

Program : <b>Diploma in Automobile Engineering</b>	
Course Code : <b>5059A</b>	Course Title: <b>Automotive Power Train Control Systems Lab</b>
Semester : <b>5</b>	Credits: <b>1.5</b>
Course Category: <b>Program Elective</b>	
Periods per week: <b>3 (L:0, T:0, P:3)</b>	Periods per semester: <b>45</b>

### Course Objectives:

- To familiarize and experiment with various components of Automotive power train components.
- To identify and explain the functional requirements, inter relationship of the components involved in the power train control systems.

### Course Prerequisites:

Topic	Course code	Course name	Semester
Knowledge about Engine system and Power Train		Internal Combustion Engines	3
		Automobile Electrical and Electronics Systems	3
		Automotive Chassis and Transmission	4

### Course Outcomes:

On completion of the course, the student will be able to:

CO <sub>n</sub>	Description	Duration (Hours)	Cognitive Level
CO1	Experiment with various sensors used in control system	11	Applying
CO2	Utilize various actuators used in control system	9	Applying
CO3	Make use of various Engine Control systems	12	Applying
CO4	Experiment with Automatic Transmission	10	Applying
	Lab Exam	3	

**CO – PO Mapping:**

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
<b>CO1</b>	3			2		2	2
<b>CO2</b>	3			2			
<b>CO3</b>	3			2		2	2
<b>CO4</b>	3			2			

3-Strongly mapped, 2-Moderately mapped, 1-Weakly mapped

**Course Outline:**

Module Outcomes	Description	Duration (Hours)	Cognitive Level
<b>CO1</b>	<b>Experiment with various sensors used in control system</b>		
M1.01	Experiment with Temperature sensor	2	Applying
M1.02	Experiment with pressure sensor	2	Applying
M1.03	Make use of Mass air flow sensor	2	Applying
M1.04	Experiment with Oxygen sensor	2	Applying
M1.05	Utilize Position sensor-Position/speed sensor	2	Applying
M1.06	Experiment with Knock sensor	1	Applying
<b>CO2</b>	<b>Utilize various actuators used in control system</b>		
M2.01	Make use of Solenoid-switches	3	Applying
M2.02	Experiment with relays	3	Applying
M2.03	Experiment with motors	3	Applying
	Lab Exam – I	1.5	
<b>CO3</b>	<b>Make use of various Engine Control systems</b>		
M3.01	Utilize engine diagnostic machine	2	Applying
M3.02	Plan testing of engine with analyzer	4	Applying
M3.03	Experiment with EGR Control	2	Applying

M3.04	Experiment with Variable valve timing control	2	Applying
M3.05	Utilize Distributor less Ignition control.	2	Applying
<b>CO4</b>	<b>Experiment with Automatic Transmission</b>		
M4.01	Make use of automatic transmission	6	Applying
M4.02	Experiment with traction control	4	Applying
	Open Ended Projects**		Applying
	Lab Exam – II	1.5	

\*\* - Suggested Open Ended Projects

(Not for End Semester Examination but compulsory to be included in Continuous Internal Evaluation. Students can do open ended experiments as a group of 2-3. There is no duplication in experiments between groups. Open ended experiments should include the concepts of arrays, functions and structures)

1. Prepare charts of sensors used in modern automobiles.
2. Prepare a report on modern control systems of selected automobiles.

**Text / Reference:**

<b>T/R</b>	<b>Book Title/Author</b>
T1	Advanced Automotive Fault Diagnosis, Automotive Technology: Vehicle Maintenance and Repair, Tom Denton, Routledge
R1	Automotive Technology: A Systems Approach by Jack Erjavec, Cengage Learning
R2	Automotive Technology: Principles, Diagnosis, and Service by James D. Halderman, Prentice Hall
R3	Automotive Suspension & Steering Systems (Classroom Shop Manuals), Don Knowles, Cengage learning
R4	Automotive Mechanics, Anglin And Crouse, McGraw-Hill

**Online Resources:**

<b>Sl.No</b>	<b>Website Link</b>
1	<a href="https://www.electronicproducts.com/10-hot-sensors-for-automotive/">https://www.electronicproducts.com/10-hot-sensors-for-automotive/</a>
2	<a href="https://studentlesson.com/car-sensors-definition-functions-diagram-types-working/">https://studentlesson.com/car-sensors-definition-functions-diagram-types-working/</a>
3	<a href="https://www.nonda.co/blogs/news/what-is-a-car-diagnostic-test">https://www.nonda.co/blogs/news/what-is-a-car-diagnostic-test</a>
4	<a href="https://www.youtube.com/watch?v=h9-6dkjMmQ4">https://www.youtube.com/watch?v=h9-6dkjMmQ4</a>
5	<a href="https://www.youtube.com/watch?v=u_y1S8C0Hmc">https://www.youtube.com/watch?v=u_y1S8C0Hmc</a>