model, analyze and design electric and hybrid electric vehicles drive train and to understand energy management strategies
	<p>Upon successful completion of this course, the learner will be able to:</p> <ol style="list-style-type: none"> Identify and describe the history and evolution of electric & hybrid electric vehicles. Identify and describe the principles of various EV/HEVs drive train topologies. Select electric propulsion system components for EV/HEV drives for the desirable performance and control. Compare and evaluate various energy sources and energy storage components for EV/HEV. Model, analyze and design EV/HEV drive train with energy management strategies. Recognize the need to adapt and engage in operations EV/HEV for sustainable transportation system.

Module	Detailed Contents	Hours
1	<p>Introduction:</p> <p>Basics of vehicles mechanisms, history of electric vehicles (EV) and hybrid electric vehicles (HEV), need and importance of EV and HEV, Power/Energy supplies requirements for EV/HEV applications. State of the art and Indian and global scenario in EV/HEV</p>	04
2	<p>Drive-train Topologies:</p> <p>Various electric drive-train topologies, basics of hybrid traction system, various hybrid drive-train topologies, power flow control in drive-train topologies, fuel efficiency analysis.</p>	07
3	<p>DC and AC Machines for Propulsion Applications:</p> <p>Electric system components for EV/HEV, suitability of DC and AC machines for EV/HEV applications, AC and DC Motor drives.</p>	05
4	<p>Energy Sources for EV/HEV:</p> <p>Requirements of energy storage in EV/HEV: batteries, fuel cells, flywheels and ultra-capacitors as energy sources for EV/HEV, characteristics and comparison of</p>	10

	energy sources for EV/HEV, hybridization of different energy sources. EV battery chargers: AC and DC, Fast chargers and related standards	
5	Drive-train Modelling and Design Considerations : Modeling and analysis of EV/HEV drive train: Total tractive force calculation, sizing of motor, and design considerations for power electronics drive.	08
6	Energy Management Strategies and Energy Efficiency: EV/HEV energy management strategies, classification and comparison of various energy management strategies. Basic EV AC and DC Chargers, G2V and V2G concept.	05

Self-study: Testing and Evaluation Standards for EV & HEV available on Automotive Research Association of India (ARAI) website: <https://emobility.araiindia.com/standards/>

Assessment:

Internal Assessment Test:

Assessment consists of two class tests of 20 marks each. The first-class test (Internal Assessment I) is to be conducted when approx. 40% syllabus is completed and second class test (Internal Assessment II) when additional 40% (approx.) syllabus is completed. Duration of each test shall be one hour.

End Semester Theory Examination:

1. Question paper will comprise of total 06 questions, each carrying 20 marks.
2. Total 04 questions need to be solved.
3. Question No: 01 will be compulsory and based on entire syllabus wherein 4 sub-questions of 5 marks each will be asked.
4. Remaining questions will be randomly selected from all the modules.
5. Weightage of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.

Books Recommended:

Text Books:

1. I. Hussein, *Electric and Hybrid Vehicles: Design Fundamentals*, CRC Press, 2003.
2. M. Ehsani, Y. Gao, S.E. Gay and Ali Emadi, *Modern Electric, Hybrid Electric and Fuel Cell Vehicles: Fundamentals, Theory and Design*, CRC Press. 2005
3. Sheldon Williamsom, *Energy Management Strategies for Electric and Plug-in Hybrid Vehicles*, Springer 2013
4. J. Larminie and J. Lowry, *Electric Vehicle Technology Explained*, Wiley, 2003
5. C. MI, M. Abul and D. W. Gao, *Hybrid Electrical Vehicle Principles and Application with Practical Perspectives*, Wiley 2011

Reference Books:

1. N.Mohan, T.M.Undeland, and W.P Robbins, *Power Electronics, Converters, Applications & Design*, Wiley India Pvt. Ltd., 2003
2. B. K Bose, *Modern Power Electronics and AC Drives*, Pearson Education 2002
3. Robert A. Huggins, *Energy Storage*, Springer 2010

NPTEL/ Swayam Course:

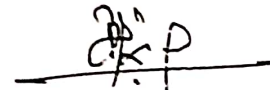
1. Course: Intro. to Hybrid and Electric Vehicles - Prof. Praveen Kumar & Prof. S. Majhi (IIT Guwahati): <https://nptel.ac.in/courses/108/103/108103009/>
2. Course: Electric Vehicles - Part I By Prof. Anait Kumar Jain (IIT Delhi) <https://nptel.ac.in/courses/108/102/108102121/>

ALUMNI FEEDBACK FORM

Department:

Alumni Name:	Swapnali B. Kadu
Date of Birth: (DD/MM/YY)	28/05/1995
Year of Passing:	2017
Contact No.	8237183337
E-mail ID	Swxpk2895@gmail.com

Sr. No.	Statement	Agree	Sometimes	Disagree
1	Do you feel proud to be associated with Vishwaniketan's iMEET "V-Lineage" Alumni Association?	<input checked="" type="checkbox"/>		
2	Institute organizes various kind of activities for overall development of students	<input checked="" type="checkbox"/>		
3	Are you willing to contribute in the development of the Institute?		<input checked="" type="checkbox"/>	
4	Institute is having adequate laboratories and equipment for practical experiences.		<input checked="" type="checkbox"/>	
5	Is education imparted at ViMEET is useful and relevant in your present job?		<input checked="" type="checkbox"/>	
6	Have you obtained sufficient technical knowledge (both in theory and practical) at ViMEET?	<input checked="" type="checkbox"/>		
7	Has the T & P Cell provided ample placement Opportunities (On Campus and Off Campus)	<input checked="" type="checkbox"/>		
8	Do you like to join the Institute Alumni Association?	<input checked="" type="checkbox"/>		
9	Is Institute providing good hospitality as Alumni after passing out?	<input checked="" type="checkbox"/>		
10	Do you receive regular updates from the Institute through Mails/Calis/SMS etc.?	<input checked="" type="checkbox"/>		


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Vishwaniketan's
Institute of Management Entrepreneurship & Engineering Technology [i MEET]
Affiliated to University of Mumbai, Approved by AICTE, New Delhi Survey No. 52,
Khumbhivali, Near Khalapur Toll Naka, off. Mumbai-Pune Expressway,
Tal. - Khalapur, Dist. - Raigad. Pin- 410 202

ALUMNI FEEDBACK FORM

Department: EXTC

Alumni Name:	<u>Harsh Girish Popad</u>
Date of Birth: (DD/MM/YY)	<u>17 July 1996</u>
Year of Passing:	<u>2018</u>
Contact No.	<u>8600328333</u>
E-mail ID	<u>harsh.popad.333@gmail.com</u>

Sr. No.	Statement	Agree	Sometime	Disagree
1	Do you feel proud to be associated with Vishwaniketan's iMEET "V-Lineage" Alumni Association?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Institute organizes various kind of activities for overall development of students	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Are you willing to contribute in the development of the Institute?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Institute is having adequate laboratories and equipment for practical experiences.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Is education imparted at ViMEET is useful and relevant in your present job?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Have you obtained sufficient technical knowledge (both in theory and practical) at ViMEET?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	Has the T & P Cell provided ample placement Opportunities (On Campus and Off Campus)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8	Do you like to join the Institute Alumni Association?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	Is Institute providing good hospitality as Alumni after passing out?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	Do you receive regular updates from the Institute through Mails/Calls/SMS etc.?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

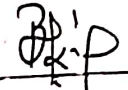
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ALUMNI FEEDBACK FORM

Department:

Alumni Name:	Neha Patil
Date of Birth: (DD/MM/YY)	31-07-1996
Year of Passing:	2018
Contact No.	9987217743
E-mail ID	nehapati1317@gmail.com

Sr. No.	Statement	Agree	Sometime	Disagree
1	Do you feel proud to be associated with Vishwaniketan's iMEET "V-Lineage" Alumni Association?	✓		
2	Institute organizes various kind of activities for overall development of students	✓		
3	Are you willing to contribute in the development of the Institute?	✓		
4	Institute is having adequate laboratories and equipment for practical experiences.		✓	
5	Is education imparted at ViMEET is useful and relevant in your present job?	✓		
6	Have you obtained sufficient technical knowledge (both in theory and practical) at ViMEET?	✓		
7	Has the T & P Cell provided ample placement Opportunities (On Campus and Off Campus)		✓	
8	Do you like to join the Institute Alumni Association?	✓		
9	Is Institute providing good hospitality as Alumni after passing out?	✓		
10	Do you receive regular updates from the Institute through Mails/Calls/SMS etc.?	✓		

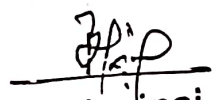

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ALUMNI FEEDBACK FORM

Department:

Alumni Name:	Tushar A. Ishward.
Date of Birth: (DD/MM/YY)	24/04/1997
Year of Passing:	2019
Contact No.	8087438449
E-mail ID	tusshharish@gmail.com

Sr. No.	Statement	Agre e	Sometime s	Disagree
1	Do you feel proud to be associated with Vishwaniketan's iMEET "V-Lineage" Alumni Association?	✓		
2	Institute organizes various kind of activities for overall development of students		✓	
3	Are you willing to contribute in the development of the Institute?			✓
4	Institute is having adequate laboratories and equipment for practical experiences.			✓
5	Is education imparted at ViMEET is useful and relevant in your present job?		✓	
6	Have you obtained sufficient technical knowledge (both in theory and practical) at ViMEET?		✓	
7	Has the T & P Cell provided ample placement Opportunities (On Campus and Off Campus)		✓	
8	Do you like to join the Institute Alumni Association?		✓	
9	Is Institute providing good hospitality as Alumni after passing out?	✓		
10	Do you receive regular updates from the Institute through Mails/Calls/SMS etc.?			✓


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ALUMNI FEEDBACK FORM

Department: Electronics of Telecommunication Eng

Alumni Name:	Poonam. R. Bhosale
Date of Birth: (DD/MM/YY)	01/07/1998
Year of Passing:	2019
Contact No.	9359360626
E-mail ID	poonamb595@gmail.com

Sr. No.	Statement	Agree	Sometimes	Disagree
1	Do you feel proud to be associated with Vishwaniketan's iMEET "V-Lineage" Alumni Association?		<input checked="" type="checkbox"/>	
2	Institute organizes various kind of activities for overall development of students		<input checked="" type="checkbox"/>	
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9	Is Institute providing good hospitality as Alumni after passing out?	<input checked="" type="checkbox"/>		
10	Do you receive regular updates from the Institute through Mails/Calls/SMS etc.?			<input checked="" type="checkbox"/>

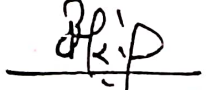

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ALUMNI FEEDBACK FORM

Department:

Alumni Name:	Suraj Sanjay Shinde
Date of Birth: (DD/MM/YY)	17/02/1998.
Year of Passing:	2019.
Contact No.	9007761657.
E-mail ID	shindesuraj7272@gmail.com.

Sr. No.	Statement	Agree	Sometimes	Disagree
1	Do you feel proud to be associated with Vishwaniketan's iMEET "V-Lineage" Alumni Association?	✓		
2	Institute organizes various kind of activities for overall development of students	✓		
3	Are you willing to contribute in the development of the Institute?	✓		
4	Institute is having adequate laboratories and equipment for practical experiences.	✓		
5	Is education imparted at ViMEET is useful and relevant in your present job?	✓		
6	Have you obtained sufficient technical knowledge (both in theory and practical) at ViMEET?	✓		
7	Has the T & P Cell provided ample placement Opportunities (On Campus and Off Campus)	✓		
8	Do you like to join the Institute Alumni Association?	✓		
9	Is Institute providing good hospitality as Alumni after passing out?	✓		
10	Do you receive regular updates from the Institute through Mails/Calls/SMS etc.?	✓		



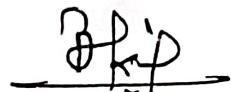
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ALUMNI FEEDBACK FORM

Department:

Alumni Name:	Kiran Sanjeev Bhosale
Date of Birth: (DD/MM/YY)	07/05/2000
Year of Passing:	2021
Contact No.	8788651283
E-mail ID	kbhosale035@gmail.com

Sr. No.	Statement	Agree	Sometimes	Disagree
1	Do you feel proud to be associated with Vishwaniketan's iMEET "V-Lineage" Alumni Association?	✓		
2	Institute organizes various kind of activities for overall development of students	✓		
3	Are you willing to contribute in the development of the Institute?	✓		
4	Institute is having adequate laboratories and equipment for practical experiences.	✓		
5	Is education imparted at ViMEET is useful and relevant in your present job?	✓		
6	Have you obtained sufficient technical knowledge (both in theory and practical) at ViMEET?	✓		
7	Has the T & P Cell provided ample placement Opportunities (On Campus and Off Campus)	✓		
8	Do you feel, it is essential to modify syllabus of University for placements?	Strongly Agree ✓		
9	Is Institute providing good hospitality as Alumni after passing out?	✓		
10	Do you receive regular updates from the Institute through Mails/Calls/SMS etc.?	✓		



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