

LESSON PLAN

SUB:-ELECTRIC VEHICLE

BRANCH:- ELECTRICAL ENGG.

SEMESTER: 6TH

NAME OF FACULTY: ABHIPSA DUTTA



**GOVERNMENT POLYTECHNIC,
BHADRAK
SESSION:2025-26**

HOD Electrical
As
19/2-25

HOD (ELECT.)
G.P.BHADRAK

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Academic Co-ordinator

Academic Co-ordinator

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Principal
Govt. Polytechnic Bhadrak

Principal
Govt. Polytechnic
Bhadrak

LESSON PLAN

Course: Electric Vehicles (TH-4, Elective-C)

Faculty name: Abhipsa Dutta

Semester: VI Total Periods: 75 Periods/Week: 4+1

Period	Unit	Topic / Sub-topic	Teaching Method	Evaluation
1	I	Evolution of Electric Vehicles	Lecture	Oral questions
2	I	Advanced electric drive vehicle technology	Lecture	Short questions
3	I	Types of vehicles: EV, HEV, PHEV	Lecture	Assignment
4	I	Components of Hybrid Electric Vehicle	Lecture	Homework
5	I	Economic impacts of EV and HEV	Discussion	Class test
6	I	Environmental impacts of EVs	Lecture	Oral
7	I	Parameters affecting economic analysis	Lecture	Assignment
8	I	Comparative study of EV, HEV and IC engine vehicles	Lecture	Short test
9	I	Case study on EV adoption	Discussion	Homework
10	I	Unit-I revision and test	Revision	Unit test
11	II	Vehicle movement and forces acting on vehicle	Lecture	Oral
12	II	Vehicle resistance and rolling resistance	Lecture	Homework
13	II	Aerodynamic drag and grading resistance	Lecture	Assignment
14	II	Dynamic equation of vehicle motion	Numerical	Problems
15	II	Drive train configuration	Lecture	Short test
16	II	Automobile power train	Lecture	Oral
17	II	Classification of vehicle power plants	Lecture	Homework
18	II	Performance characteristics of IC engine	Lecture	Assignment
19	II	Performance characteristics of electric motor	Lecture	Class test
20	II	Need of gearbox in EVs	Discussion	Oral

21	II	Classification of motors used in EVs	Lecture	Homework
22	II	Architecture of hybrid drive trains	Lecture	Assignment
23	II	Types of HEVs – Series	Lecture	Oral
24	II	Parallel and Series-Parallel HEVs	Lecture	Short test
25	II	Energy saving potential of HEVs	Discussion	Homework
26	II	Complex HEV configurations	Lecture	Assignment
27	II	Numerical problems on vehicle dynamics	Numerical	Problems
28	II	Unit-II revision and test	Revision	Unit test
29	III	Power converter based EV configuration	Lecture	Oral
30	III	Classification of DC-DC converters	Lecture	Homework
31	III	Unidirectional and bidirectional converters	Lecture	Assignment
32	III	Step-down (Buck) converter principle	Lecture	Short test
33	III	Step-up (Boost) converter principle	Lecture	Oral
34	III	Buck-Boost converter	Lecture	Homework
35	III	Two quadrant converters	Lecture	Assignment
36	III	Multi quadrant converters	Lecture	Short test
37	III	Applications of DC-DC converters in EVs	Discussion	Homework
38	III	Numerical problems on converters	Numerical	Problems
39	III	Unit-III revision and test	Revision	Unit test
40	IV	Introduction to DC-AC inverters	Lecture	Oral
41	IV	Half bridge inverter with R load	Lecture	Homework
42	IV	Half bridge inverter with RL load	Lecture	Assignment
43	IV	Single phase bridge inverter with R load	Lecture	Short test
44	IV	Single phase bridge inverter with RL load	Lecture	Oral
45	IV	Electric machines used in EVs	Lecture	Homework
46	IV	Permanent magnet motors	Lecture	Assignment
47	IV	Switched reluctance motor	Lecture	Short test
48	IV	Characteristics of EV motors	Lecture	Oral
49	IV	Motor control techniques in EVs	Lecture	Homework

50	IV	Unit-IV revision and test	Revision	Unit test
51	V	Overview of batteries used in EVs	Lecture	Oral
52	V	Battery parameters	Lecture	Homework
53	V	Types of batteries for EV applications	Lecture	Assignment
54	V	Battery charging methods	Lecture	Short test
55	V	Battery management system (BMS)	Lecture	Oral
56	V	Regenerative braking in EVs	Lecture	Homework
57	V	Alternative energy sources – fuel cells	Lecture	Assignment
58	V	Super capacitors and flywheels	Lecture	Short test
59	V	Control system for EVs and HEVs	Lecture	Oral
60	V	Electronic Control Unit (ECU)	Lecture	Homework
61	V	Control architecture of hybrid drive train	Lecture	Assignment
62	V	EV schematics and block diagrams	Lecture	Oral
63	V	Case study on commercial EV	Discussion	Homework
64	V	Environmental benefits of EVs	Lecture	Short test
65	V	Future trends in EV technology	Lecture	Oral
66	V	Numerical problems on batteries	Numerical	Problems
67	V	Revision of battery and control topics	Revision	Assignment
68	V	Unit-V revision and test	Revision	Unit test
69	–	Overall syllabus revision – Unit I	Revision	Q&A
70	–	Overall syllabus revision – Unit II	Revision	Q&A
71	–	Overall syllabus revision – Unit III	Revision	Q&A
72	–	Overall syllabus revision – Unit IV	Revision	Q&A
73	–	Overall syllabus revision – Unit V	Revision	Q&A
74	–	Model question discussion	Discussion	Test
75	–	Final revision and student interaction	Revision	Feedback