THERMAL ENGINEERING LABORATORY

V Semester: ME

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
AME109	Core	-	-	3	2	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 48				Total Classes: 48		

OBJECTIVES:

The course should enable the students to:

1. Visualize the cycle timings of S.I and C.I engines
2. Determine performance characteristics of C.I and S.I engines
3. Differentiate between water tube and fire tube boilers.
4. Estimate the importance of multi-staging of air compressors.

COURSE LEARNING OUTCOMES (CLOs):

1. Understand the concept of Drawing valve and port timing diagram for 4-stroke diesel and 2-stroke petrol engine respectively.
2. Know the Performance test for 4-stroke SI engine and draw performance curves
3. Understand Basic fundamentals and Determination of volumetric efficiency and break thermal efficiency
4. Understand Fundamentals and Determination of frictional power of IC engine.
5. Performance of Machining practice on balancing of heat losses and heat input in SI/CI engines
6. Performance Test on SI engine with speed as a parameter
7. Calculating air/fuel ratio of a 4-stroke SI Engine
8. Understand the Performance Test on CI engine when the compression ratio is changing
9. Performance Test on 4-stroke CI engine and to draw the performance curves
10. Understand the Performance of air compressor Unit
11. Awareness of components of given IC engine and assembling /disassembling of parts.
12. To study the working operation of different types of boilers

Week - 1	**IC ENGINES VALVE/PORT TIMING DIAGRAM**
Drawing valve and port timing diagram for 4-stroke diesel and 2-stroke petrol engine respectively.	
Week - 2	**IC Engine performance test for 4-stroke SI Engine**
Performance test for 4-stroke SI engine and draw performance curves	
Week - 3	**IC Engine performance test for 2-stroke SI Engine**
Determination of volumetric efficiency and break thermal efficiency.	
Week - 4	**IC Engines Morse, retardation and motoring test**
Determination of frictional power of IC engine.	

Week - 5	**IC Engines heat balance-CI/SI engines**
Balancing of heat losses and heat input in SI/CI engines	
Week - 6	**IC Engines economical speed test on SI Engine**
Performance Test on SI engine with speed as a parameter	
Week - 7	**IC Engines effect of Air/Fuel ration in a SI engine**
Calculating air/fuel ratio of a 4-stroke SI Engine .	
Week - 8	**Performance test on Variable Compression Ratio(VCR) engine**
Performance Test on CI engine when the compression ratio is changing. .	
Week - 9	**IC Engine performance test on 4-Stroke CI engine**
Performance Test on 4-stroke CI engine and to draw the performance curves	
Week - 10	**Volumetric Efficiency of Reciprocating Air compressor unit**
Performance of air compressor unit	
Week - 11	**Disassembly/Assembly of Engines**
Awareness of components of given IC engine and assembling /disassembling of parts.	
Week - 12	**Study of Boilers**
To study the working operation of different types of boilers	

Text Books:

1. V. Ganesan, ―I.C. Engines‖, Tata McGraw-Hill, 3rd Edition, New Delhi, India. 2011
2. B. John Heywood, ―Internal combustion engine fundamentals‖, Tata McGraw-Hill, 2nd Edition, New Delhi. 2011
3. R. K. Rajput , ―Thermal Engineering‖, Lakshmi Publications, 18th Edition, 2011

Reference Books:

1. https://en.wikipedia.org/wiki/Internal_combustionengines.
2. https://en.wikipedia.org/wiki/Compression_Ignitionengines