	Course Title: Automobile Engineering Lab-II	Course Code:**15AT22P**
	Credits (L:T:P) : **0:2:4**	Core/ Elective: **Core**
	Type of course: **Tutorial &Practical**	Total Contact Hours: **78**
CIE- 25 Marks		SEE- 50 marks

Pre-requisites:

Basic knowledge of Automobile engines.

Course objective:

1. Identifying and locating different components of fuel feed systems in SI and CI engines.
2. Identifying and locating different components of cooling and lubrication system.
3. Understand the servicing of different components of fuel feed systems in SI and CI engines.
4. Understand the servicing of different components of cooling and lubrication system.

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

Course Outcome		CL	Experiments linked	Linked PO	Teaching Hrs
CO1	Practice on inspection, testing and servicing of different components of fuel feed systems in SI and CI engines.	***U/A***	1,2,3,4,5,6,7,8,9,10,11,12,13	1,2,3,4,8,9,10	**57**
CO2	Practice on inspection, testing and servicing of different components of cooling system in engines.	***U/A***	14,15,16	1,2,3,4,8,9,10	**09**
CO3	Practice on inspection and servicing of different components of lubrication system in engines.	***U/A***	17,18,19,20	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-II	**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	Identification of different components in Fuel supply system of Petrol engines	03
2	Inspection and cleaning of fuel tank & fuel lines.	03
3	Servicing and testing of AC mechanical fuel pump.	03
4	Servicing and testing of Electrical fuel pump.	03
5	Servicing of Two wheeler carburettor and Identify its different circuits	06
6	Servicing of SU carburettor and identify its different circuits	06
7	Identification of different components in Fuel supply system of Diesel engines.	03
8	Servicing of Air cleaners.	03
9	Replacing of petrol and diesel Fuel filters	03
10	Servicing of Plunger type Fuel feed pump.	03
11	Servicing of diesel Fuel injection pump.	12
12	Servicing and testing of diesel Fuel injectors.	06
13	Bleeding of diesel fuel feed system.	03
14	Servicing of Radiator.	03
15	Cleaning of water jackets by reverse flushing method.	03
16	Servicing of water pump.	03
17	Replacing of engine oil and oil filters	03
18	Servicing of Gear type oil pump.	03
19	Servicing of Rotor type oil pump.	03
20	Servicing of vane type oil pump.	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 tests marks are considered)	**10**	Blue Books	1 to 3
		Record writing/Quiz		Record writing (Average marks of each exercise to be computed)	**10**	Record + Log of activity sheet	1 to 3
				Student activity	05	Report and rubrics chart	1 to 3
				TOTAL	**25**		
	SEE – Semester End Examination	End Exam		End Of the Course	**50**	Answer Scripts	ALL CO's
INDIRECT ASSESSMENT METHODS	Student Feedback on course		Students	Middle Of The Course		Feedback forms	1
	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

Note: The dimensions and scales has 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 any one to else to speak	Usually does most of the talking, rarely allows others to speak	Listens, but some times 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)/4=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 Practicles.	N.Malhotra	Asian publishers
03	Bosch/Delphi/Lucas TVS Service Manuals	---------	Mico Bosch
04	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 **1-10** b) One exercise from list of exercises **11-20**	(05+05) = **10**
2	**Conducting & Performance** a) One exercise from list of exercises **1-10** b) One exercise from list of exercises **11-20**	(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/Equipments	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 plier.	02
11.	Combination plier.	02
12.	Nose plier.	02
13.	Circlip plier.(inside, outside, straight bent)	02 each
14.	screw driver(star, flat).	02 set
15.	Hammers (ball peen, sledge).	02 each
16.	Mallets.	02
17.	Pneumatic wrench.	02
18.	Electrical wrench.	02
19.	Spark plug spanner.	02
20.	Chisels.	02 each
21.	Punches (hallow, solid)	02 each
22.	Scrapers.	02 each
23.	Files.	02 each
24.	Speed handle.	02
25.	Oil can.	02
26.	Vacuum gauge.	02
27.	Feeler gauge.	02
28.	Bench vice.	02
29.	Leg vice.	01
30.	Harbour press.	01
31.	Two wheeler lifting platform.	01
32.	Valve spring compressors.	02
33.	Oil filter wrench.	01
34.	Trays.	08
35.	Four stroke petrol engine	02
36.	Four stroke Diesel engine.	02
37.	High pressure car washer.	01
38.	Air compressor.	01
39.	Hydraulic hoist.	01
40.	Two post lift.	01
41.	Hand greasing gun (lever type, push type).	02 each
42.	Steel props	08
43.	Injector Testing Machine	01
44.	Bosch Servicing kit for Inline FIP	02

45.	Fuel tanks	02
46.	A C Mechanical fuel pump	02
47.	Electrical fuel pump	02
48.	Two wheeler carburettor	04
49.	SU/CV Carburettor	04
50.	Air Cleaners	04
51.	Petrol fuel filters	04
52.	Diesel fuel filters	04
53.	Diesel fuel feed pump	04
54.	Diesel fuel injection pump	02
55.	Diesel fuel injectors(Hole and pin type)	02 Each
56.	Radiators	04
57.	Water pumps	04
58.	Oil pumps(Gear, Rotor and Vane type)	02 Each

MODEL QUESTIONS

1. Service the given fuel tank with fuel lines.
2. Service the given AC mechanical fuel pump and test the same.
3. Service the given Electrical fuels pump and test the same.
4. Service the given two wheeler carburettor and identify its circuits.
5. Service the given S U carburettor and identify its circuits.
6. Remove the air filter element from the vehicle and service the same.
7. Remove the petrol filter from the vehicle and service the same.
8. Remove the Diesel filter from the vehicle and service the same.
9. Remove the fuel feed pump from the engine and service the same.
10. Remove the inline fuel injection pump from the engine and service the same.
11. Remove the diesel injectors from the engine and service the same.
12. Conduct the experiment to test the given diesel injectors.
13. Conduct the experiment to bleed the diesel fuel feed system.
14. Remove the radiator from the vehicle and service the same.
15. Conduct the experiment to reverse flush the cooling system.
16. Remove the water pump from the engine and service the same.
17. Remove the gear type oil pump from the engine and service the same.
18. Remove the rotor type oil pump from the engine and service the same.
19. Remove the vane type oil pump from the engine and service the same.

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