



## B. P. Poddar Institute of Management & Technology

### Department of Electrical Engineering

#### LESSON PLAN 2025-26

**Program** : B.Tech Electrical Engineering  
**Contact:** 3L hours/Week.  
**Course Name** : Electric & Hybrid Vehicles  
**Course Code** : PE EE 602A

**Credit:3**

Lectures Number	Topics Covered	Text Books / Reference	Teaching Aids	Teaching Methodology
L1	Introduction: Conventional Vehicles	T1,T2,R 2	Chalk & talk,green glass boards,	Lecturing/ PPT
L2	Basics of vehicle performance,.	T1,T2,R 2	Chalk & talk,green glass boards,	Lecturing/ PPT
L3	Vehicle power source characterization, transmission characteristics	T1,T2,R 2	Chalk & talk,green glass boards,	Lecturing/ PPT
L4	Mathematical models to describe vehicle performance.	T1,T2,R 2	Chalk & talk,green glass boards,	Lecturing/ PPT
L5	Introduction to Hybrid Electric Vehicles: History of hybrid and electric vehicles, social and environmental importance of hybrid and electric vehicles	T1,T2,R 2		Flip Class
L6	Impact of modern drive-trains on energy supplies.	T1,T2,R 2		Flip Class
L7	Hybrid Electric Drive-trains: Basic concept of hybrid traction	T1,T2,R 2		Flip Class

L8	introduction to various hybrid drive-train topologies,	T1,T2,R 2	Chalk & talk,green glass boards,	Lecturing/ PPT/ Flip Class
L9	power flowcontrol in hybrid drive-train topologies, fuel efficiency analysis.	T1,T2,R 2	Chalk & talk,green glass boards,	Lecturing/ PPT
L10	Electric Trains: Electric Drive-train	T1,T2,R 2	Chalk & talk,green glass boards,	Lecturing/ PPT
L11	Basic concept of electric traction,	T1,T2,R 2	Chalk & talk,green glass boards,	Lecturing/ PPT
L12	introduction to various electric drivetrain topologies	T1,T2,R 2	Chalk & talk,green glass boards,	Lecturing/ PPT
L13	power flow control in electric drive-train topologies, fuel efficiency analysis.	T1,T2,R 2	Chalk & talk,green glass boards,	Lecturing/ PPT
L14	Electric Propulsion unit: Introduction to electric components used in hybrid and electric vehicles,	T1,T2,R 2	Chalk & talk,green glass boards,	Lecturing/ PPT
L15	Configuration and control of DC Motor drives	T1,T2,R 2	Chalk & talk,green glass boards,	Lecturing/ PPT
L16	Configuration and control of Induction Motor drives	T1,T2,R 2	Chalk & talk,green glass boards,	Lecturing/ PPT
L17	configuration and control of Permanent Magnet Motor drives	T1,T2,R 2	Chalk & talk,green glass boards,	Lecturing/ PPT
L18	Configuration and control of Switch Reluctance Motor drives	T1,T2,R 2	Chalk & talk,green glass boards,	Lecturing/ PPT
L19	Drive system efficiency.	T1,T2,R 2	Chalk & talk,green glass boards,	Lecturing/ PPT
L20	Energy Storage: Energy Storage: Introduction to Energy Storage	T4, R2	Chalk & talk,green glass boards,	Lecturing/ PPT

L21	Requirements in Hybrid and Electric Vehicles, Battery based energy storage and its analysis	T4, R2	Chalk & talk, green glass boards,	Lecturing/ PPT
L22	Fuel Cell based energy storage and its analysis	T4, R2	Chalk & talk, green glass boards,	Lecturing/ PPT
L23	Super Capacitor based energy storage and its analysis,	T4, R2	Chalk & talk, green glass boards,	Lecturing/ PPT
L24	Flywheel based energy storage and its analysis,	T4, R2	Chalk & talk, green glass boards,	Lecturing/ PPT
L25	Hybridization of different energy storage devices. Sizing the drive system		Chalk & talk, green glass boards,	Lecturing/ PPT
L26	Matching the electric machine and the internal combustion engine (ICE),		Chalk & talk, green glass boards,	Lecturing/ PPT
L27	Sizing the propulsion motor, sizing the power electronics		Chalk & talk, green glass boards,	Lecturing/ PPT
L28	selecting the energy storage technology, Communications, supporting subsystem		Chalk & talk, green glass boards,	Lecturing/ PPT
L29	Energy Management Strategies: Introduction to energy management strategies used in hybrid vehicles		Chalk & talk, green glass boards,	Lecturing/ PPT
L30	Energy Management Strategies: Introduction to energy management strategies used in electric vehicles,		Chalk & talk, green glass boards,	Lecturing/ PPT
L31	classification of different energy management strategies		Chalk & talk, green glass boards,	Lecturing/ PPT
L32	comparison of different energy management strategies		Chalk & talk, green glass boards,	Lecturing/ PPT
L33	implementation issues of energy management strategies.		Chalk & talk, green	Lecturing/ PPT

			glass boards,	
L34	<b>Numerical problems on L29 to L33</b>		Chalk & talk, green glass boards,	Lecturing/ PPT
L35	Case Studies: Design of a Hybrid Electric Vehicle (HEV)		Chalk & talk, green glass boards,	Lecturing/ PPT
L36	Design of a Hybrid Electric Vehicle (HEV)		Chalk & talk, green glass boards,	Lecturing/ PPT
L37	Design of a Battery Electric Vehicle (BEV).		Chalk & talk, green glass boards,	Lecturing/ PPT
L38	Design of a Battery Electric Vehicle (BEV)		Chalk & talk, green glass boards,	Lecturing/ PPT
L39	<b>Course Over view</b>			

**Text Books:**

T1. Electric and Hybrid Vehicles: Design Fundamentals, Iqbal Hussein, CRC Press.

T2. Hybrid Electric Vehicles: Principles and Applications with Practical Perspectives, C. Mi, M. A. Masrur and D. W. Gao, John Wiley & Sons.

T3. Electric and Hybrid Vehicles: Khanna Publishing House.

T4. Hybrid Electric Vehicles: Energy Management Strategies, Onori Simona, Serrao Lorenzo and Rizzoni Giorgio, Springer.

T5. Electric and Hybrid Vehicles, T. Denton, Routledge.

Reference books

R1. Electric Vehicle Technology Explained, James Larminie, John Lowry, Wiley.

R2. Modern Electric, Hybrid Electric and Fuel Cell Vehicles: Fundamentals, Theory and Design, Mehrdad Ehsani, Yimi Gao, Sebastian E. Gay, Ali Emadi CRC Press, 2004.