NOIDA INSTITUTE OF ENGINEERING & TECHNOLOGY, GREATER NOIDA, GAUTAM BUDDH NAGAR (AN AUTONOMOUS INSTITUTE)



Affiliated to

DR. A.P.J. ABDUL KALAM TECHNICAL UNIVERSITY UTTAR PRADESH, LUCKNOW



Evaluation Scheme & Syllabus

For

Minor Degree / Specialization

in

E-mobility

School of Mechanical Engineering

(Effective from the Session: 2023-24)

NOIDA INSTITUTE OF ENGG. & TECHNOLOGY, GREATER NOIDA, GAUTAM BUDDH NAGAR (AN AUTONOMOUS INSTITUTE)

Minor Degree / Specialization E-mobility

EVALUATION SCHEME

Sl.	Subject	Subject Name	F	Perio	d	Ev	alua	tion Scher	ne	End Semester		Total	Credit	
No.	Codes	Subject Nume	L	T	P	AA	QZ	TOTAL	PS	TE	PE	1000	Creare	Sem
1	AMSEM0301	Modern Automotive Technology	3	0	0	25	25	50		100		150	3	III
2	AMSEM0401	Green Transportation Systems	3	0	0	25	25	50		100		150	3	IV
3	AMSEM0501	Power drives and systems	3	0	0	25	25	50		100		150	3	V
4	AMSEM0601	Smart Vehicles	3	0	0	25	25	50		100		150	3	VI
5	AMSEM0701	Automotive Power Grids	3	0	0	25	25	50		100		150	3	VII
6	AMSEM0351	Modern Automotive Technology Lab	0	0	2				25		25	50	1	III
7	AMSEM0451	Green Transportation Systems Lab	0	0	2				25		25	50	1	IV
8	AMSEM0551	Power drives and systems Lab	0	0	2				25		25	50	1	V
9	AMSEM0751	Capstone Project	0	0	2				50		50	100	2	VII
		GRAND TOTAL										1000	20	

Abbreviation Used: -

L: Lecture, T: Tutorial, P: Practical, AA: Assignment Assessment, QZ: Quiz, PS: Practical Sessional, TE: Theory End Semester Exam., PE: Practical End Semester Exam.

NOIDA INSTITUTE OF ENGG. & TECHNOLOGY, GREATER NOIDA, GAUTAM BUDDH NAGAR (AN AUTONOMOUS INSTITUTE)

Branch wise Minor Degree / Specialization Details

S.no.	Name of Minor Degree/Specialization	Streams/Branches of B.Tech. Programs whose students are eligible to opt for the Minor Degree	Streams/Branches of B.Tech. Programs whose students are eligible to opt for the Specialization
1	Artificial Intelligence and Machine Learning	All Branches except CSE and EC related Branches	CSE and EC related Branches
2	Data Science	All Branches except CSE and EC related Branches	CSE and EC related Branches
3	E-mobility	All Branches except ME related Branches	Only ME Branch
4	VLSI Design	All Branches except EC related Branches	Only EC Branch

NOIDA INSTITUTE OF ENGG. & TECHNOLOGY, GREATER NOIDA, GAUTAM BUDDH NAGAR (AN AUTONOMOUS INSTITUTE)

Guidelines for assessment of Minor Degree / Specialization Program

For Theory Paper

Intern	al (50)	External (100)		
ASSIGNMENT (25)	QUIZ(25)	External (100)		
5 Assignments of 5 marks each	5 Quiz papers of 5 marks each	Theory Examination will be Conduct at the end of Semester		

For Practical Paper

Internal (25)	External (25)
On the basis of continuous Assessment	Practical Examination will be Conduct at the end of Semester

Course Code	AMSEM0301 L T P	Credit
Course Title	Modern Automotive Technology 3 0 0	3
Course object		
•	and Modern vehicles.	
2. To know al	out basics of Modern vehicles Technologies.	
	and Energy Management.	
	e about Power Transmission & Control.	
5. To elaborat	e various Safety & Emission Norms.	
	s: Physics, Basic Electrical concepts, Basic Electronics	
-	Course Contents / Syllabus	
UNIT-I	Introduction	8 hours
	and need of modern technologies; Components of mechanical module in modern gement system.	vehicles;
UNIT-II	Modern vehicles Technologies	8 hours
Working Prin	ciple of Hybrid Electrical Vehicles technologies, Fuel Cell technology, Full Electric	vehicles
-	ar power vehicles.	
UNIT-III	Energy Management	8 hours
	ectric machines Electric motors; Components of electrical & electronics module	e; energy
consumption		
UNIT-IV	Power Transmission & Control	8 hours
systems, Clut	m module; Braking system; ABS components and Operations, power steering, suspen th and differential gear box	
UNIT-V	Safety & Emission Norms	8 hours
T · ·		
	ntrol techniques, Indian emissions standards and regulations, Safety measures; I	Diagnostic
	ntrol techniques, Indian emissions standards and regulations, Safety measures; Dedern vehicles.	Diagnostic
system for mo	odern vehicles.	Diagnostic
system for mo	odern vehicles. ome:	
Course outco	odern vehicles. ome: derstand the basic concepts of various systems used in automobile.	Diagnostic
Course outco CO 1 U1 CO 2 U1	ome: Inderstand the basic concepts of various systems used in automobile. Inderstand the modern vehicle technologies and distinct types of vehicles.	
Course outco CO 1 U1 CO 2 U1 CO 3 U1 the	ome: Inderstand the basic concepts of various systems used in automobile. Inderstand the modern vehicle technologies and distinct types of vehicles. Inderstand the principles and fundamentals of automotive electrical system and study eir functions.	k2
Course outco CO 1 Un CO 2 Un CO 3 Un the CO 4 Un	ome: Inderstand the basic concepts of various systems used in automobile. Inderstand the modern vehicle technologies and distinct types of vehicles. Inderstand the principles and fundamentals of automotive electrical system and study eir functions. Inderstand the braking system and power transmission system- types & constructional	k2 k2
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Course outco CO 1 Un CO 2 Un CO 3 Un the CO 4 Un fee CO 5 De	ome: Inderstand the basic concepts of various systems used in automobile. Inderstand the modern vehicle technologies and distinct types of vehicles. Inderstand the principles and fundamentals of automotive electrical system and study being functions. Inderstand the braking system and power transmission system- types & constructional actures used in automobile.	k2 k2 k2 k2
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Link: NPTE	L/ YouTube/ Faculty Video Link:
Unit 1	https://www.youtube.com/watch?v=xCPINg7s1yY
Unit 2	https://www.youtube.com/watch?v=D-f0yVjYBRQ
Unit 3	https://www.youtube.com/watch?v=GeSY3oHHGAU
Unit 4	https://www.youtube.com/watch?v=uy9lZCdkQIM&list=PLD4ED2FAF3C155625
Unit 5	https://www.youtube.com/watch?v=HBPtdm9lErI

Course Code	AMSEM0401	L	T	P		Credit
Course Title	Green Transportation Systems	3	0	0		3
Course object					•	
 To understar 	d Green Transportation Systems.					
2. To know abo	out basics of Modern Transport Planning					
	d Various Transportation Models					
4. To describe	about Transportation Strategies.					
5. To elaborate	various Green Transportation Infrastructures.					
Pre-requisites						
	Course Contents / Syllabus					
UNIT-I	Introduction					8 hours
	rtation: Introduction to Environmental Impact Assessment	(EIA)	and T	ransp	ortati	on systems;
Land-use plans	, zoning schemes and provisions.					
UNIT-II	Modern Transport Planning					8 hours
Urban and reg	ional transport planning Impacts on humans, flora and fa	una,	soil, v	vater,	air,	climate and
	planes, Railways, Metro, Ropeway, Tramways, Crane, Ear					
Frucks & Buse						
UNIT-III	Various Transportation Models					8 hours
Establishment	of baseline conditions w.r.t soil, water and air quality; noise,	air ar	nd wat	er pol	lution	n modelling.
	of baseline conditions w.r.t soil, water and air quality; noise, at Trains, Magnetic Lavigation, Hyperloops.	air ar	nd wat	er pol	lutio	n modelling,
Shipping, Bulle		air ar	nd wat	er pol	lution	
Shipping, Bulle UNIT-IV	t Trains, Magnetic Lavigation, Hyperloops.					8 hours
Shipping, Bulle UNIT-IV Modelling of in	t Trains, Magnetic Lavigation, Hyperloops. Transportation Strategies	projec	t impa	cts inc	cludir	8 hours
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- 1. Assessment & Decision Making for Sustainable Transport, European Conference of Ministers of Transport, OECD Publishing 2004.
- 2. Wood, C. and Wood, C., "Environmental Impact Assessment: A Comparative Review", Prentice Hall. 2002.
- 3. Petts, J., "Handbook of Environmental Impact Assessment", Blackwell Publishing. 1999

Reference Books:

1. Sucharov, L.J. and Baldasano, J.M., "Urban Transport and the Environment, Vol. II", Computational Mechanics Publications. 1996.

- 2. Zannetti P. (Ed.), "Environmental Modeling, Vol. I", Computational Mechanics Publication, Elsevier Applied Science. 1993.

 3. Tumlin, Leffray (2012), Sustainable Transportation Planning: Tools for Creating Vibrant, Healthy and
- 3. Tumlin, Jeffrey (2012). Sustainable Transportation Planning: Tools for Creating Vibrant, Healthy and Resilient Communities. Wiley, Hoboken, NJ.

Link: NPTEL/ YouTube/ Faculty Video Link:

Unit 1	https://www.youtube.com/watch?v=2M8FZiKQ798
Unit 2	https://www.youtube.com/watch?v=OnjX0O9dPMc
Unit 3	https://www.youtube.com/watch?v=NwgjVFjmlws
Unit 4	https://www.youtube.com/watch?v=GJiaIcYuAlQ
Unit 5	https://www.youtube.com/watch?v=yDz5bRy7AgI

Course Code	AMSEM0601	L	T	P		Credit
Course Title	Smart Vehicles	3	0	0		3
Course ob	jective:	1				
1. To unde	rstand Automated, Connected, and Intelligent Vehicles.					
2. To know	v about basics of Remote Sensing and Wireless Technology.					
3. To unde	rstand Wireless Networking and Connected Car Technology.					
4. To desc	ribe about Vehicle Prognostics Technology and Autonomous V	/ehic	les.			
	orate various Troubleshooting and Maintenance of ADAS Syst					
	sites: Physics, Basic Electrical concepts, Basic Electronics					
.	Course Contents / Syllabus					
UNIT-I	Introduction to Automated, Connected, and Intelligen	nt			8	hours
	Vehicles					
	e Electronics, Infotainment, Body, Chassis, and Power Train E					
	isted Systems, Basic Control System Theory, Overview of EC				ept	
of Cyber-F	Physical Control Systems, Remote Sensing Technology, Wirele	ess No	etworl	ks and		
Autonomy						
UNIT-II	Remote Sensing and Wireless Technology					hours
	onar, LIDAR – Multiple Beam, Cameras & Night Vision, Mod					
	n, Wireless System Block Diagram, Transmission - Modulation				otion	
	ation/ Decoding, Propagation, Transmission Lines, and Antenna		Vorld-	Wide		
Standards,	Cellular and IEEE, Examples: DSRC, VANET, IEEE 802.11p).				
UNIT-III	Windows Networking and Connected Con Technology				0	houne
	Wireless Networking and Connected Car Technology		1 000	15 000		hours
	vorking Concepts, Wireless Networking Fundamentals, IEEE8					
	ar, Protocols and IP Addressing, Connection of On-Board Netv					
	On-Board Networks, Connectivity Fundamentals, Navigation				tions,	
	-Vehicle (V2V), Vehicle-to-Roadside (V2R), Vehicle-to-Infras	struct	ure (v	21),		
wireless S	ecurity Issue.					
UNIT-IV	Vehicle Prognostics Technology and Autonomous Ve	hicle	s		8	hours
	g of Vehicle Systems – Advanced OBD, Basic Maintenance Fu			nd-of-Li		110415
	s, ADAS Maintenance, Driverless Vehicle Technology, Artific					
	ning, Implementation Issues.	101 111	comp	nice unc	•	
Beep Bear	imig, imprementation issues:					
UNIT-V	Troubleshooting and Maintenance of ADAS Systems				8	hours
Failure Mo	odes and Self Calibration, Sensor Testing and Calibration, Red	undar	nt Syst	ems.		
	Jpgrades, Uber/Lyft Business Model, Trucking, Farming, Mini		•		Rail.	
Military.	, p. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.			-6 *****	,	
willitary.						
Course ou	tcome:					
CO 1	Analyze the Automated, Connected, and Intelligent Vehicles.					K1, K2
CO 2	Evaluate Remote Sensing and Wireless Technology models.					K3, K4
CO 3	Explain the use of different Remote Sensing and Wireless Tec	chnol	ogies.			K2, K3
CO 4	Analyze Vehicle Prognostics Technology and Autonomous V			ems		
~ ·	rimaryze remote i rognostics reciniology and Autonomous V		oo oysi	C1115.		K3, K4

CO 5	Relevant Troubleshooting and Maintenance of ADAS Systems.	K2,
		K3
Text b	ooks:	
1. Ljub	o Vlacic, Michel Parent, Fumio Harashima, "Intelligent Vehicle Technologies Theory	
and Ap	plications" Boca Raton, CRC Press, 2001	
	in, I. "Electric and Hybrid Vehicles" Boca Raton, CRC Press, 2010.	
3.Stuar	t Borlase 'Smart Grid: Infrastructure, Technology and Solutions', CRC Press 2012.	
Refere	nce Books:	
1 G N	Iullett, Wireless Telecommunications Systems and Networks, Thomson – Delmar	
	ng, ISNB#1-4018-8659-0, 2006	
Learnin	18, 151\Dill 4010 0037 0, 2000	
Link:	NPTEL/ YouTube/ Faculty Video Link:	
Unit 1	https://www.youtube.com/watch?v=HgF7E5q9sU4	
Unit 2	https://www.youtube.com/watch?v=N49PzLDUIFQ	
Unit 3	https://www.youtube.com/watch?v=0FXHr1B8H7M	
Unit 4	https://www.youtube.com/watch?v=gEy91PGGLR0	
Unit 5	https://www.youtube.com/watch?v=EiWl5PAtfYA	

	AMSEM0501 L	T	P	Credit
Course Title	Power drives and systems 3	0	0	3
Course objecti	ve:			
1. To understar	d Automated, Connected, and Intelligent Vehicles.			
2. To know abo	out basics of Remote Sensing and Wireless Technology.			
	d Wireless Networking and Connected Car Technology.			
	about Vehicle Prognostics Technology and Autonomous Vehicles.			
	various Troubleshooting and Maintenance of ADAS Systems.			
Pre-requisites:	Physics, Basic Electrical concepts, Basic Electronics			
	Course Contents / Syllabus			
UNIT-I	Introduction			8 hours
	Dynamics of Electric Drives: Fundamentals of torque equation, Spe operation, components of load torques	ed to	que co	onvention and
UNIT-II	Power Drive Classifications			8 hours
	f load torques steady state stability. Load equation, Speed control ar	nd driv	ve clas	
close loop cont		ia aii	ve cius	
UNIT-III	Various Power Drives			8 hour
DC motor Driv	es-Modelling of DC machines. Steady state characteristics with an	natur	e and s	speed control
	d DC motor drives, Chopper controlled DC motor drives.			
UNIT-IV	Various Power Drive Control Systems			8 hour
	action machines- Dynamic modelling of induction machines. Small			
	of induction machines. Phase-controlled induction machines, Stator	voltag	re cont	
	1 6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	-		trol, Slip
	y scheme, frequency control and vector control of induction motor d	-		
UNIT-V	Power Machines	rives.		8 hours
UNIT-V Traction motor	Power Machines : Starting, Speed-Time characteristics, Braking, Traction motors us	rives.	practi	8 hour
UNIT-V Traction motor Drives-Digital	Power Machines : Starting, Speed-Time characteristics, Braking, Traction motors us Control of Electric Drives, Stepper motor, Servo motor, Solar dri	rives.	practi	8 hour
UNIT-V Traction motor Drives-Digital	Power Machines : Starting, Speed-Time characteristics, Braking, Traction motors us	rives.	practi	8 hour
UNIT-V Traction motor Drives-Digital drive, SRM dri	Power Machines : Starting, Speed-Time characteristics, Braking, Traction motors use Control of Electric Drives, Stepper motor, Servo motor, Solar drive and their specific applications.	rives.	practi	8 hour
UNIT-V Traction motor Drives-Digital drive, SRM dri Course outcon	Power Machines : Starting, Speed-Time characteristics, Braking, Traction motors use Control of Electric Drives, Stepper motor, Servo motor, Solar drive and their specific applications.	rives.	practi	8 hour
UNIT-V Traction motor Drives-Digital drive, SRM dri Course outcon CO 1 Mod	Power Machines : Starting, Speed-Time characteristics, Braking, Traction motors us Control of Electric Drives, Stepper motor, Servo motor, Solar drive and their specific applications. ne:	sed in ve, B	practi	8 hour ice. Industria drive, PMSM
UNIT-V Traction motor Drives-Digital drive, SRM dri Course outcon CO 1 Mod CO 2 Des	Power Machines : Starting, Speed-Time characteristics, Braking, Traction motors us Control of Electric Drives, Stepper motor, Servo motor, Solar drive and their specific applications. ne: del and simulate electric drive systems	sed in ve, B	practi	8 hour ice. Industria drive, PMSM
UNIT-V Traction motor Drives-Digital drive, SRM dri Course outcon CO 1 Mod CO 2 Des CO 3 Des	Power Machines : Starting, Speed-Time characteristics, Braking, Traction motors us Control of Electric Drives, Stepper motor, Servo motor, Solar drive and their specific applications. ne: del and simulate electric drive systems ign modulation strategies of power electronics converters, for drives	sed in ve, B	practi	8 hour ice. Industria drive, PMSN
UNIT-V Traction motor Drives-Digital drive, SRM dri Course outcon CO 1 Mod CO 2 Des CO 3 Des CO 4 Sele CO 5 Imp	Power Machines : Starting, Speed-Time characteristics, Braking, Traction motors us Control of Electric Drives, Stepper motor, Servo motor, Solar drive and their specific applications. ne: lel and simulate electric drive systems ign modulation strategies of power electronics converters, for drives ign appropriate current/voltage regulators for electric drives	sed in ve, B	practi	8 hour ice. Industria drive, PMSM
UNIT-V Traction motor Drives-Digital drive, SRM dri Course outcon CO 1 Moo CO 2 Des CO 3 Des CO 4 Sele CO 5 Imp Text books:	Power Machines : Starting, Speed-Time characteristics, Braking, Traction motors use Control of Electric Drives, Stepper motor, Servo motor, Solar drive and their specific applications. ne: lel and simulate electric drive systems ign modulation strategies of power electronics converters, for drives ign appropriate current/voltage regulators for electric drives ct and implement the drives for Industrial Process lement various variable speed drives in Electrical Energy Conversion	sed inve, B	LDC	8 hour ice. Industria drive, PMSN
Traction motor Drives-Digital drive, SRM dri Course outcon CO 1 Mod CO 2 Des CO 3 Des CO 4 Sele CO 5 Imp Text books: 1. G.K, Dubey,	Power Machines : Starting, Speed-Time characteristics, Braking, Traction motors use Control of Electric Drives, Stepper motor, Servo motor, Solar drive and their specific applications. ne: del and simulate electric drive systems ign modulation strategies of power electronics converters, for drives ign appropriate current/voltage regulators for electric drives ct and implement the drives for Industrial Process lement various variable speed drives in Electrical Energy Conversion "Power semiconductor controlled Drives", Prentice Hall internation	sed in ve, B	practi LDC (cation tem	8 hour ice. Industria drive, PMSN
Traction motor Drives-Digital drive, SRM dri Course outcon CO 1 Mod CO 2 Des CO 3 Des CO 4 Sele CO 5 Imp Text books: 1. G.K, Dubey, 2. R.Krishanar	Power Machines : Starting, Speed-Time characteristics, Braking, Traction motors use Control of Electric Drives, Stepper motor, Servo motor, Solar drive and their specific applications. ne: lel and simulate electric drive systems ign modulation strategies of power electronics converters, for drives ign appropriate current/voltage regulators for electric drives ct and implement the drives for Industrial Process lement various variable speed drives in Electrical Energy Conversion	sed in ve, B appli	LDC (cation	8 hour ice. Industria drive, PMSM K2 K2 K2 K2 K2 K2 Sey, 1989.

1. W. Leonhard, "Control of Electrical drives", Springer, 3rd edition, 2001.

P.C. Krause –, "Analysis of Electric Machine", Wiley-IEEE press 3rdedition.
 K. Bose, "Modern Power Electronics and AC Drives", Prentice Hall publication, 1st edition, 2001.

Link: NPTI	EL/ YouTube/ Faculty Video Link:
Unit 1	https://www.youtube.com/watch?v=btNSMMednG0
Unit 2	https://www.youtube.com/watch?v=E8f_h_6DIZc
Unit 3	https://www.youtube.com/watch?v=EaENkSSUK-k
Unit 4	https://www.youtube.com/watch?v=1AT1yuQ9awM&list=PLFW6lRTa1g83sIfVY1p1xGqP GYUmXyahx
Unit 5	https://www.youtube.com/watch?v=L6bq5U9tVt0

Course Code	AMSEM0701	L	T	P	Credit
Course Title	Automotive Power Grids	3	0	0	3
Course objectiv		,		<u> </u>	
1. To understand	d hybrid electric vehicle				
2. To know abou	ut basics of electric drives				
3. To understand	d concept of energy storage				
4. To describe a	bout Energy management systems				
5. To elaborate	various Mobility and connectors				
Pre-requisites:	Physics, Basic Electrical concepts, Basic Electron	ics			
	Course Contents / Syllab	ous			
UNIT-I	Introduction to Hybrid Electric Vehicle				8 hours
Review of Conv	ventional Vehicle: Introduction to Hybrid Electric	Vehicles: Types	of EV	s,	
Hybrid Electric	Drivetrain, Tractive effort in normal driving				
UNIT-II	Electric Drives				10 hours
	ption Concept of Hybrid Electric Drive Trains, Ar	chitecture of Hy	hrid E	lectric I	
	Electric Drive Trains, Parallel hybrid electric				
•	nd control of DC Motor drives, Induction Motor			-	
switched relucta					,
UNIT-III	Energy Storage				8 hours
Introduction to I	Energy Storage Requirements in Hybrid and Electr	ric Vehicles: - Ba	attery b	oased er	nergy storage
	Fuel Cell based energy storage and its analysis,				
		Trybriuizanon (or arric	erent en	icigy siorage
devices. Sizing	the drive system, Design of Hybrid Electric Vehic				
devices. Sizing to UNIT-IV					
UNIT-IV	the drive system, Design of Hybrid Electric Vehic	le and Plug-in E	lectric	Vehicle	e. 8 hours
UNIT-IV Energy Manage G2V, V2B, V2F	the drive system, Design of Hybrid Electric Vehic. Energy Management System ment Strategies, Automotive networking and community. H. Business: E-mobility business, electrification ch	le and Plug-in E	lectric chargi	Vehicle ng stand	8 hours dards, V2G,
UNIT-IV Energy Manage G2V, V2B, V2F electrification cl	the drive system, Design of Hybrid Electric Vehic. Energy Management System ment Strategies, Automotive networking and community. Business: E-mobility business, electrification challenges.	le and Plug-in E	lectric chargi	Vehicle ng stand	e. 8 hours dards, V2G, y business,
UNIT-IV Energy Manage G2V, V2B, V2F electrification cl UNIT-V	the drive system, Design of Hybrid Electric Vehic. Energy Management System ment Strategies, Automotive networking and community. Business: E-mobility business, electrification challenges. Mobility and Connectors	munication, EV	lectric chargi ess- E-	Vehicle ng stand mobilit	e. 8 hours dards, V2G, y business, 8 hours
UNIT-IV Energy Manage G2V, V2B, V2F electrification cl UNIT-V Connected Mob	the drive system, Design of Hybrid Electric Vehic. Energy Management System ment Strategies, Automotive networking and community. Business: E-mobility business, electrification challenges. Mobility and Connectors ility and Autonomous Mobility- case study E-mobility.	munication, EV nallenges, Busine pility Indian Roa	chargi ess- E-	Nehicle ng stand mobilit	8 hours dards, V2G, y business, 8 hours ctive. Policy:
UNIT-IV Energy Manage G2V, V2B, V2H electrification cl UNIT-V Connected Mob EVs in infrastru	the drive system, Design of Hybrid Electric Vehic. Energy Management System ment Strategies, Automotive networking and community. Business: E-mobility business, electrification challenges. Mobility and Connectors ility and Autonomous Mobility- case study E-mobility and Autonomous Mobility in smart grid, socious et al. (1988).	munication, EV tallenges, Busine to the control of	chargi ess- E- admap	ng stand mobility Perspect	8 hours dards, V2G, y business, 8 hours etive. Policy: ectors- Types
UNIT-IV Energy Manage G2V, V2B, V2F electrification cl UNIT-V Connected Mob EVs in infrastru of EV charging	the drive system, Design of Hybrid Electric Vehic. Energy Management System ment Strategies, Automotive networking and community. Business: E-mobility business, electrification challenges. Mobility and Connectors ility and Autonomous Mobility- case study E-mobility and Autonomous Mobility- case study E-mobility and System, integration of EVs in smart grid, socconnector, North American EV Plug Standards, Design of EVs in System and EV Plug Standards, Design of EVs in System and EV Plug Standards, Design of EVs in System and EVs Plug Standards, Design of EVs in System and EVs Plug Standards, Design of EVs in System and EVs Plug Standards, Design of EVs in System and EVs Plug Standards, Design of EVs in System and EVs Plug Standards, Design of EVs in System and EVs Plug Standards, Design of EVs in System and EVs Plug Standards, Design of EVs in System and EVs Plug Standards, Design of EVs in System and EVs Plug Standards, Design of EVs in System and EVs Plug Standards, Design of EVs in System and EVs Plug Standards, Design of EVs in System and Evs Plug Standards, Design of EVs in System and Evs Plug Standards, Design of EVs in System and Evs Plug Standards, Design of EVs in System and Evs Plug Standards, Design of EVs in System and Evs Plug Standards, Design of EVs in System and Evs Plug Standards, Design of EVs in System and Evs Plug Standards, Design of EVs in System and Evs Plug Standards, Design of EVs in System and Evs Plug Standards, Design of EVs in System and Evs Plug Standards, Design of Evs Plug Standards, Design of EVs in System and Evs Plug Standards, Design of EVs in System and Evs Plug Standards, Design of Evs in System and Evs Plug Standards, Design of Evs in System and Evs Plug Standards, Design of Evs in System and Evs Plug Standards, Design of Evs in System and Evs Plug Standards, Design of Evs in System and Evs Plug Standards, Design of Evs in System and Evs Plug Standards, Design of Evs in System and Evs Plug Standards, Design of Evs in System and Evs Plug Standards, Design of Evs in System	munication, EV nallenges, Busine Dility Indian Roadial dimensions of C Fast Charge E	chargi ess- E- admap of EVs	ng stand mobilit Perspection. Conne	8 hours dards, V2G, y business, 8 hours etive. Policy: ectors- Types ards in North
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UNIT-IV Energy Manage G2V, V2B, V2F electrification cl UNIT-V Connected Mob EVs in infrastru of EV charging America, CCS (the drive system, Design of Hybrid Electric Vehic. Energy Management System ment Strategies, Automotive networking and community. Business: E-mobility business, electrification challenges. Mobility and Connectors ility and Autonomous Mobility- case study E-mobility and Autonomous Mobility- case study E-mobility and System, integration of EVs in smart grid, socionnector, North American EV Plug Standards, Decombined Charging System), CHAdeMO, Tesla,	munication, EV nallenges, Busine Dility Indian Roadial dimensions of C Fast Charge E	chargi ess- E- admap of EVs	ng stand mobilit Perspection. Conne	e. 8 hours dards, V2G, y business, 8 hours etive. Policy ectors- Types ards in North
UNIT-IV Energy Manage G2V, V2B, V2F electrification cl UNIT-V Connected Mob EVs in infrastru of EV charging America, CCS (Course outcom CO 1 Anal	the drive system, Design of Hybrid Electric Vehic. Energy Management System ment Strategies, Automotive networking and communated the Business: E-mobility business, electrification challenges. Mobility and Connectors ility and Autonomous Mobility- case study E-mobility and Autonomous Mobility- case study E-mobility and System, integration of EVs in smart grid, socionnector, North American EV Plug Standards, Decombined Charging System), CHAdeMO, Tesla,	munication, EV nallenges, Busine Dility Indian Roadial dimensions of C Fast Charge E	chargi ess- E- admap of EVs	ng stand mobilit Perspection. Conne	8 hours dards, V2G, y business, 8 hours etive. Policy: ectors- Types ards in North
Energy Manage G2V, V2B, V2F electrification cl UNIT-V Connected Mob EVs in infrastru of EV charging America, CCS (Course outcom CO 1 Anal CO 2 Eval	the drive system, Design of Hybrid Electric Vehic. Energy Management System ment Strategies, Automotive networking and commet. Business: E-mobility business, electrification challenges. Mobility and Connectors ility and Autonomous Mobility- case study E-mobility and Autonomous Mobility- case study E-mobic cture system, integration of EVs in smart grid, socionnector, North American EV Plug Standards, Decombined Charging System), CHAdeMO, Tesla, e: yze the grid system in hybrid electric Vehicles. uate concept of electric drives	munication, EV nallenges, Busine Dility Indian Roadial dimensions of C Fast Charge E	chargi ess- E- admap of EVs	ng stand mobilit Perspection. Conne	8 hours dards, V2G, y business, 8 hours etive. Policy: ectors- Types ards in North K ₁ , K ₂ K ₃ , K ₄
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Energy Manage G2V, V2B, V2F electrification of UNIT-V Connected Mob EVs in infrastru of EV charging America, CCS (Course outcom CO 1 Anal CO 2 Eval CO 3 Expl CO 4 Anal CO 5 Rele Text books: 1. Emadi, A. (Ec CRC Press, 200 2. Husain, I. "El CO 3 Tariq Muneer	the drive system, Design of Hybrid Electric Vehice Energy Management System ment Strategies, Automotive networking and completed and Electric Electrication of the Business: E-mobility business, electrification challenges. Mobility and Connectors ility and Autonomous Mobility- case study E-mobility and Autonomous Mobility- case study E-mobility and EV Plug Standards, Document Combined Charging System), CHAdeMO, Tesla, e: yze the grid system in hybrid electric Vehicles. uate concept of electric drives ain the use of different energy storages yze Vehicle energy management systems vant mobility and connectors. d.), Miller, J., Ehsani, M., "Vehicular Electric Pow 3 ectric and Hybrid Vehicles" Boca Raton, CRC Program IllescasGarcía, "The automobile, In Electric In Elect	munication, EV munication, EV mallenges, Busine polity Indian Roa cial dimensions of C Fast Charge E European EV Pl ver Systems" Bo ess, 2010.	chargi chargi ess- E- admap of EVs V Plug dug Sta	Vehicle ng stand mobilit Perspec . Conne g Stand ndards, on,	8 hours dards, V2G, y business, 8 hours etive. Policy: ectors- Types ards in North K ₁ , K ₂ K ₃ , K ₄ K ₂ , K ₃ K ₃ , K ₄
Energy Manage G2V, V2B, V2F electrification of UNIT-V Connected Mob EVs in infrastruof EV charging America, CCS (Course outcom CO 1 Anal CO 2 Eval CO 3 Expl CO 4 Anal CO 5 Rele Text books: 1. Emadi, A. (Ec CRC Press, 200 2. Husain, I. "El 3. Tariq Muneer	the drive system, Design of Hybrid Electric Vehic. Energy Management System ment Strategies, Automotive networking and comparent Business: E-mobility business, electrification challenges. Mobility and Connectors ility and Autonomous Mobility- case study E-mobility and Autonomous Mobility- case study E-mobility and Autonomous Mobility- case study E-mobility and Connector, North American EV Plug Standards, Decombined Charging System), CHAdeMO, Tesla, e: yze the grid system in hybrid electric Vehicles. uate concept of electric drives ain the use of different energy storages yze Vehicle energy management systems vant mobility and connectors. d.), Miller, J., Ehsani, M., "Vehicular Electric Pow 3 lectric and Hybrid Vehicles" Boca Raton, CRC Presentation of the present systems and the presentation of the present systems and the presentation of the	munication, EV munication, EV mallenges, Busine polity Indian Roa cial dimensions of C Fast Charge E European EV Pl ver Systems" Bo ess, 2010.	chargi chargi ess- E- admap of EVs V Plug dug Sta	Vehicle ng stand mobilit Perspec . Conne g Stand ndards, on,	8 hours dards, V2G, y business, 8 hours etive. Policy ectors- Types ards in North K ₁ , K ₂ K ₃ , K ₄ K ₂ , K ₃ K ₃ , K ₄

1. Larminie	e, James, and John Lowry, "Electric Vehicle Technology Explained" John Wiley
and Sons, 20	012
2. Sheldon	S. Williamson, "Energy Management Strategies for Electric and Plug-in Hybrid
3. Electric	Vehicles", Springer, 2013
Link: NPTE	EL/ YouTube/ Faculty Video Link:
Unit 1	https://www.youtube.com/watch?v=opvKyJ3DVJI
Unit 2	https://www.youtube.com/watch?v=1AT1yuQ9awM&list=PLFW6lRTa1g83sIfVY1p1xGqPGYUmXyahx
Unit 3	https://www.youtube.com/watch?v=9eAFEU7pMwU
Unit 4	https://www.youtube.com/watch?v=JABjhJHX8Tc
Unit 5	https://www.youtube.com/watch?v=ASU5nT3cTfs

Course Co	ode AMSEM0351	L	T	P	Credit
Course Ti	tle Modern Automotive Technology Lab	0	0	2	1
Course ob	jective:	<u> </u>		ı	
Students w	vill be studying the experiments based on Modern A	Automotive Technology	systen	ns	
	sites: Student know the concept of Automobiles	•	e E	•	
	Suggested list of Experiment Perform Ten expe	eriment from the list	of Ex	perime	ent
S. No.	Name of Experiments	-t 1-11 t			
1	To Study Engine control units in modern Au	itomobile systems			
<u>2</u> 3	To Study Engine management techniques To Study Engine cooling system of modern	vahialas			
<u>3</u> 4	To Study hybrid electric vehicle	venicies			
4 5	To Study flybrid electric verificie To Study fuel cell technology				
<u>6</u>	To Study ruer cent technology To Study solar power vehicles				
0 7	To Study solar power venicles To Study electric motors				
8	To Study energy consumption and efficiency	N/			
9	Draw a flowchart of ABS components)			
10	To Study manual clutch and gear box				
11	To Study power steering				
12	To Study suspension systems				
Course ou	tcome:				
CO 1	Understand the concept of Engine control				K2
CO 2	Understand the concept of Engine management				K2
CO 3	Understand the concept of Engine cooling system	<u> </u>			K2
CO 4	Understand the concept of fuel cell technology				K2
CO 5	Understand the concept of electric motors				K2
	onderstand the concept of electric motors				K2

https://www.youtube.com/watch?v=dxv579W2G2c

https://www.youtube.com/watch?v=HgwhvfKcMMw

1.

2.

Course Title Green Transportation Systems Lab 0	Course Co	de AMSEM0451	L	T	P	Credit
Pre-requisites: Student know the concept of Automobiles and systems	Course Tit	tle Green Transportation Systems Lab	0	0	2	1
S. No. Name of Experiment Perform Ten experiment from the list of Experiment S. No. Name of Experiments To Study Environmental Impact Assessment (EIA) model for automobiles. To Study Land-use plans, zoning schemes. To Study Urban and regional transport planning Impacts on humans To Study Urban and regional transport planning Impacts on Trucks & Buses To Study Establishment of baseline conditions w.r.t soil, water and air quality. To Study Magnetic Levitation. To Study Bullet Trains model. To Study Modelling of impacts and scenario-based analysis. To Study Assessment of potential project impacts To Study Fog security Systems To Study Sustainable transportation systems To Study Decision support systems for EIA of transport infrastructures. Course outcome: CO 1 Understand the concept of Environmental Impact Assessment (EIA) model for automobiles CO 3 Understand the concept of Magnetic Levitation. K2 CO 4 Understand the concept of Magnetic Levitation.	•	•	Systems.		,	
S. No. Name of Experiment Perform Ten experiment from the list of Experiment S. No. Name of Experiments To Study Environmental Impact Assessment (EIA) model for automobiles. To Study Land-use plans, zoning schemes. To Study Urban and regional transport planning Impacts on humans To Study Urban and regional transport planning Impacts on Trucks & Buses To Study Establishment of baseline conditions w.r.t soil, water and air quality. To Study Magnetic Levitation. To Study Bullet Trains model. To Study Modelling of impacts and scenario-based analysis. To Study Assessment of potential project impacts To Study Fog security Systems To Study Sustainable transportation systems To Study Decision support systems for EIA of transport infrastructures. Course outcome: CO 1 Understand the concept of Land-use plans, zoning schemes CO 2 Understand the concept of Environmental Impact Assessment (EIA) model for automobiles CO 3 Understand the concept of Magnetic Levitation. K2 CO 4 Understand the concept of Bullet Trains model.	Pre-requis	ites: Student know the concept of Automobiles and system	ns			
To Study Environmental Impact Assessment (EIA) model for automobiles. To Study Land-use plans, zoning schemes. To Study Urban and regional transport planning Impacts on humans To Study Urban and regional transport planning Impacts on Trucks & Buses To Study Establishment of baseline conditions w.r.t soil, water and air quality. To Study Magnetic Levitation. To Study Bullet Trains model. To Study Modelling of impacts and scenario-based analysis. To Study Assessment of potential project impacts To Study Fog security Systems To Study Sustainable transportation systems To Study Decision support systems for EIA of transport infrastructures. Course outcome: CO 1 Understand the concept of Land-use plans, zoning schemes CO 2 Understand the concept of Environmental Impact Assessment (EIA) model for k2 automobiles CO 3 Understand the concept of Magnetic Levitation. K2 CO 4 Understand the concept of Bullet Trains model.				of Ex	periment	
To Study Land-use plans, zoning schemes. To Study Urban and regional transport planning Impacts on humans To Study Urban and regional transport planning Impacts on Trucks & Buses To Study Establishment of baseline conditions w.r.t soil, water and air quality. To Study Magnetic Levitation. To Study Bullet Trains model. To Study Modelling of impacts and scenario-based analysis. To Study Assessment of potential project impacts To Study Fog security Systems To Study Sustainable transportation systems To Study Decision support systems for EIA of transport infrastructures. Course outcome: CO 1 Understand the concept of Land-use plans, zoning schemes CO 2 Understand the concept of Environmental Impact Assessment (EIA) model for k2 automobiles CO 3 Understand the concept of Magnetic Levitation. k2 CO 4 Understand the concept of Bullet Trains model.	S. No.	Name of Experiments			-	
To Study Urban and regional transport planning Impacts on humans To Study Urban and regional transport planning Impacts on Trucks & Buses To Study Establishment of baseline conditions w.r.t soil, water and air quality. To Study Magnetic Levitation. To Study Bullet Trains model. To Study Modelling of impacts and scenario-based analysis. To Study Assessment of potential project impacts To Study Fog security Systems To Study Sustainable transportation systems To Study Decision support systems for EIA of transport infrastructures. Course outcome: CO 1 Understand the concept of Land-use plans, zoning schemes CO 2 Understand the concept of Environmental Impact Assessment (EIA) model for k2 automobiles CO 3 Understand the concept of Magnetic Levitation. k2 CO 4 Understand the concept of Bullet Trains model. k2	1	To Study Environmental Impact Assessment (EIA) mod	lel for aut	omobil	les.	
To Study Urban and regional transport planning Impacts on Trucks & Buses To Study Establishment of baseline conditions w.r.t soil, water and air quality. To Study Magnetic Levitation. To Study Bullet Trains model. To Study Modelling of impacts and scenario-based analysis. To Study Assessment of potential project impacts To Study Fog security Systems To Study Sustainable transportation systems To Study Decision support systems for EIA of transport infrastructures. Course outcome: CO 1 Understand the concept of Land-use plans, zoning schemes CO 2 Understand the concept of Environmental Impact Assessment (EIA) model for k2 automobiles CO 3 Understand the concept of Magnetic Levitation. CO 4 Understand the concept of Bullet Trains model.	2	To Study Land-use plans, zoning schemes.				
To Study Establishment of baseline conditions w.r.t soil, water and air quality. To Study Magnetic Levitation. To Study Bullet Trains model. To Study Modelling of impacts and scenario-based analysis. To Study Assessment of potential project impacts To Study Fog security Systems To Study Sustainable transportation systems To Study Decision support systems for EIA of transport infrastructures. Course outcome: CO 1 Understand the concept of Land-use plans, zoning schemes	3					
To Study Magnetic Levitation. To Study Bullet Trains model. To Study Modelling of impacts and scenario-based analysis. To Study Assessment of potential project impacts To Study Fog security Systems To Study Sustainable transportation systems To Study Decision support systems for EIA of transport infrastructures. Course outcome: CO 1 Understand the concept of Land-use plans, zoning schemes CO 2 Understand the concept of Environmental Impact Assessment (EIA) model for automobiles CO 3 Understand the concept of Magnetic Levitation. CO 4 Understand the concept of Bullet Trains model.	4					
To Study Bullet Trains model. To Study Modelling of impacts and scenario-based analysis. To Study Assessment of potential project impacts To Study Fog security Systems To Study Sustainable transportation systems To Study Decision support systems for EIA of transport infrastructures. Course outcome: CO 1 Understand the concept of Land-use plans, zoning schemes	5	To Study Establishment of baseline conditions w.r.t soi	l, water a	nd air	quality.	
To Study Modelling of impacts and scenario-based analysis. To Study Assessment of potential project impacts To Study Fog security Systems To Study Sustainable transportation systems To Study Decision support systems for EIA of transport infrastructures. Course outcome: CO 1 Understand the concept of Land-use plans, zoning schemes CO 2 Understand the concept of Environmental Impact Assessment (EIA) model for automobiles CO 3 Understand the concept of Magnetic Levitation. CO 4 Understand the concept of Bullet Trains model.	6	To Study Magnetic Levitation.				
To Study Assessment of potential project impacts To Study Fog security Systems To Study Sustainable transportation systems To Study Decision support systems for EIA of transport infrastructures. Course outcome: CO 1 Understand the concept of Land-use plans, zoning schemes CO 2 Understand the concept of Environmental Impact Assessment (EIA) model for k2 automobiles CO 3 Understand the concept of Magnetic Levitation. CO 4 Understand the concept of Bullet Trains model.	7	To Study Bullet Trains model.				
To Study Fog security Systems To Study Sustainable transportation systems To Study Decision support systems for EIA of transport infrastructures. Course outcome: CO 1 Understand the concept of Land-use plans, zoning schemes	8	To Study Modelling of impacts and scenario-based ana	lysis.			
To Study Sustainable transportation systems To Study Decision support systems for EIA of transport infrastructures. Course outcome: CO 1 Understand the concept of Land-use plans, zoning schemes		To Study Assessment of potential project impacts				
To Study Decision support systems for EIA of transport infrastructures. Course outcome: CO 1 Understand the concept of Land-use plans, zoning schemes						
Course outcome: CO 1 Understand the concept of Land-use plans, zoning schemes		To Study Sustainable transportation systems				
CO 1 Understand the concept of Land-use plans, zoning schemes CO 2 Understand the concept of Environmental Impact Assessment (EIA) model for automobiles CO 3 Understand the concept of Magnetic Levitation. K2 CO 4 Understand the concept of Bullet Trains model.	12	To Study Decision support systems for EIA of transport	infrastru	ctures.		
CO 1 Understand the concept of Land-use plans, zoning schemes CO 2 Understand the concept of Environmental Impact Assessment (EIA) model for automobiles CO 3 Understand the concept of Magnetic Levitation. K2 CO 4 Understand the concept of Bullet Trains model.	Course out	tcome:				
automobiles CO 3 Understand the concept of Magnetic Levitation. K2 CO 4 Understand the concept of Bullet Trains model.						K2
CO 4 Understand the concept of Bullet Trains model. K2		1	sment (E	EIA) n	nodel for	K2
	CO 3	Understand the concept of Magnetic Levitation.				K2
CO 5 Understand the concept of Fog security Systems K2	CO 4	Understand the concept of Bullet Trains model. K2				
	CO 5	Understand the concept of Fog security Systems				K2

Link: NPTEL/ YouTube/ Faculty Video Link:

1.

2.

https://www.youtube.com/watch?v=yDz5bRy7AgI

https://www.youtube.com/watch?v=pBwemNvHVkY

Course Co	ode AMSEM0551	L	T	P	Credit
Course Ti	tle Power drives and systems Lab	0	0	2	1
Course ob Students w	jective: vill be studying the experiments based on Power drives and	systems			
Pre-requis	sites: Student know the concept of Automobiles and sys	stems			
	Suggested list of Experiment Perform Ten experiment		of Ex	perim	ent
S. No.	Name of Experiments				
1	To Study 1-phase Half & Full Controlled Converter	,			
2	To study Characteristics of 1-phase Cycloconverter				
3	To study the construction of a three-phase induction	motor with the	he helj	of a n	nodel.
4	To study about the starters of three phase induction	motors			
5	To study about the power modulator & control unit.				
6	To perform the Speed control of DC shunt Motor by		ntrol.		
7	To Start DC shunt motor by using three-point starter				
8	To obtain the Speed control of DC shunt Motor by Field control.				
9	To study about the detailed structure of wind power				
10	To study about Traction motor: Starting, Speed-Tim	e characterist	ics		
11	To study about Poly-phase induction machines				
12	To study about Chopper controlled DC motor drives	,			
Course ou	tcome:				
CO 1	Understand the concept of Full Controlled Converter				K2
CO 2	Understand the concept of Characteristics of 1-phase Cyc	loconverter			K2
CO 3	Understand the concept of Traction motor: Starting, Speed-Time characteristics K2				
CO 4	Understand the concept of Poly-phase induction machines K2				
CO 5	Understand the concept of Chopper controlled DC motor	drives			K2
Link: NPT	TEL/ YouTube/ Faculty Video Link:				I
1.	https://www.youtube.com/watch?v=mPJxo_RnlFE				

https://www.youtube.com/watch?v=DBvCP-LL-mE

2