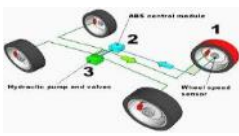


Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bangalore

	COURSE TITLE: ADVANCED AUTOMOBILE SYSTEMS LAB		
	Scheme (L:T:P) : 0:2:4	Total Contact Hours: 78	Course & Code: 15AT56P
	Type of Course: Tutorial and practice	Credit :03	Core/ Elective: Core(practice)
CIE- 25 Marks		SEE- 50 Marks	

Prerequisites: Knowledge of basic automobile Engineering. Advanced automobile systems and tools and equipments.

Course Objectives:

After completion of the course, the student should acquire sufficient knowledge about the advanced components and systems in automobile engineering with their diagnoses & rectification.

COURSE OUT COMES

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

Course out come		C L	Linked PO	Teaching Hrs
CO1	Practice Servicing and troubleshooting of turbo charger, Intercooler, compressor, condenser, evaporator.	A/An	2,3,4,,9	18
CO2	Practice wheel balancing, wheel alignment and measuring turning circle radius.	A/An	2,3,4 ,9	12
CO3	Practice Servicing and troubleshooting of servo and power brake system and their components.	A/An	2,3,4 ,9	18
CO4	Practice on Reconditioning of brake drum, Brake Disk, brake liners and check the performance of brake.	A/An	2,3,4,9	30
			Total sessions	78

Legend: R; Remember, U: Understand A: Application An: Analyze

COURSE-PO ATTAINMENT MATRIX

COURSE	PROGRAMME OUTCOMES									
	1	2	3	4	5	6	7	8	9	10
Advanced Automobile Systems Lab	0	3	3	3	0	0	0	0	3	0

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.

LIST OF GRADED PRACTICAL EXERCISES

The practical/Graded exercises should be properly planned and focussed to develop different types of learning outcomes in affective domain and psychomotor domain, so that students are able to acquire necessary skills. Following is the list of experiments to be carried out

EXERCISE NO	PRACTICAL/ EXERCISE	APPROXIMATE HRS REQUIRED
Part A performing experiments		
1	Practice on servicing of turbo chargers, intercooler and prepare the detailed trouble shooting chart	6
2	Practice on servicing of automobile air conditioning system (compressor, condenser ,evaporator, leak in AC system and refilling of refrigerants & prepare the detailed trouble shooting chart	6
3	Practice on servicing of hydraulic power steering system (hydraulic pump & hydraulic actuator),check leakage, refilling of hydraulic fluid & prepare the detailed trouble shooting chart	6
4	Practice on wheel balancing	3
5	Practice on checking of wheel alignment and adjustment (computerized / mechanical) & prepare the detailed trouble shooting chart	3
6	Practice on measuring minimum turning circle radius for two wheeler, three wheeler and four wheeler	6
7	Practice on servicing of servo brake system and prepare the detailed trouble shooting chart	6
8	Practice on servicing of air brake valve, un loader valve, brake chamber and prepare the detailed trouble shooting chart	6
9	Practice on servicing of air brake air compressor and prepare the detailed trouble shooting chart	6
10	Practice on measuring brake drum ovality & brake disc run outs and recondition the same (skimming)	6
11	Practice on de riveting, cleaning & riveting of brake linres	6
12	Practice on measuring stopping distance on two wheeler, three wheeler four wheeler	6
Open ended experiments (The below experiments are only examples, such experiments has to be decided by course co-ordinator relevaler to above mentioned CO'S)		
1	Vehicle pulls to one side: List the causes, suggest the remedial measures and rectify the fault	6
2	Hard power steering : List the causes, suggest the remedial measures and rectify the fault	6
TOTAL HRS		78

Note:

1. Open ended experiments have to be performed using the skills learnt in the Laboratory.
2. These experiments could be extended versions of the standard experiments.
3. Lecturer should know the end results of open ended experiments and only acts as a guide and students has to establish the procedure and conduct experiments.

REFERENCE BOOKS

1	Automobile Engineering vol 2	Kripal Singh	
2	Vehicle Maintenance and Garage Practice	Jigar.A.Doshi	PHI Publication
3	Automobile engineering Vol I	Anil chikara	
4	Automotive mechanics 10 th Edi	W H Crouse and Anglin	
5	Automobile electrical and electronic systems	Tom Denton.	
6	Automobile Technology	R B Gupta	Satya Prakashan
7	Automobile Technology	Dr N K Giri	Kanna Publications
8	Workshop manuals of different manufacturers		

SUGGESTED STUDENT ACTIVITY

Each student should submit report on any one of the following type of activities or any other similar activity related to the course. Before taking up, it should be approved by concerned course coordinator. Each student should conduct different activity and no repetition should be allowed.

1. Collect/ download the information's regarding the different types of supercharger/Turbocharger used in engine and prepare a hand written report
 2. Collect/ download the information's regarding the servo / power brakes and prepare a hand written report
 3. Collect/ download the information's regarding the electric power steering (EPS) and prepare a hand written report
 4. Collect/ download the information's regarding the non slip differential and prepare a hand written report
- 5 the course co-ordinator may decide any similar type of activities to be performed by the students to attain the above course outcomes

Course Assessment and Evaluation Scheme:

Method	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
DIRECTASSESSMENT	CIE (Continuous Internal Evaluation)	IA Tests	Students	Two IA Tests (Average of two Tests)	10	Blue books	1,2,3,4
				Record writing (Average marks of all exercises to be computed)	10	Lab Records	1,2,3,4
				Activity	05	report	1,2,3,4
				TOTAL	25		
	SEE (Semester End Examination)	End Exam	End of the course	50	Answer scripts at BTE	1,2,3,4	
INDIRECTASSESSMENT	Student Feedback on course		Students	Middle of the course		Feedback forms	1 & 2 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1,2,3,4 Effectiveness of Delivery of instructions & Assessment Methods

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 Student activities.
3. Student suggested activities report for 5 marks
4. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods

SL. No	Description	Quantity
1	Turbo charger, Intercooler of different vehicles	05 Each
2	Compressor, condenser ,evaporator & refilling unit (Refrigerant)	03 Each
3	Hydraulic pump & hydraulic actuator (power steering)	03 Each
4	Computerised wheel balancing equipment	One
5	Computerised wheel alignment equipment with accessories	One
6	Vacuum servo brake booster unit for different vehicles	06 units
7	Air brake valve, un loader valve, brake chamber	06 Each
8	Air compressor (vehicle)	06Each
9	Brake drum skimming lathe	One
10	Limited slip differential	02No
11	Vehicle AC demo kit	one
12	Vehicle power steering demo unit	one
13	Mechanic tool kit	04No

Note for setting the QP In the SEE :

- One question should be set from the exercises. 1 to 6
- Second question should be set from exercises. 7 to12

• Scheme of Valuation for End Examination

SL.No	Descriptions	Distribution of Marks	Marks
1	Writing procedure	5 + 5	10
2	Conducting of Experiment	10 +10	20
3	Trouble shooting chart	5 + 5	10
4	Viva-Voice	10	10
TOTAL			50

Note: Open ended experiments are only for Viva-Voce.
