Program : **Diploma in Automobile Engineering**	
Course Code : **3058**	Course Title: **Automobile Electrical & Electronics Lab**
Semester : **3**	Credits: **1.5**
Course Category: **Program Core**	
Periods per week: **3 (L:0, T:0, P:3)**	Periods per semester: **45**

CourseObjectives:

- To understand the complete procedure of dismantling, cleaning, and inspection, fault finding/rectifying and reassembling of components of automobile electrical and electronic systems.

Course Prerequisites:

Topic	Course code	Course name	Semester
Knowledge about working of engines		Basic Automobile Engineering	2

Course Outcomes:

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

COn	Description	Duration (Hours)	Cognitive Level
CO1	Identify various tests on lead acid battery	10	Applying
CO2	Experiment with alternator and starter motor	9	Applying
CO3	Identify the various troubles relating to ignition system	9	Applying
CO4	Select various wiring circuits of automobile.	14	Applying
	Lab Exam	3	

CO – PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3			2		2	2
CO2	3			2			
CO3	3			2			
CO4	3			2		2	2

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

Course Outline:

Module Outcomes	Description	Duration (Hours)	Cognitive Level
CO1	**Identify various tests on lead acid battery**		
M1.01	Make use of Specific gravity test on lead acid battery	2	Applying
M1.02	Plan Voltage test on lead acid battery	2	Applying
M1.03	Utilize Load test on lead acid battery	2	Applying
M1.04	Apply Electrical drain test on lead acid battery	2	Applying
M1.05	Apply Electronic conductance test on lead acid battery	2	Applying
CO2	**Experiment with alternator and starter motor.**		
M2.01	Experiment with alternator (physical inspection and overhauling)	1	Applying
M2.02	Make use of voltage output test, current output test and ac leakage test on alternator	2	Applying
M2.03	Organize testing of alternator stator, rotor and rectifier	1	Applying
M2.04	Experiment with starter motor (physical inspection and overhauling)	1	Applying
M2.05	Make use of drop test, control circuit test and starter amperage test on starter motor	2	Applying
M2.06	Experiment with solenoid, armature and field coil of starter motor.(Inspection and testing)	2	Applying
M2.07	Lab Exam I	1.5	

CO3	**Identify the various troubles relating to ignition system**		
M3.01	Develop the wiring circuit of ignition system	2	Applying
M3.02	Organize no start diagnosis of a spark ignition engine	2	Applying
M3.03	Identify the testing of ignition coil and ignition sensors	2	Applying
M3.04	Experiment with spark plug	1	Applying
M3.05	Plan ignition timing setting	2	Applying
CO4	**Select various wiring circuits of automobile.**		
M4.01	Identify wiring circuits in various vehicles including wiring harness, color codes and cable specifications	1	Applying
M4.02	Construct wiring of headlight circuit	2	Applying
M4.03	Build the wiring of horn circuit	2	Applying
M4.04	Construct the wiring of turn signal circuit	2	Applying
M4.05	Build wiring of wiper and washer circuit	2	Applying
M4.06	Construct the wiring of brake light circuit	1	Applying
M4.07	Build the wiring of power window circuit	2	Applying
M4.08	Build the wiring of power door lock circuit	2	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.)

1. Identify the condition of the given lead acid battery by conducting various tests.
2. Experiment with a given starter motor.
3. Identify the causes of ‘no output’ for the given alternator.
4. Utilize no start diagnosis on the given spark ignition engine.
5. Experiment with given power window for mal functioning.

Text /Reference:

T/R	Book title/Author
T1	Automobile Engineering Practical / N. Malhotra
R1	Automotive Technology: Principles, Diagnosis, and Service by James D. Halderman, Prentice Hall
R2	Automotive Technology: A Systems Approach by Jack Erjavec, Cengage Learning
R3	Automobile Electrical and Electronic Systems by Tom Denton, Elsevier
R4	Automobile Engineering Vol-2 by Kirpal Singh, Standard Publications
R5	Automobile Electrical Equipment by Kohli, Tata McGraw-Hill

Online Resources:

Sl.No	Website/Link
1	https://www.youtube.com/watch?v=Nq5mnn9xMGM
2	https://www.wikihow.com/Check-Lead-Acid-Battery-Health
3	https://www.instructables.com/How-to-Rebuild-a-Starter-Motor/
4	https://www.youtube.com/watch?v=Qvz_RNwq-Yg