

GOVT. POLYTECHNIC, NAYAGARH
6TH SEMESTER MECHANICAL ENGINEERING 2025-26
LESSON PLAN

Subject: - Th.2 Automobile Engineering and Hybrid Vehicles
Name of Faculty: - Abinas Nayak, Lecturer Stage I
Session: - 22/12/2025 to 18/04/2026

Total Periods: - 60
Theory: - 4p/Week

Sl. No.	Week	Period	Topics To Be Covered
1	1st	1 st	Unit-1: Introduction & Transmission System: Automobiles: Definition, need and classification.
		2 nd	Layout of automobile chassis with major components (Line diagram).
		3 rd	Clutch System: Need and Types (Single & Multiple).
		4 th	Working principle of Clutch System with sketch.
Sl. No.	Week	Period	Topics To Be Covered
2	2nd	1 st	Gear Box: Purpose of gear box.
		2 nd	Construction and working of a 4-speed gear box.
		3 rd	Concept of automatic gear changing mechanisms.
		4 th	Propeller shaft: Constructional features.
Sl. No.	Week	Period	Topics To Be Covered
3	3rd	1 st	Differential: Need and Types.
		2 nd	Working principle of Differential.
		3 rd	Review of Transmission System components.
		4 th	Unit-1 Assessment / Doubt Clearing (End of 12 Periods).
Sl. No.	Week	Period	Topics To Be Covered
4	4th	1 st	Unit-2: Braking System: Braking systems in automobiles: Need and types.
		2 nd	Mechanical Brake: Construction and working.
		3 rd	Hydraulic Brake: Principle and working.
		4 th	Air Brake and Air assisted Hydraulic Brake.
Sl. No.	Week	Period	Topics To Be Covered
5	5th	1 st	Vacuum Brake; Review of Braking Systems.
		2 nd	Unit-3: Ignition & Suspension System: Battery ignition system description.
		3 rd	Magneto ignition system description.
		4 th	Spark plugs: Purpose, construction and specifications.
Sl. No.	Week	Period	Topics To Be Covered
6	6th	1 st	Common ignition troubles and remedies.
		2 nd	Conventional suspension system for Rear and Front axle.
		3 rd	Independent suspension system used in cars (coil spring).
		4 th	Independent suspension system (tension bars).
Sl. No.	Week	Period	Topics To Be Covered
7	7th	1 st	Telescopic shock absorber: Constructional features and working.
		2 nd	Unit-3 Review (Internal Assessment Syllabus Completed: Ch 1, 2, & 3).
		3 rd	Unit-4: Cooling and Lubrication: Engine cooling: Need and classification.
		4 th	Defects of cooling and their remedial measures.
Sl. No.	Week	Period	Topics To Be Covered
8	8th	1 st	Function of lubrication.
		2 nd	Lubrication System of I.C. engine (Splash/Pressure systems).
		3 rd	Lubrication System components and maintenance.
		4 th	Unit-4 Review / Class Test.
Sl. No.	Week	Period	Topics To Be Covered
9	9th	1 st	Unit-5: Fuel System: Air fuel ratio description.
		2 nd	Carburetion process for Petrol Engine.
		3 rd	Carburetor working principle and circuits.
		4 th	Multipoint fuel injection system (MPFI) for Petrol Engine.

Sl. No.	Week	Period	Topics To Be Covered
10	10th	1 st	Working principle of fuel injection system for multi cylinder Engine.
		2 nd	Filter for Diesel engine.
		3 rd	Fuel feed pump for Diesel engine: Working principle.
		4 th	Fuel Injector for Diesel engine: Working principle.
Sl. No.	Week	Period	Topics To Be Covered
11	11th	1 st	Comparison of Petrol and Diesel Fuel Systems.
		2 nd	Unit-5 Review / Doubt Clearing.
		3 rd	Unit-6: Electric and Hybrid Vehicles: Introduction, Social and Environmental importance.
		4 th	Description of Electric Vehicles and operational advantages.
Sl. No.	Week	Period	Topics To Be Covered
12	12th	1 st	Present performance and applications of Electric Vehicles.
		2 nd	Battery for Electric Vehicles: Introduction.
		3 rd	Battery types used in EVs.
		4 th	Fuel cells: Principles and application in vehicles.
Sl. No.	Week	Period	Topics To Be Covered
13	13th	1 st	Hybrid vehicles: Introduction and Concept.
		2 nd	Types of Hybrid Vehicles: Parallel configuration.
		3 rd	Types of Hybrid Vehicles: Series configuration.
		4 th	Types of Hybrid Vehicles: Parallel and Series combined configuration.
Sl. No.	Week	Period	Topics To Be Covered
14	14th	1 st	Drive train layouts for Hybrid/Electric vehicles.
		2 nd	Drive train components and function.
		3 rd	Solar powered vehicles: Introduction and Working.
		4 th	Future trends in Automobile Engineering (EV Focus).
Sl. No.	Week	Period	Topics To Be Covered
15	15th	1 st	Revision: Units 1 & 2 (Transmission & Braking).
		2 nd	Revision: Units 3 & 4 (Ignition/Suspension & Cooling/Lube).
		3 rd	Revision: Units 5 & 6 (Fuel Systems & Hybrids).
		4 th	Final Semester Examination Discussion / Record Submission.

References:

1. **Automobile Engineering** - R.B. Gupta, Satya Prakashan.
2. **Automobile Engineering Vol- I & II** - Dr. Kirpal Singh, Standard Publishers.
3. **Electric & Hybrid Vehicles - Design Fundamentals** - Iqbal Hussain, CRC Press.
4. **Statistical Electric & Hybrid Vehicles** - A.K. Babu, Khanna Publishing House.

Abinas Nayak
(Lecturer Stage I)