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Department of Electrical Engineering

LESSON PLAN

SESSION:2026-2027

Discipline: Electrical Engg.	**Semester: 5th**	**Name of the Teaching Faculty : NIBEDITA HO**
Subject:ELECTRIC VEHICLES	**No. of Days/per week class allotted:3**	**Semester from date: 01.07.2026 To Date: 05.11.2026** **No. of Weeks:15**
Week	**Class Day**	**Theory**
1st	1st	**IntroductiontoHybridElectricVehicles** EvolutionofElectricvehicles
	2nd	AdvancedElectricdrivevehicletechnologyVehicles-Electricvehicles (EV), Hybrid Electric drive (HEV)
	3rd	Plug in Electric vehicle (PIEV),
2nd	1st	ComponentsusedHybridElectricVehicle
	2nd	EconomicandenvironmentalimpactsofElectrichybridvehicle
	3rd	ParametersaffectingEnvironmentalandeconomic analysis
3rd	1st	Comparativestudyofvehiclesforeconomic,environmentalaspects
	2nd	**DynamicsofhybridandElectric vehicles** Generaldescriptionofvehiclemovement
	3rd	Factorsaffectingvehiclemotion-Vehicleresistance,tyreground adhesion, rolling resistance
4th	1st	aerodynamicdrag, equationofgradingresistance,dynamicequation
	2nd	Drivetrainconfiguration,Automobilepowertrain,classificationof vehicle power plant

	3rd	Performancecharacteristics ofIC engine,electricmotor, needof gear box
5th	1st	Classificationofmotors usedinElectricvehicles
	2nd	Basicarchitectureofhybriddrivetrains,typesofHEVs
	3rd	Energysavingpotentialofhybriddrivetrains
6th	1st	HEVConfigurations-Series,parallel,Series-parallel,complex.
	2nd	**DC-DCConvertersforEVandHEVApplications** EVandHEVconfigurationbasedonpower converters
	3rd	Classificationofconverters–unidirectionalandbidirectional
7th	1st	Principleofstepdownoperation
	2nd	Boost converters
	3rd	Buck-Boost converters
8th	1st	PrincipleofStep-Upoperation
	2nd	Twoquadrantconverters
	3rd	multiquadrantconverters
9th	1st	**DC-ACInverter&MotorsforEVandHEVs** DC-ACConverters
	2nd	PrincipleofoperationofhalfbridgeDC-ACinverter(Rload)
	3rd	PrincipleofoperationofhalfbridgeDC-ACinverter(R-Lload)
10th	1st	SinglephaseBridgeDC-ACinverterwithRload
	2nd	SinglephaseBridgeDC-ACinverterwithR-Lload
	3rd	ElectricMachinesusedinEVsprinciple ofoperation, working & control

11th	1st	ElectricMachinesusedinHEVs,principle ofoperation, working & control
	2nd	Permanentmagnetmotors,theirdrives, Characteristicsandapplications
	3rd	switchedreluctancemotorCharacteristicsand applications
12th	1st	**Batteries** Overviewofbatteries
	2nd	BatteryParameters
	3rd	typesofbatteries
13th	1st	BatteryCharging
	2nd	alternativenovelenergysources-solarphotovoltaic cells
	3rd	fuel cells, super capacitors, flywheels
14th	1st	Control systemforEVs
	2nd	Control systemforHEVs
	3rd	overview,Electroniccontrol unit ECU
15th	1st	Schematicsof hybriddrivetrain
	2nd	controlarchitecture
	3rd	RegenerativebrakinginEVs

Course outcomes: After completion of the course, the students will be able to

CO1:Discuss the salient features of Hybrid electric vehicles.

CO2: Interpret the Dynamics of hybrid and Electric vehicles.

CO3: Illustrate the process to maintain the DC-DC converters in EV applications.

CO4: Illustrate the process to maintain the DC-AC converters in EV applications.

CO5: Explain the parameters to select the batteries for EV applications.

29.06.26

Signature of the faculty