LESSON PLAN 2020-21

HYDRAULIC AND PNEUMATIC CONTROL (TH-3)

(From 19-04-2021 to 30-06-2021)

&

(From 01-07-2021 to 13-08-2021)

Semester - 4TH (Automobile Engineering)

Name of the teaching faculty - SIBASIS HARIHAR SAHU

BHUBANANANDA ODISHA SCHOOL OF ENGINEERING, CUTTACK

DEPARTMENT OF AUTOMOBILE ENGINEERING

LESSON PLAN

SUBJECT NAME - HYDRAULIC AND PNEUMATIC CONTROL (TH-3) **SEMESTER - 4TH**

TOTAL PERIODS – 60 **CLASSES ALLOTED PER WEEK - 4**

NAME OF TEACHING FACULTY – SIBASIS HARIHAR SAHU **SESSION - (2020-2021)**

Week & Date	No of periods allotted	Topics to be covered	Topics actually covered	Shortfall If any	Reason of shortfall	How to make up	Remarks / Signature With date
1st 19-04-2021 To 24-04-2021	3	**Dt. 19/04/2021** **1. Fluid Mechanics** **1.1** Fluid properties. Define fluid, description of fluid properties like Density, **Dt. 20/04/2021** Specific weight, specific gravity, specific volume, **Dt. 22/04/2021** Dynamic viscosity, kinematic viscosity, surface tension Capillary phenomenon.					
2nd 26-04-2021 To	4	**Dt. 26/04/2021** Solve simple numerical. **Dt. 27/04/2021**					

01-05-2021		**1.2** Measurement of pressure Concept of atmospheric pressure, gauge pressure, absolute pressure **Dt. 28/04/2021** Piezometer tube **Dt. 29/04/2021** simple & differential monometer					
3rd 03-05-2021 To 08-05-2021	4	**Dt. 03/05/2021** Micro Manometer (simple problems on manometers) Bourdon tube pressure gauge **Dt. 04/05/2021** **2. Hydro dynamics.** **2.1** Law of continuity and its application. **Dt. 05/05/2021** **2.2** Bernoulli's Theorem. Energy possessed by the liquid in motion, **Dt. 06/05/2021** Bernoulli's theorem and its applications such as venturimeter, orifice meter &pitot tube (Analytical treatment with derivation for measurement of discharge is expected) (Cont.)					

4th 10-05-2021 To 15-05-2021	4	**Dt. 10/05/2021** Bernoulli's theorem and its applications such as venturimeter, orifice meter &pitot tube (Analytical treatment with derivation for measurement of discharge is expected) **Dt. 11/05/2021** **2.3** Hydraulic Coefficients. Concept of vena contract. **Dt. 12/05/2021** Coefficient of contraction, coefficient of velocity, coefficient of discharge, **Dt. 13/05/2021** relation between the hydraulic coefficients.					
5th 17-05-2021 To 22-05-2021	4	**Dt. 17/05/2021** **2.4** Types of fluid flow Steady, unsteady **Dt. 18/05/2021** rotational, irrotational, laminar, turbulent **Dt. 19/05/2021** one, two & three dimensional flow, uniform & non uniform flow. **Dt. 20/05/2021**					

		3. Hydraulic Devices. **3.1** Simple Hydraulic devices. Working principles, construction and applications of hydraulic jack,					
6th 24-05-2021 To 29-05-2021	4	**Dt. 24/05/2021** hydraulic Ram, **Dt. 25/05/2021** hydraulic lift, **Dt. 26/05/2021** hydraulic press **Dt. 27/05/2021** **3.2** Centrifugal Pumps. Types, construction & working of centrifugal pump					
7th 31-05-2021 To 05-06-2021	4	**Dt. 31/05/2021** Types of casing **Dt. 01/06/2021** Need of priming, Heads, Losses & efficiencies of centrifugal pump (NO analytical treatment). **Dt. 02/06/2021** Net positive suction head, **Dt. 03/06/2021** fault finding &remedies, pump selection.					
8th 07-06-2021	3	**Dt. 07/06/2021** **3.3** Reciprocating Pumps.					

To 12-06-2021		Constriction and working of single & double acting reciprocating pump (Cont.) **Dt. 08/06/2021** Constriction and working of single & double acting reciprocating pump **Dt. 09/06/2021** positive & negative slip.					
9th 14-06-2021 To 19-06-2021	2	**Dt. 16/06/2021** Air vessels- their function & advantages **Dt. 17/06/2021** Air vessels- their function & advantages					
10th 21-06-2021 To 26-06-2021	4	**Dt. 21/06/2021** **3.6** Describe construction and working of cupola and crucible furnace. (Cont.) **Dt. 22/06/2021** Reasons of cavitations & separation. **Dt. 23/06/2021** **4. Basic components of Hydraulic & Pneumatic systems.** **4.1** Hydraulic & Pneumatic system components. (Cont.) **Dt. 24/06/2021**					

		Hydraulic & Pneumatic system components					
11th 28-06-2021 To 30-06-2021	3	**Dt. 28/06/2021** **4.2** Air Motors. (Cont.) **Dt. 29/06/2021** Air Motors **Dt. 30/06/2021** **4.3** Hydraulic Actuator – single and double cylinder (Cont.)					

11th 01-07-2021 To 03-07-2021	1	**Dt. 01/07/2021** 4.3 Hydraulic Actuator – single and double cylinder					
12th 05-07-2021 To 10-07-2021	4	**Dt. 05/07/2021** **4.4** Valves: Classification of valves, pressure control **Dt. 06/07/2021** directional control, sequencing, **Dt. 07/07/2021** Synchronizing **Dt. 08/07/2021** low control valve.					

13th 12-11-2021 To 17-07-2021	3	**Dt. 13/07/2021** **5. Accessories of hydraulic & pneumatic circuit.** **5.1** Filters: Type, functions, construction (Cont.) **Dt. 14/07/2021** Filters: Type, functions, construction (Cont.) **Dt. 15/07/2021** Filters: Type, functions, construction					
14th 19-07-2021 To 24-07-2021	3	**Dt. 19/07/2021** **5.2** Hoses & connectors: Type, construction and applications. (Cont.) **Dt. 20/07/2021** Hoses & connectors: Type, construction and applications. **Dt. 22/07/2021** **5.3** Seals and gaskets: Types, function, construction (Cont.)					
15th 26-07-2021 To 31-07-2021	4	**Dt. 26/07/2021** Seals and gaskets: Types, function, construction (Cont.) **Dt. 27/07/2021** Seals and gaskets: Types, function, construction. **Dt. 28/07/2021** **6. Hydro Pneumatic Systems**					

		& Circuits **6.1** Comparison of Hydraulic and Pneumatic circuits. (Cont.) **Dt. 29/07/2021** Comparison of Hydraulic and Pneumatic circuits.					
16th 02-08-2021 To 07-08-2021	4	**Dt. 02/08/2021** **6.2** Hydraulic Circuits: Meter in, Meter out, **Dt. 03/08/2021** Bleed off **Dt. 04/08/2021** Sequencing **Dt. 05/08/2021** Applications of hydraulic circuits					
17th 09-08-2021 To 13-08-2021	4	**Dt. 09/08/2021** **6.3** Simple Pneumatic Circuits. Speed Control Circuits **Dt. 10/08/2021** Sequencing circuits **Dt. 11/08/2021** Application of Pneumatic Circuits **Dt. 12/08/2021** Final Revision					

LESSON PLAN 2020-21

ELECTRIC & HYBRID AND EMISSION CONTROL (TH-4 (B))

(From 19-04-2021 to 30-06-2021)

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Semester - 6^{TH} (Automobile Engineering)

Name of the teaching faculty - SIBASIS HARIHAR SAHU

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LESSON PLAN

SUBJECT NAME – ELECTRIC & HYBRID AND EMISSION CONTROL (TH-4 (B)) **SEMESTER - 6TH**

TOTAL PERIODS – 60 **CLASSES ALLOTED PER WEEK - 4**

NAME OF TEACHING FACULTY – SIBASIS HARIHAR SAHU **SESSION - (2020-2021)**

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1st 19-04-2021 To 24-04-2021	3	**Dt. 20/04/2021** **1. ELECTRIC VEHICLE** Introduction **Dt. 22/04/2021** Need for electric vehicle **Dt. 23/04/2021** Problems of electric vehicles – (range and batteries, charging, lack of performance, purchase price, safety and reliability)					
2nd 26-04-2021 To 01-05-2021	4	**Dt. 27/04/2021** Advantage of electric vehicle **Dt. 28/04/2021** Disadvantage of electric vehicle **Dt. 29/04/2021**					

		Major component of electric vehicle – (motor, battery, charger, controller, DC converter, energy management system) **Dt. 30/04/2021** **2. CLASSIFICATION OF EVs** Battery electric vehicle (BEV)- (advantage, disadvantage, application) (Cont.)					
3rd 03-05-2021 To 08-05-2021	4	**Dt. 04/05/2021** Battery electric vehicle (BEV)- (advantage, disadvantage, application) **Dt. 05/05/2021** Hybrid Electric Vehicle (HEV)- (advantage, disadvantage, application (Cont.) **Dt. 06/05/2021** Hybrid Electric Vehicle (HEV)- (advantage, disadvantage, application **Dt. 07/05/2021** Plug-In Hybrid Electric vehicle (PHEV) – (advantage, disadvantage, application) (Cont.)					

4th 10-05-2021 To 15-05-2021	3	**Dt. 11/05/2021** Plug-In Hybrid Electric vehicle (PHEV) – (advantage, disadvantage, application) **Dt. 12/05/2021** Energy sources (battery, ultra capacitors, flywheels ,fuel cells) (Cont.) **Dt. 13/05/2021** Energy sources (battery, ultra capacitors, flywheels ,fuel cells)					
5th 17-05-2021 To 22-05-2021	4	**Dt. 18/05/2021** Requirements of EVs energy sources **Dt. 19/05/2021** Battery – requirement of EV batteries, selection of battery, deep cycle battery **Dt. 20/05/2021** Types of battery for EVS (lead-acid battery, lithium-ion battery) and their advantages and disadvantages (Cont.) **Dt. 21/05/2021** Types of battery for EVS (lead-acid battery, lithium-ion battery) and their advantages and disadvantages					

6th 24-05-2021 To 29-05-2021	4	**Dt. 25/05/2021** Ultra capacitor and its working principle **Dt. 26/05/2021** Flywheel and its advantage and disadvantage **Dt. 27/05/2021** **3. ELECTRIC MOTOR** Electric motor Requirements of EV motor **Dt. 28/05/2021** Brushed DC motor (Cont.)					
7th 31-05-2021 To 05-06-2021	4	**Dt. 01/06/2021** Brushed DC motor **Dt. 02/06/2021** Brushless DC motor (Cont.) **Dt. 03/06/2021** Brushless DC motor **Dt. 04/06/2021** Switched reluctance motor (Cont.)					
8th 07-06-2021 To 12-06-2021	3	**Dt. 08/06/2021** Switched reluctance motor **Dt. 09/06/2021** AC induction motor (Cont.) **Dt. 11/06/2021** AC induction motor					
9th 14-06-2021	3	**Dt. 16/06/2021** Indian electric vehicle (4					

To 19-06-2021		wheeler, 3 wheeler, 2 wheeler) (Cont.) **Dt. 17/06/2021** **3.4** Classify different pattern Indian electric vehicle (4 wheeler, 3 wheeler, 2 wheeler) (Cont.) **Dt. 18/06/2021** Indian electric vehicle (4 wheeler, 3 wheeler, 2 wheeler)					
10th 21-06-2021 To 26-06-2021	4	**Dt. 22/06/2021** Revision and Doubt Clearing **Dt. 23/06/2021** Internal Assessment **Dt. 24/06/2021** **4. HYBRID VEHICLES** Hybrid electric vehicle (HEV) (Cont.) **Dt. 25/06/2021** Hybrid electric vehicle (HEV)					
11th 28-06-2021 To 30-06-2021	2	**Dt. 29/06/2021** Advantage and disadvantage of HEV (Cont.) **Dt. 30/06/2021** Advantage and disadvantage of HEV					

11th 01-07-2021 To 03-07-2021	2	**Dt. 01/07/2021** Components of HEV (Cont.) **Dt. 02/07/2021** Components of HEV					
12th 05-07-2021 To 10-07-2021	4	**Dt. 06/07/2021** Working of hybrid vehicle (Cont.) **Dt. 07/07/2021** Working of hybrid vehicle **Dt. 08/07/2021** Hybridization (micro hybrid, mild hybrid, full hybrid) (Cont.) **Dt. 09/07/2021** Hybridization (micro hybrid, mild hybrid, full hybrid)					
13th 12-11-2021 To 17-07-2021	4	**Dt. 13/07/2021** Fuel cell electric vehicle (FCEV) working principle, advantages and disadvantages (Cont.) **Dt. 14/07/2021** Fuel cell electric vehicle (FCEV) working principle, advantages and disadvantages (Cont.) **Dt. 15/07/2021** Fuel cell electric vehicle (FCEV) working principle,					

		advantages and disadvantages **Dt. 16/07/2021** **5. VEHICLE EMISSION CONTROL TECHNOLOGIES** Advanced Engine Design					
14th 19-07-2021 To 24-07-2021	3	**Dt. 20/07/2021** Variable Valve Timing **Dt. 22/07/2021** Turbo charging Systems **Dt. 23/07/2021** Catalytic Converters					
15th 26-07-2021 To 31-07-2021	4	**Dt. 27/07/2021** The Two-Way Catalyst **Dt. 28/07/2021** The Three-Way Catalyst **Dt. 29/07/2021** Diesel Oxidation Catalyst (DOC) **Dt. 30/07/2021** Selective Catalytic Reduction (SCR) (Cont.)					
16th 02-08-2021 To 07-08-2021	4	**Dt. 03/08/2021** Selective Catalytic Reduction (SCR) **Dt. 04/08/2021** Nitrogen–Oxide (NOx) Adsorber Catalyst (Cont.) **Dt. 05/08/2021**					

		Nitrogen–Oxide (NOx) Adsorber Catalyst **Dt. 06/08/2021** The Diesel Particulate Filter (DPF)					
17th 09-08-2021 To 13-08-2021	4	**Dt. 10/08/2021** Exhaust Gas Recirculation (EGR) (Cont.) **Dt. 11/08/2021** Exhaust Gas Recirculation (EGR) **Dt. 12/08/2021** Crankcase Emission Control Syste **Dt. 13/08/2021** Final revision					