

DEPARTMENT OF ELECTRICAL ENGINEERING(G.P,NAYAGADA) LESSON PLAN			
Discipline : ELECTRICAL ENGG.	Semester: 3rd Sem	Name of the Teaching Faculty : Suryamani Sahoo	
Subject : E.C	No. of Days / per week class allotted : 03	Semester From date : 01.07.2026 No. of Weeks : 15	To Date : 05.11.2026
Week	Class Day	Topics	Cos
1ST	1st	1.Single Phase A.C Series Circuits.1.1 Generation of alternating voltage 1.2 Phasor representation of sinusoidal quantities	CO1
	2nd	1.3 R, L, C circuit elements its voltage and current response 1.4 R-L, R-C, R-L-C combination of A.C series circuit	CO1
	3rd	1.4.1 Impedance, reactance, impedance triangle	CO1
2ND	1st	1.4.2 Power factor, active power, reactive power, apparent power 1.4.3 Power triangle and vector diagram	CO1
	2nd	1.4.4 Resonance, Bandwidth	CO1
	3rd	1.4.5 Quality factor and voltage magnification in series R-L, R-C, R-L-C circuit	CO1
3RD	1st	Doubt Clear & Revision	
	2nd	2.Single Phase A.C Parallel Circuits 2.1 R-L, R-C and R-L-C parallel combination of A.C. circuits	CO1
	3rd	2.1.1 Impedance, reactance, phasor diagram, impedance triangle	CO1
4TH	1st	2.1.1 Impedance, reactance, phasor diagram, impedance triangle	CO1
	2nd	2.1.2 Power factor, active power, apparent power, reactive power, power triangle	CO1
	3rd	2.2 Resonance in parallel R-L, R-C, R-L-C circuit	CO1
5TH	1st	2.3 Bandwidth, Quality factor and voltage magnification	CO1
	2nd	2.3 Bandwidth, Quality factor and voltage magnification	CO1
	3rd	CLASS TEST-1	
6TH	1st	3.Three Phase Circuits 3.1 Phasor and complex representation of three phase supply	CO2
	2nd	3.2 Phase sequence and polarity	CO2
	3rd	3.3 Types of three-phase connections	CO2
7TH	1st	3.4 Phase and line quantities in three phase star and delta system	CO2
	2nd	3.5 Balanced and unbalanced load	CO2
	3rd	3.6 Neutral shift in unbalanced load	CO1
8TH	1st	3.7 Three phase power, active, reactive and apparent power in star and delta system	CO2
	2nd	3.7 Three phase power, active, reactive and apparent power in star and delta system	CO2
	3rd	Doubt Clear and Revision	
9TH	1st	4.Network Reduction and Principles of Circuit Analysis 4.1 Source transformation	CO3
	2nd	4.2 Star/delta and delta/star transformation	CO3
	3rd	4.3 Mesh Analysis	CO3
10TH	1st	4.4 Node Analysis	CO3
	2nd	Doubt Clear and Revision/CLASS TEST-2	
	3rd	5.Network Theorems	
11TH	1st	5.1 Superposition theorem	CO3
	2nd	5.2 Thevenin's theorem	CO3
	3rd	Solution of Numerical Problems.	CO3
12TH	1st	5.3 Norton's theorem	CO4
	2nd	5.4 Maximum power transfer theorem	CO4
	3rd	Solution of Numerical Problems.	CO4
13TH	1st	5.5 Reciprocity Theorem	CO4
	2nd	Solution of Numerical Problems.	CO4
	3rd	Doubt clear and Revision	CO4
14TH	1st	6.Two Port Network	
	2nd	6.1 Open Circuit Impedance Parameters	CO5
	3rd	6.2 Short Circuit Admittance Parameters, Transmission Parameters , Hybrid Parameters	CO5
15TH	1st	6.3 Interrelationship of Two Port Network	CO5
	2nd	6.4 Inter Connection of Two Port Network	CO5
	3rd	CLASS TEST-3	
16TH	1st	Doubt clear and Revision	
	2nd	Doubt clear and Revision	
	3rd	Doubt clear and Revision	

COURSE OUTCOMES:

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

- CO1:Explain various characteristics of different single phase AC series, AC parallel circuits and terms related to three phase circuits
- CO2:Solve problems using network reduction & principles of circuit analysis
- CO3:Apply Network theorems in analyzing and solving electrical circuit problems
- CO4:Explain the behavior of circuit in transient condition.
- CO5:Describe two-port networks

Signature of Faculty

Signature of HOD

DEPARTMENT OF ELECTRICAL ENGINEERING(GOVT.POLYTECHNIC,NAYAGADA) LESSON PLAN

Discipline : ELECTRICAL ENGG.	Semester: 5TH Sem	Name of the Teaching Faculty : Suryamani Sahoo	
Subject : E.V	No. of Days / per week class allotted : 03	Semester From date : 01.07.2026 No. of Weeks : 15	To Date : 05.11.2026
Week	Class Day	Topics	COs
1ST	1st	1.Introduction to Hybrid Electric Vehicles Evolution of Electric vehicles	CO1
	2nd	Advanced Electric drive vehicle technology Vehicles-Electric vehicles (EV)	CO1
	3rd	Advanced Electric drive vehicle technology Vehicles Hybrid Electric drive (HEV),	CO1
2ND	1st	Advanced Electric drive vehicle technology Vehicles	CO1
	2nd	Components used Hybrid Electric Vehicle	CO1
	3rd	Economic and environmental impacts of Electric hybrid vehicle	CO1
3RD	1st	Parameters affecting Environmental and economic analysis	CO1
	2nd	Comparative study of vehicles for economic, environmental aspects	CO1
	3rd	Revision & Doubt Clear	
4TH	1st	2.Dynamics of hybrid and Electric vehicles	CO2
	2nd	General description of vehicle movement	CO2
	3rd	Factors affecting vehicle motion- Vehicle resistance, tyre ground adhesion, rolling resistance	CO2
5TH	1st	Factors affecting vehicle motion- Vehicle resistance, tyre ground	CO2
	2nd	aerodynamic drag, equation of grading resistance, dynamic equation	CO2
	3rd	Drive train configuration, Automobile power train, classification of	CO2
6TH	1st	Performance characteristics of IC engine, electric motor, need of gear	CO2
	2nd	Classification of motors used in Electric vehicles	CO2
	3rd	Basic architecture of hybrid drive trains, types of HEVs	CO2
7TH	1st	Energy saving potential of hybrid drive trains	CO2
	2nd	HEV Configurations-Series, parallel, Series-parallel, complex.	CO2
	3rd	CLASS TEST-1	
8TH	1st	3.DC-DC Converters for EV and HEV Applications	CO3
	2nd	EV and HEV configuration based on power converters	CO3
	3rd	Classification of converters –unidirectional and bidirectional	CO3
9TH	1st	Principle of step down operation	CO3
	2nd	Boost and Buck- Boost converters	CO3
	3rd	Principle of Step-Up operation	CO3
10TH	1st	Two quadrant converters; multi quadrant converters	CO3
	2nd	Revision and Doubt Clear	
	3rd	CLASS TEST-2	
11TH	1st	DC-AC Inverter & Motors for EV and HEVs	CO4
	2nd	DC-AC Converters	CO4
	3rd	Principle of operation of half bridge DC-AC inverter (R load, R-L load)	CO4
12TH	1st	Single phase Bridge DC-AC inverter with R load, R-L load	CO4
	2nd	Electric Machines used in EVs and HEVs, principle of operation,	CO4
	3rd	Electric Machines used in EVs and HEVs, principle of operation,	CO4
13TH	1st	Permanent magnet motors, their drives, switched reluctance motor	CO4
	2nd	Permanent magnet motors, their drives, switched reluctance motor	CO4
	3rd	Characteristics and applications of above motors	CO4
14TH	1st	5.Batteries Overview of batteries	CO5
	2nd	Battery Parameters, types of batteries	CO5
	3rd	Battery Charging, alternative novel energy sources-solar photovoltaic	CO5
15TH	1st	Control system for EVs and HEVs, overview, Electronic control unit	CO5
	2nd	Control system for EVs and HEVs, overview, Electronic control unit	CO5
	3rd	Schematics of hybrid drive train, control architecture	CO5
16TH	1st	Regenerative braking in EVs	CO5
	2nd	Revision and Doubt Clear	
	3rd	CLASS TEST-3	

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

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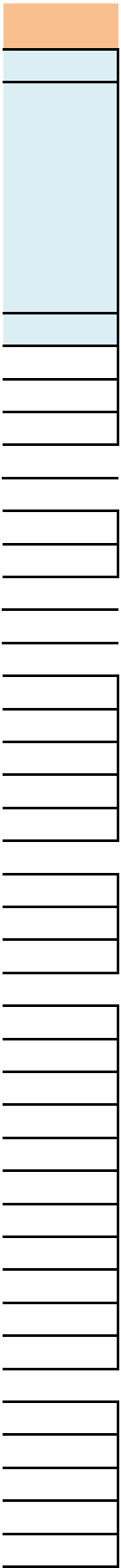
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GOVT. POLYTECHNIC NAYAGADA LESSON PLAN

Discipline :	Semester: 5TH	Name of the Teaching Faculty : Suryamani Sahoo	
Subject : E.V	No. of Days / per week class allotted : 03	Semester From date : 01.07.2026 No. of Weesks : 15	To Date : 05.11.2026
Week	Class Day	Topics	
1ST	1st	1.Introduction to Hybrid Electric Vehicles	
	2nd	Advanced Electric drive vehicle technology Vehicles-Electric vehicles (EV)	
	3rd	Advanced Electric drive vehicle technology Vehicles Hybrid Electric drive (HEV),	
2ND	1st	Advanced Electric drive vehicle technology Vehicles	
	2nd	Components used Hybrid Electric Vehicle	
	3rd	Economic and environmental impacts of Electric hybrid vehicle	
3RD	1st	Parameters affecting Environmental and economic analysis	
	2nd	Comparative study of vehicles for economic, environmental aspects	
	3rd	Revision & Doubt Clear	
4TH	1st	2.Dynamics of hybrid and Electric vehicles	
	2nd	General description of vehicle movement	
	3rd		
5TH	1st	Factors affecting vehicle motion- Vehicle resistance, tyre ground	
	2nd	aerodynamic drag, equation of grading resistance, dynamic equation	
	3rd	Drive train configuration, Automobile power train, classification of	
6TH	1st	Performance characteristics of IC engine, electric motor, need of gear	
	2nd	Classification of motors used in Electric vehicles	
	3rd	Basic architecture of hybrid drive trains, types of HEVs	
7TH	1st	Energy saving potential of hybrid drive trains	
	2nd	HEV Configurations-Series, parallel, Series-parallel, complex.	
	3rd	CLASS TEST-1	
8TH	1st	3.DC-DC Converters for EV and HEV Applications	
	2nd	EV and HEV configuration based on power converters	
	3rd	Classification of converters –unidirectional and bidirectional	
9TH	1st	Principle of step down operation	
	2nd	Boost and Buck- Boost converters	
	3rd	Principle of Step-Up operation	
	1st	Two quadrant converters; multi quadrant converters	

10TH	2nd	Revision and Doubt Clear
	3rd	CLASS TEST-2
11TH	1st	DC-AC Inverter & Motors for EV and HEVs
	2nd	DC-AC Converters
	3rd	Principle of operation of half bridge DC-AC inverter (R load, R-L load)
12TH	1st	Single phase Bridge DC-AC inverter with R load, R-L load
	2nd	Electric Machines used in EVs and HEVs, principle of operation,
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13TH	1st	Permanent magnet motors, their drives, switched reluctance motor
	2nd	Permanent magnet motors, their drives, switched reluctance motor
	3rd	Characteristics and applications of above motors
14TH	1st	5.Batteries
	2nd	Battery Parameters, types of batteries
	3rd	Battery Charging, alternative novel energy sources-solar photovoltaic
15TH	1st	Control system for EVs and HEVs, overview, Electronic control unit
	2nd	Control system for EVs and HEVs, overview, Electronic control unit
	3rd	Schematics of hybrid drive train, control architecture
16TH	1st	Regenerative braking in EVs
	2nd	Revision and Doubt Clear
	3rd	CLASS TEST-3



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