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

Course Title: Engine Testing Lab		
Scheme (L:T:P) : 0:2:4	Total Contact Hours: 78	Course Code:15AT64P
Type of Course: Tutorial and Practice	Credit:3	Core/Elective: **Core**
CIE:25 Marks		SEE:50 Marks

Prerequisites: Knowledge of Basic Science, Thermal Engineering, IC Engines and Automotive Mechanics.

Course Objectives:

Measure and analyse the different engine performance parameters using appropriate tools and equipments.

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	Analyse the condition of the engine by measuring the engine Compression pressures.	A/An	2,3,4.	10
CO2	Draw and Analyse valve and port timing of the engine	A/An	2,3,4.	10
CO3	Measure and analyse the injection pressure.	A/An	2,3,4.	08
CO4	Test the performance of engine using dynamometer.	A/An	2,3,4.	16
CO5	Compile and analyse the heat generated and heat utilised by the engine.	A/An	2,3,4.	12
CO6	Compare the performance of the engines running on different fuels.	A/An	2,3,4,6.	16
		Total sessions		72

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
Engine Testing Lab	-	3	3	3	-	1	-	-	-	-

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 out comes 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	Differentiate the dynamometers and their torque measurement arrangements	3
2	Determine compression pressure of single cylinder engine (SI and CI)	3
3	Determine the Compression pressure of multi cylinder engine	3
4	Determine the vacuum pressure of multi cylinder engines	3
5	Sketch Valve timing diagram of an engine	6
6	Sketch port timing diagram of an engine	6
7	Determine injection pressure of fuel injectors	6
8	Examine calibration of FIP (phasing and Calibration)	6
9	Conduct experiment to Determine the performance of SI engine	6
10	Conduct experiment to Determine the performance of CI engine	6
11	Conduct the experiment to determine indicated power of Multi cylinder engine (Morse test)	6
12	Conduct experiment to Determine the performance of two stroke SI engine	6
13	Compute Heat balance sheet for SI engines	6
14	Compute Heat balance sheet for CI engines	6
Part B Open experiments		
1	Performance test on Diesel engine using alternative fuel	3
2	Performance test on Petrol engine using alternative fuel	3

Reference Books

Elements of Thermal Engineering by R.S.Khurmi/ Rajputh
Automobile Engg by Kirpal Singh (Vols. 1 and II)
Internal Combustion Engines by Mathur and Sharma
Internal Combustion Engines by N Ganeshan
Thermal Engineering by Kodanda Ramanna
Thermal Engineering by Balleni

SUGGESTED STUDENT ACTIVITY

1. 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 Teacher and HOD.
2. Each student should conduct different activity and no reparation should be allowed.

1. Collect/ download the information's regarding different types of engine loading with dynamometer
2. Collect data on different types of injection types and injection pressure.
3. Explain the working of Fuel injection pump with the help of U tube videos

4. Explain testing of engines with the help of U tube videos

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 each exercise 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

Tools and Equipments List

SNo	Description	Quantity
1	Compression pressure gauge: (a)Diesel (b) Petrol	03 each
2	Vacuum gauge	03 each
3	Two Stroke Engine	03 each
4	Four stroke Engine	One
5	Injector Tester	One
6	FIP calibration Equipment	One
7	Single cylinder Diesel engine with Rope brake Dynamometer Test Rig	One
8	Single cylinder Petrol engine with Eddy current Dynamometer Test Rig	One
9	Multi-cylinder Diesel / petrol engine with Hydraulic dynamometer Test Rig with morse test attachments.	One
10	Computerised Diesel / petrol engine test rig	two

Scheme of Valuation for End Examination				
Q No		Descriptions	Marks	
1	From Exercise 1to 8	Writing procedure	5	15
		Conducting of Experiment	10	
2	From Exercise 9 to 14	Writing procedure With tabular column and formulae	10	30
		Conducting of Experiment	10	
		Calculation, results, Inference	10	
3		Viva-voce	05	05
			Total	50

Note: Open ended exercises are for only viva-voce.