	Course Title: **Automobile Engineering Lab-I**	Course Code:15AT13P
	Credits (L:T:P) : **0:2:4** **Credit:3**	Core/ Elective: **Core**
	Type of course: **Practical**	Total Contact Hours: **78**
CIE- 25 Marks		SEE- 50 marks

Pre-requisites:

Basic knowledge of science principles.

Course objective:

1. Develop the skill of efficiently using basic workshop tools and gauges.
2. Identifying and locating different components of Automobile.
3. Develop the skill of disassembling and assembling of single cylinder engines.
4. Learn the process of cleaning and basic tune up of two and four wheelers.

On successful completion of the course, the students will be able to attain CO:

Course Outcome		CL	Experiments linked	Linked PO	Teaching Hrs
CO1	Understand the use of different tools and measuring instruments.	***U/A***	1,2,3,9,10	1,2,3,4,8,9,10	**21**
CO2	Identify the different components of two wheeler and four wheelers.	***U/A***	4,5	1,2,3,4,8,9,10	**06**
CO3	Practice on dissemble and assemble of the two stroke and four stroke engines of two wheelers using proper tools and equipments.	***U/A***	6,7,8,11	1,2,3,4,8,9,10	**24**
CO4	Understand the working of valve operating mechanism and measure the valve tappet clearance.	***U/A***	12	1,2,3,4,8,9,10	**3**
C05	Practice on changing different control cables of two wheelers using proper tools.	***U/A***	17,18	1,2,3,4,8,9,10	**12**
C06	Practice on washing and cleaning of different vehicle.	U/A	13,14,15,16	1,2,3,4,8,9,10	12
		Total sessions			**78**

COURSE PO ATTAINMENT MATRIX

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Automobile Engineering Lab-I	**3**	**3**	**3**	**3**	**-**	**-**	**-**	**3**	**3**	**3**

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

Course contents:

Sl No	List of Graded Exercises:	Hours
1	Safety precautions in automobile workshop.	**03**
2	Identification of tools, special tools, gauges and equipments used in Automobile workshop.	**06**
3	Practice on use of tools and gauges used in workshop.	**06**
4	Identification of major components in Two-wheeler and three wheeler.	**03**
5	Identification of major components in Four-wheeler.	**03**
6	Practice on dismantling and assembling of Two-stroke single cylinder petrol engine.	**09**
7	Practice on dismantling and assembling of Four-stroke single cylinder petrol engine.	**09**
8	Calculate the swept volume & compression ratio of a single cylinder engine assuming the clearance volume.	**03**
9	Practice on use of Torque wrench.	**03**
10	Check the compression pressure of a given petrol engine using Compression gauge.	**03**
11	Practice on adjusting belt tension of cooling / charging system.	**03**
12	Identification of components of valve operating mechanism and adjust the tappet clearance.	**03**
13	Measuring the wheel base, wheel track and ground clearance of LMV.	**03**
14	Practice on using different jacks to remove wheels from vehicle and.	**03**
15	Practice on removal of tyre from disc and mending the punctured tubes using hot patch and cold patch.	**03**
16	Practice on High pressure washing of different vehicles.	**03**
17	Practice on adjusting/changing the different control cables and drive chain of two wheelers.	**09**
18	Practice on Cleaning and adjustment of spark plug gap.	**03**
	Total hours	**78**

Course Assessment and Evaluation:

	What		To Whom	Frequency	Practical	Evidence Collected	Course Outcomes
DIRECT ASSESSMENT	CIE - Continuous Internal Evaluation	I A Tests	Students	Two IA tests for Practical (Average of two IA test marks)	**10**	Blue Books	1 to 6
		Record writing/Quiz		Record writing (Average marks of each exercise)	**10**	Lab Record	1 to 6
				Activity	05	Report, rubrics chart	1 to 6
				TOTAL	**25**		
	SEE – Semester End Examination	End Exam		End Of the Course	**50**	Answer Scripts at BTE	ALL CO's
INDIRECT ASSESSMENT METHODS	Student Feedback on course		Students	Middle Of The Course		Feedback forms	1 - 3
	End Of Course Survey			End Of The Course		Questionnaire	ALL CO's

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note:

1. I.A. test shall be conducted as per SEE scheme of valuation. However obtained marks shall be reduced to 10 marks. Average marks of two tests shall be rounded off to the next higher digit.
2. Rubrics to be devised appropriately by the concerned faculty to assess Mini project/Student activities.

MODEL OF RUBRICS FOR ASSESSING STUDENT ACTIVITY/MINI PROJECT:

Note: The dimensions have to be decided by the teacher based on the type of activity.

Dimension	Scale					Students Score				
	Unsatisfactory (1 marks)	Developing (2marks)	Satisfactory (3marks)	Good(4 marks)	Exemplary (5marks)	1	2	3	4	5
1. Research and gather information	Does not collect information relate to topic	Collects very limited information, some relate to topic	Collects basic information, most refer to the topic	Collects more information, most refer to the topic	Collects a great deals of information, all refer to the topic	2				
2.Full fills teams roles and duties	Does not perform any duties assigned to the team role	Performs very little duties	Performs nearly all duties	Performs almost all duties	Performs all duties of assigned team roles	3				
3.Shares work equally	Always relies on others to do the work	Rarely does the assigned work, often needs reminding	Usually does the assigned work, rarely needs reminding	Always does the assigned work, rarely needs reminding.	Always does the assigned work, without needing reminding	4				
4. listen to other team mates	Is always talking, never allows anyone to else to speak	Usually does most of the talking, rarely allows others to speak	Listens, but sometimes talk too much,	Listens and talks a little more than needed.	Listens and talks a fare amount	5				
Grand Average/Total= (2+3+4+5)=14/4=3.5=4						4				

Resources:

SlNo	Title of the book	Author Name	Publisher
01	Mechanic Motor Vehicle Trade theory and Practical	----------	National Instructional Media Institute, Chennai
02	Automobile Engineering Practices.	N.Malhotra	Asian publishers
03	Vehicle Maintenance &Garage Practice	Jigar A Doshi	PHI Learning,Delhi

SCHEME OF EVALUATION

Serial no	Description	Marks
1	**Writing procedure** a) One exercise from list of exercises 1-9 b) One exercise from list of exercises 10-18	(05+05) = **10**
2	**Conducting & Performance** a) One exercise from list of exercises 1-9 b) One exercise from list of exercises 10-18	(15+15) =**30**
3	**Viva-voice**	**10**
	Total	**50**

Note: Lab Record is compulsory for Practical Examination.

LIST OF TOOLS AND EQUIPMENTS:

Sl No	Tools/ Equipment	Quantity
1.	Open end spanner set.	02
2.	Ring spanner set.	02
3.	Tubular spanner set.	02
4.	Socket set.	02
5.	Allen key set.	02
6.	Pipe wrench.	02
7.	Adjustable screw wrench.	02
8.	Torque wrench.	02
9.	Water pump pliers.	02
10.	Vice grip pliers.	02
11.	Combination pliers.	02
12.	Nose pliers.	02
13.	Circlip pliers.(inside, outside, straight bent)	02 each
14.	screw driver (star, flat).	02 set
15.	Hammers (ball peen, sledge).	02 each
16.	Mallets.	02
17.	Wheel spanners.	02
18.	Tyre levers.	02 each
19.	Pneumatic wrench.	02
20.	Electrical wrench.	02
21.	Spark plug spanner.	02
22.	Chisels.	02 each
23.	Punches (hallow, solid)	02 each
24.	scrapers.	02 each
25.	Files.	02 each
26.	Speed handle.	02
27.	Oil can.	02
28.	Tyre pressure gauge.	02
29.	Compression gauge.	02
30.	Vacuum gauge.	02
31.	Feeler gauge.	02
32.	Bench vice.	02
33.	Leg vice.	01
34.	Harbour press.	01
35.	Two wheeler lifting platform.	01
36.	Spark plug cleaning and testing machine.	01
37.	Valve spring compressors.	02
38.	Oil filter wrench.	01
39.	Trays. (1X1mt).	08
40	Two stroke single cylinder petrol engine	02
41	Four stroke single cylinder petrol engine	02
42	Two wheeler chassis	01
43	Three wheeler chassis	01
44	Four wheeler chassis	01

45	High pressure car washer.	01
46	High pressure greasing bucket.	01
47	Air compressor.	01
48	Hydraulic hoist.	01
49	Two post lift.	01
50	Hand greasing gun (lever type, push type).	02 each
51	Vulcanizing machine.	02
52	Steel props	08
53	Mechanic Tool kit	02

MODEL QUESTIONS

1. Dismantle the given Two-stroke single cylinder petrol engine and list the missing parts.
2. Dismantle the given Two-stroke single cylinder petrol engine and list the missing parts.
3. Tighten the given engine cylinder head bolts with Torque wrench, according to its specifications.
4. Calculate the swept volume & compression ratio of a single cylinder engine assuming the clearance volume.
5. Check the compression pressure of a given petrol engine using Compression gauge.
6. Adjust the belt tension of cooling/charging system of the given Engine.
7. Identify the components of valve operating mechanism and adjust the tappet clearance.
8. Measure the wheel base, wheel track and ground clearance of given light motor vehicle and record the readings.
9. Change the brake cable of given two wheeler.
10. Clean and adjust the spark plug gap to specified value.
11. Change the clutch cable of given two wheeler.
12. Change the accelerator cable of given two wheeler.
13. Service the given two wheeler using high pressure washing
14. Service the given four wheeler using high pressure Car washing machine.