MEE1006 Applied Mechanics and Thermal Engineering			L	T	P	J	C
Pre-Requisite: Nil			2	0	2	0	3
Module	**Topic**	**L Hrs**	**SLO**				
1	**Solid Mechanics:** Concept of stress and strain- Normal and shear stress -relationship between stress and strain- Elasticity- poisson's ratio- shear force and bending moment diagrams for simply supported, cantilever and overhanging beams - Analysis of forces in truss members	5	1,2,5,14				
2	**Mechanical Vibrations:** Single degree of freedom systems- Undamped and damped- Natural frequency- transverse vibration of shafts- critical speed by Rayleigh's and Dunkerley's method. Forced vibration-Harmonic excitation- Magnification factor- Vibration isolation- Torsional vibration-Holzer's analysis.	5	1,2,5,9				
3	**Fluid Mechanics:** Properties of fluid- Uniform and steady flow- Euler's and Bernoulli's Equations- pressure losses along the flow. Flow measurement- Venturi meter and Orifice meters, Pipes in series and parallel. Introduction to Turbines and pumps - classification of turbines - specific speed and speed governance. Classification of pumps- characteristics and efficiency.	4	1,2,5, 9				
4	**Thermodynamic systems:** Basic concepts of Thermodynamics - First law of thermodynamics– Second law of thermodynamics - applications- Working Principle of four stroke and two stroke engines - Open and closed cycle gas turbines	3	1,2,5,11				
5	**Steam Boilers and Turbines:** Formation of steam – Thermal power plant – Boilers -Modern features of high-pressure boilers - Mountings and accessories - Steam turbines: Impulse and reaction principle.	3	1,2,5,11				
6	**Compressors, Refrigeration and Air conditioning:** Air Compressors- Principle of operation of reciprocating, centrifugal and axial flow compressors - Basic functions of refrigeration- Vapour Compression and Vapour absorption systems-Principle of air conditioning system- Types and comparison.	5	1,2,5,9				
7	**Heat Transfer:** Fundamentals of heat transfer- conduction, convection and radiation- Free convection and forced convection - Applications like cooling of electronic components, electric motor and transformers	3	1,2,5,9				
8	**Contemporary Discussion**	2					
	Total Lecture Hours	**30**					

 # Mode:
Flipped Class Room, Use of physical and computer models to lecture, Visit to industries.

Min of 2 lectures by industry experts.		
Practical Expereiments 1. Evaluation of Engineering Stress / Strain Diagram on Steel rod, Thin and Twisted Bars under tension. 2. Compression test on Bricks, Concrete blocks. 3. Natural frequency of longitudinal vibraton of spring mass system. 4. Determination of torsional vibration frequency of a single rotor system 5. Undamped free vibration of equivalent spring mass system 6. Damped vibration of equivalent spring mass system 7. Flow through Venturimeter 8. Flow through Orifice Meter 9. Verification of Bernoulli's Apparatus 10. Performance test on air-conditioning system 11. Performance test on vapour compression refrigeration system 12. Heat transfer in natural/forced convection 13. Heat transfer through a composite wall.	**30**	5,7,9

Text Books

1. R.K. Rajput, (2010), Thermal Engineering, Lakshmi Publications

Reference Books

1. Rogers and Mayhew, 'Engineering Thermodynamics – Work and Heat Transfer', Addision Wesley, New Delhi, 1999.
2. B.K. Sarkar, 'Thermal Enginerring', Tata McGraw Hill, New Delhi, 1998.
3. Ahmadal Ameen 'Refrigeration and Airconditioning' Prentice Hall of India Ltd, 2006.
4. P.K. Nag, 'Heat Transfer', Tata McGraw Hill 2002.
5. R.K. Rajput, (2006), Strength of materials (Mechanics of solids), S. Chand & Company Ltd.
6. P.K. Nag, 'Basic and Applied Engineering Thermodynamics', Tata McGraw Hill, New Delhi, 2010.
7. B.K. Sachdeva, 'Fundamentals of Engineering Heat and Mass Transfer (SI Units)', New Age International (P) Limited (2009).
8. C.P. Arora 'Refrigeration and Air Conditioning', Tata McGraw Hill (2001).

Mode of Evaluation	Continuous Assessment includes CAT I, CAT II, Assignments/Quizzes, FAT
Recommended by the Board of Studies on	
Date of approval by the Academic Council	