SYLLABUS

FOR

B.TECH. PROGRAMME

IN

MECHANICAL ENGINEERING

INSTITUTE OF TECHNOLOGY

ZAKURA CAMPUS
UNIVERSITY OF KASHMIR
SRINAGAR J&K, 190006

COURSE STRUCTURE

B.Tech 7th Semester in Mechanical Engineering

Zakura Campus, University of Kashmir

B.Tech. IV. Year

Semester-VII

Course Code	Course Title	Teaching Classes Per Week			Credits
		L	T	P	
MEE-7117	Compressible Fluid Flow	3	1	0	4
MEE-7217	Internal Combustion Engines	3	1	0	4
MEE-7317	Numerical Techniques	3	1	0	4
MEE-7417	Introduction to Mechatronics	2	1	0	3
MEE-7517	Power Plant Engineering	2	1	0	3
MEE-7617	Pre Project	2	0	4	4
MEE-7717	Industrial Training*	0	0	2	1
MEE-7117L	Compressible Fluid Flow - Lab	0	0	2	1
MEE-7217L	Internal Combustion Engines - Lab	0	0	2	1
	Total	15	5	10	25

*The industrial training is to be covered in summer/winter break.

COURSE STRUCTURE
B.Tech 8th Semester in Mechanical Engineering
Zakura Campus, University of Kashmir

B.Tech. IV. Year
Semester-VIII

Course Code	Course Title	Teaching Classes Per Week			Credits
		L	T	P	
MEE-8117	Refrigeration and Air Conditioning	3	1	0	4
MEE-8217	Fundamentals of Tribology	3	1	0	4
MEC-80*	Departmental Elective	2	1	0	3
MEE-8517	Project	6	0	14	13
MEE-8117L	Refrigeration and Air Conditioning Lab	0	0	2	1
	Total	14	03	16	25

Departmental Electives	
Course No:	**Course Name**
MEC-80*	Theory of Elasticity
MEC-80*	Value Engineering
MEC-80*	Introduction to Acoustics
MEC-80*	Introduction to MEMS

Course Code: MEE-7117
Compressible Fluid Flow
Course Credits: 04

S.No:	Topic	No. of Hrs
1	Basics of Compressible flow: Velocity of sound, Compressibility effects in fluids and Mach number, isentropic flow, stagnation & critical conditions, normal shock waves, quasi-ID steady isentropic flow through a variable area passage.	08
2.	Review of Basic Equation in Differential and Integral Form (Mass, Momentum and Energy) for a viscous compressible flow and equations of states, Basic differential equations for an inviscid compressible flow Dynamic similarity parameters in a compressible viscous flow.	08
3.	Steady One Dimensional Flow Model-Basic Equations, Normal Shock Waves (Stationary), Oblique Shock Waves, Reflection & Interaction of Oblique Shock Waves, Expansion Waves Adiabatic Flow in a Constant area passage with friction, frictionless flow in a constant area passage with heat addition/removal.	06
4.	Quasi-ID Steady Flows-Adiabatic Flow in a variable area passage without friction, Convergent-divergent nozzles and their operating characteristics. Convergent-divergent Supersonic Diffusers, Generalized Quasi-ID Flow Governing Equations.	06
5.	Unsteady wave motion Moving normal shocks, reflected shock waves, Physical aspects of wave propagation, Basic elements of acoustic theory. Finite (Non-Linear) waves, Shock-tube relations, Finite compression waves.	06
6.	Introduction to 2-Dimentional Compressible Flow Velocity considerations, velocity potential, linearized solutions, method of characteristics, numerical solutions.	06
7.	Gas power cycles, Otto cycle, Diesel cycle, Atkinson Cycle, Ericsson cycle, Brayton cycle,	04
8.	Flow through nozzles and diffusers, Gas turbines cycles, Modification to basic cycles, constant pressure combustion gas turbine, open cycle and closed cycle gas turbines, Constant volume combustion turbine, Jet propulsion, Turbojet, Turboprop, Ramjet, Rocket Propulsion	06
Total number of Hours		50

S.No:	Text Books Recommended	Author	Publisher
1.	Modern Compressible Flow with Historical perspective	John. D Anderson	McGraw Hill, 2012
2.	Applied Thermodynamics for Engineers and Technologists	Eastop and Mckonkey	Pearson, 2009
3.	Compressible Flow	Yahya. S.M	New Age Science, 2010

S.No:	References Recommended	Author	Publisher
1.	The-Dynamics-and Thermodynamics of Compressible Fluid-Flow	Ascher H Shapiro	Ronald Press Company, 1980
2.	Gas turbine theory	Cohen, Rogers and Saravanamuttoo	PHI, 1997

Course Code: MEE-7217
Internal Combustion Engines
Course Credits: 04

S.No.	Topic	No. of Hrs
1.	Classification of engines according to fuels, cycle of operation and number of strokes, construction details, value arrangements, application of IC engines, review of air standard cycles, deviation of actual cycles from fuel air cycles, various influencing factors.	08
2.	Review of fuels for IC engines with particular reference to velocity, ignition quality and knock rating, variable compression ratio engines. Air-fuel ratios and mixture requirements of SI engines, stoichiometric fuel air ratio, lean and rich mixture operation, optimum conditions, carburetors—principle, types and venturi, fuel orifice sizes, charge stratification and distribution. Fuel-air requirement in CI engines.	08
3.	Methods of fuel oil distribution and injection. Types of injector systems in SI and CI engines. Flame front and normal combustion. Detonation in SI and knocking CI engines. Factors influencing detonation and knock. Comparative analysis. Ignition systems in SI and CI engines.	06
4.	Engine friction and lubrication: Effect of engine variables, total engine friction, requirements of lubricants and lubricating systems.	06
5.	Cooling systems: Gas temperature variation, heat transfer rates, piston and cylinder temperature, heat rejected to coolant, air and water cooling systems and components. Two-stroke engines: Special features, scavenging systems.	08
6.	Supercharging: Objects, effects on engine performance, supercharging limits, methods of supercharging with special emphasis on turbochargers.	06
7.	Engine testing and performance: Various performance parameters and their measurements. Air pollution from engine exhaust, its measurement and control, principle constituents of engine, emission methods of control, modification of conventional engines, dual fuel and multifuel engines, stratified charged engines, sterlings engines, Wankel rotary combustion engine.	08
	Total number of Hours	50

S.No:	Text Books Recommended	Author	Publisher
1.	Internal Combustion Engines	John B. Heywood	Tata McGraw Hill, New York, 1998

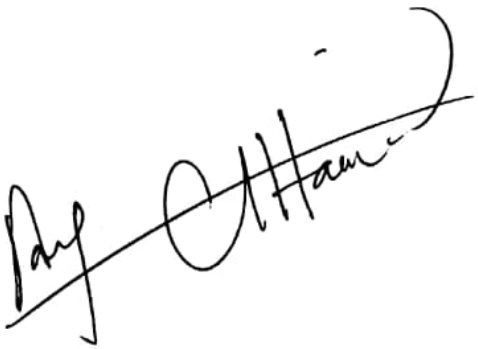
S.No:	References Recommended	Author	Publisher
1.	Internal Combustion Engines	Gupta. H.V	Prentice-Hall of India (P) Ltd., New Delhi, 2006
2.	Internal Combustion Engines	Ganeshan. V	Tata McGraw Hill, New Delhi, 1998

Course Code: MEE-7317
Numerical Techniques
Course Credits: 04

S.No:	Topic	No. of Hrs
1.	Overview of MATLAB, solutions of non linear equations, bisection method, secant method, Newton-Raphson method. Method of successive approximations.	06
2.	Concept of synthetic division, Bairstow's method, Muller's method, Quotient difference method, convergence of iterative methods.	08
3.	Solution of system of linear equations, Gauss Elimination Method, Gauss Jordan Method, Matrix Inversion Method, Crout's Method. Iterative methods, Jacobi's Method, Gauss Siedel Method. Solutions of homogenous system of linear equations, Eigen Value Problem, power method.	08
4.	Interpolation and approximation of functions, forward, backward, divided and central differences. Newton's methods of interpolation, Gauss's Interpolation formulas. Estimation of errors in interpolation.	08
5.	Curve fitting (straight line, nonlinear, exponential), Multiple regressions.	06
6.	Numerical Differentiation of graphical and tabulated functions, higher order derivatives. Numerical Integration, Simpson's rule, Weddle's, Trapezoidal rule, adaptive integration, double integration and improper integrals.	07
7.	Numerical solutions of ordinary and partial differential equations, Runge Kutta Methods, finite difference methods.	07
	Total number of Hours	50

S.No:	Text Books Recommended	Author	Publisher
1.	Numerical Methods	Veerarajan	Tata Mc-GrawHill, 2000

S.No:	References Recommended	Author	Publisher
1.	MATLAB Programming	Pratap. R	Narosa publishers, 2001
2.	Numerical Methods	Sastry.S	Prentice Hall of India, 2000



Course Code: MEE-7417
Introduction to Mechatronics
Course Credits: 03

S.No:	Topic	No. of Hrs
1.	Introduction to mechatronics, mechatronic design approach, system interfacing, instrumentation and control systems microprocessor-based controllers and microelectronics, Mechatronics, a new directions in nano-, micro-, and mini-scale, electromechanical systems design, physical system modelling, electromechanical systems structures and materials, modelling of mechanical systems for mechatronics applications,	9
2.	Sensors and actuators, fundamentals of time and frequency, sensor and actuator characteristics, linear and rotational sensors, acceleration sensors, force measurement, torque and power measurement, flow measurement, temperature measurements, distance measuring and proximity sensors, light detection; image, and vision systems, integrated micro-sensors, actuators; electromechanical actuators, electrical machines, piezoelectric actuators; hydraulic and pneumatic actuation systems.	10
3.	Micro transducers analysis, design and fabrication, role of controls in mechatronics, role of modeling in mechatronics design, response of dynamic systems, introduction to computer and logic systems.	10
4.	Logic concepts and design system interfaces, communication and computer networks, fault analysis in mechatronic systems, logic system design, programmable logic controllers, software and data acquisition.	10
	Total number of Hours	39

S.No:	Text Books Recommended	Author	Publisher
1.	Mechatronics system design	Shetty. D and Richard A.K	Cengage learning, 2011

S.No:	References Recommended	Author	Publisher
1.	Mechatronics	Dan. S.N	Prentice Hall, 2002

Course Code: MEE-7517
Power Plant Engineering
Course Credits: 03

S.No:	Topic	No. of Hrs
1.	Energy source for generation of electric power, principle types of power plants, their special features and applications, major power plants in India, steam power plants.	04
2.	Selection of site, general layout of the power plant, special features of the modern steam boilers, circulation principle, steam separation and purification, economizers and air pre-heater types and estimation of performance, super-heater and superheat control, feed water heaters, cooling tower, temperature and pressure control, introduction to hydro electric power plant.	05
3.	Types of hydro-electric plant in combination with steam plant, runoff river plant in combination with steam plant, storage plant in combination with steam or nuclear plant, coordination of hydro-electric and gas turbine stations, coordination of different types of power plants.	06
4.	Nuclear Power Plants, Nuclear fuel, nuclear energy by fission, main components of nuclear reactors, pressurized water, boiling water, liquid metal and gas nuclear reactors.	06
5.	Diesel power plants: plant layout, two and four stroke cycle diesel engines, fuel injection, lubrication and cooling systems, supercharging and starting systems, gas and steam turbine combined cycles, simple gas and steam combined cycle power generation.	06
6.	Economic Analysis of Power Plants and Tariffs, The cost of electrical energy, selection of types of generating equipment, performance and operating characteristics of power plant, load division among generators, tariff methods of electrical energy.	06
7.	Combined operation of different power plants, Advantages of combined working, load division among power stations, storage.	06
	Total number of Hours	39

S.No:	Text Books Recommended	Author	Publisher
1.	Applied Energy Conversion	Skrotzki. B.G.A, William. A.V	McGraw-Hill Book Company, inc., 1945

S.No:	References Recommended	Author	Publisher
1.	Power Plant Engineering	Domkundwar. S	S.C. Chand and company, 1996
2.	Modern Power Plant Engineering	Joel .W and Roy. E	Prentice-Hall of India Ltd, 1998

Course Code: MEE-7117L
Compressible Fluid Flow-Lab
Course Credits: 01

S.No:	Topic
1.	Study of the various types of wind tunnels.
2.	Study of fluid flow over aerofoils.
3.	Study of Normal and Oblique shocks.
4.	Study of convergent divergent nozzle.
5.	Shock tube.
6.	Fanno Flow.
7.	Rayleigh Flow.

Course Code: MEE-7217L
Internal Combustion Engines-Lab
Course Credits: 01

S.No:	Topic
1.	Study of two stroke spark ignition engine model.
2.	Study of four stroke spark ignition engine model.
3.	Study of four stroke diesel engine model.
4.	Study of rotary wankel engine.
5.	Study of models of gas turbine engines.
6.	Study of single cylinder four stroke direct injection diesel engine. (cut section)
7.	Study of multi-cylinder optical spark ignition engine.
8.	Experimental study of characteristic performance curves of spark ignition engine using gasoline as fuel.
9.	Experimental study of characteristic performance curves of compression ignition engine using diesel as fuel.
10.	Experimental study of characteristic performance curves of compression ignition engine using biodiesel blends, with diesel as fuel.
11.	Study of engine components (cylinder block, crank shaft etc).
12.	Study of components of ignition system of S.I. Engines.

Course Code: MEE-8117
Refrigeration and Air Conditioning
Course Credits: 04

S.No:	Topic	No. of Hrs
1.	Principles of refrigeration – Carnot refrigeration cycle – Various methods of producing cold, Performance parameters – capacity – Coefficient of performance (COP), Refrigeration systems – Vapour compression system –Classification of Vapour absorption system – Air cycle refrigeration – Steam jet refrigeration – thermo electric cooling and magnetic refrigeration, Introduction to liquefaction systems Cascading – simple Linde Hampson system – Claude cycle liquefier.	08
2.	Vapour compression refrigeration system – theoretical and practical cycles – simple and multipressure systems – thermodynamic analysis, System components – Compressors – Reciprocating compressors – single and multistage compressors – work of compression – effect of clearance – effect of inter-cooling – optimum pressure ratio – efficiencies – rotary compressors – screw type and vane type compressors – hermetic, semi hermetic and open compressors, condensers – water cooled and air cooled condensers – evaporative condensers, expansion devices – capillary tube – constant pressure expansion valve – thermostatic expansion valve – float valve, evaporators – natural.	08
3.	Vapour absorption system – principle of operation of aqua – ammonia and lithium bromide – water systems – electrolux system – comparison between vapour compression and absorption systems, Refrigerants – thermodynamic, physical and chemical properties of refrigerants – Selection criteria of refrigerants, designating refrigerants.	08
4.	Psychrometry – psychrometric processes – Requirement of air conditioning – human comfort – comfort chart and limitations – effective temperature – factors governing effective temperature – design considerations – inside design condition, ventilation standards, Applied psychrometry, summer air conditioning processes, winter air conditioning processes, round the year air conditioning systems.	08
5.	Cooling load calculations – various heat sources – solar load – equipment load – infiltration air load – duct heat gain – fan load – moisture gain through permeable walls and fresh air load, design of air conditioning systems – Duct design – equal friction – static regain and velocity reduction methods – distribution systems – insulation, central and unitary systems. Air conditioning equipments and control systems – air filters – humidifiers – fan – blowers – control systems for temperature and humidity – noise and noise control.	08
6.	Working of summer, winter and all year round AC systems, all air system, all water system, air water system, variable refrigerant flow and variable air volume systems, unitary and central air conditioning. Components of refrigeration and air conditioning systems Working of reciprocating, screw and scroll compressors, working of air cooled, water cooled and evaporative condensers, Working of DX, Flooded, Forced feed evaporators, Expansion devices – Capillary tube, TXV, EXV, operating and safety controls	10
	Total number of Hours	50

S.No:	Text Books Recommended	Author	Publisher
1.	Refrigeration and Air Conditioning	Arora. C.P	Tata McGraw Hill, 1996

S.No:	References Recommended	Author	Publisher
2.	Refrigeration and Air conditioning	Stockers W.F and Jones J.W.	McGraw Hill international edition, 2006
3.	Basics of refrigeration and Air Conditioning	Ananthanarayana	Tata McGraw Hill, 1997

Course Code: MEE-8217

Fundamentals of Tribology

Course Credits: 04

S.No:	Topic	No. of Hrs
1.	Introduction to Tribology, Contact between bodies in relative motion, Friction due to adhesion, ploughing and deformation, Energy dissipation during friction, Friction under complex motion conditions, Types of wear and their mechanisms, Adhesive wear, Abrasive wear, Wear due to surface fatigue, Wear due to chemical reactions, Sliding contact between surface asperities, The probability of surface asperity contact, Wear in lubricated contacts, Rheological lubrication regime, Functional lubrication regime, Fractional film defect, Load sharing in lubricated contacts.	08
2.	Friction, Lubrication and Wear of Lower Kinematic Pairs, The concept of friction angle, Friction in slideways, Friction stability, Friction in screws with a square thread, Application of a threaded screw in a jack, Plate clutch - mechanism of operation, Cone clutch - mechanism of operation, Driving torque, Boundary lubricated sliding bearings, Axially loaded bearings, Pivot and collar bearings, Drives utilizing friction force, Belt drive, Mechanism of action.	08
3.	Adhesive wear equation, Fatigue wear equation, Relation between fracture mechanics and wear, Estimation of stress intensity under non-uniform applied loads, Film lubrication, Coefficient of viscosity, Fluid film in simple shear, Viscous flow between very close parallel surfaces, Shear stress variations within the film, Lubrication theory by Osborne Reynolds, High-speed unloaded journal, Equilibrium conditions in a loaded bearing, Loaded high-speed journal, Equilibrium equations for loaded high-speed journal, Reaction torque acting on the bearing, The virtual coefficient of friction, The Sommerfeld diagram.	08
3.	Tribological problems in machine design: Plain sliding bearings, Rolling contact bearings, Piston, piston rings and cylinder liners, Cam and cam followers, Friction drives, Involute gears, Hypoid gears, Worm gears, surface roughness, RMS value, average value and ten point average of surface roughness and measurement of surface roughness. Frictional aspects of brake design, The band brake, The curved brake block, The band and block brake, The role of friction in the propulsion and the braking of vehicles.	08
4.	Tribodesign aspects of mechanical seals, Wear in mechanical seals. Friction, lubrication and wear in higher kinematic pairs, Loads acting on contact area, Traction in the contact zone, Hysteresis losses, Rolling friction, Lubrication of cylinders, Analysis of line contact lubrication, Heating at the inlet to the contact, Analysis of point contact lubrication, Cam-follower system.	08
4.	Sliding element bearings, Derivation of the Reynolds equation, Hydrostatic bearings, Squeeze-film lubrication bearings, Thrust bearings, Flat pivot, The effect of the pressure gradient in the direction of motion, Equilibrium conditions, The coefficient of friction and critical slope, Journal bearings, Geometrical configuration and pressure generation, Mechanism of load transmission, Thermoflow considerations, Design for load-bearing capacity, Unconventional cases of loading, Short bearing theory, Journal bearings for specialized applications, Dynamically loaded journal bearings, Minimum oil film thickness, Modern developments in journal bearing design, Tilting-pad bearing characteristics, Design features of hydrostatic thrust bearings, Self-lubricating bearings, Rolling-contact bearings, Analysis of friction in rolling-contact bearings, Friction torque due to gyroscopic spin, Friction torque due to elastic hysteresis, Lubrication of rolling-contact bearings, Function of a lubricant, Solid film lubrication, Grease lubrication, Jet	10

	lubrication, Surface failure modes related to lubrication, Lubrication effects on fatigue life, Elasto hydrodynamic lubrication in design practice.	
Total number of Hours		50

S.No:	Text Books Recommended	Author	Publisher
1.	Introduction to Tribology	Bushan. B	John Wiley, Tribology Series, 2013

S.No:	References Recommended	Author	Publisher
1.	Engineering Tribology	Stachowiak. G.K Batchelor. A.W	Elsevier, 1993
2.	A system approach to science and Technology of Friction, Lubrication and Wear	Czichos.H	Elsevier Publications,1978
3.	Friction, Wear and Lubrication	Ludema. K.C	CRC Press, 1996

Course Code: MEC-80*
Introduction to MEMS
Course Credits: 03

S.No:	Topic	No. of Hrs
1.	Definition of MEMS, MEMS devices, Silicon as a MEMS material, mechanical properties of silicon, Fabrication technologies, Introduction to micro-fabrication, Silicon based MEMS processes, Surface Micromachining, Sacrificial Etching Process, Bulk Micromachining and Silicon Anisotropic Etching, Bulk versus surface micromachining, mechanical components in MEMS.	10
2.	Review of essential electrical and mechanical concepts, Conductivity of Semiconductors, Review of solid mechanics for design of mechanical components, Crystal Planes and Orientation, Mechanical properties of Silicon and their related thin films.	10
3.	Review of electrostatics and electrodynamics for electrical domain calculations, Electrostatic Sensing and actuation, analysis of comb drives.	10
4.	Dynamics of comb drives, Piezoelectric Sensing and actuation, Piezoresitive Sensing, Scaling laws, Instrumentation for MEMS testing and characterization.	09
	Total number of Hours	39

S.No:	Text Books Recommended	Author	Publisher
1.	Microsystem Design	Senturia. S.D	Kluwer Academic Publisher, 2000

S.No:	References Recommended	Author	Publisher
1.	An Introduction to Micro Electromechanical Systems Engineering	Nadim. M	Artech house,1999

Course Code: MEC-80*
Introduction to Acoustics
Course Credits: 03

S.No:	Topic	No. of Hrs
1.	Fundamentals of Vibrations: Introduction, The simple oscillator, Complex exponential method of solution, Transient response of an oscillator, Power relations, Equivalent electrical circuits for oscillators, The Fourier Transform. Transverse Motion: Vibrations of extended systems, Transverse waves on a string, The one dimensional wave equation, General solution of the wave equation, The wave nature of the general solution, Initial values and boundary conditions, Reflection at a boundary, Forced vibration of an infinite string, Forced vibration of a string of finite length, Normal modes of the fixed string, Acoustic measurements.	10
2.	The Two-Dimensional Wave Equation: Vibrations of a plane surface, The wave equation for a stretched membrane, Free vibrations of a rectangular membrane, Free vibrations of a circular membrane, Normal modes of membranes, The diaphragm of a condenser microphone, Vibration of thin plates. The Acoustic Wave Equation and Simple Solutions: The equation of state, the equation of continuity, The Euler's equation, The linear wave equation, Speed of sound in fluids, Harmonic plane waves, Energy density, Acoustic intensity, Specific acoustic impedance, Spherical waves, The inhomogeneous wave equation, The point source.	10
3.	Radiation and reception of acoustic waves: Radiation from a pulsating sphere, Acoustic reciprocity and the simple source, The continuous line source, Radiation from a plane circular piston, Radiation impedance, Fundamental properties of transducers (directional factor, beam pattern, beam width, source level, directivity).	10
4.	Reflection and Transmission of Acoustic Waves: Transmission from one fluid to another: normal incidence, and oblique incidence, Normal specific acoustic impedance, Reflection from the surface of a solid: normal incidence, oblique incidence.	09
	Total number of Hours	39

S.No:	Text Books Recommended	Author	Publisher
1.	Fundamentals of Acoustics	Kinsler, Frey, Coppens, and Sanders,	John Wiley and Sons, 2000

S.No:	References Recommended	Author	Publisher
1.	Theoretical Acoustics	Philip. M. Morse, Ingard. K.U	Princeton University Press,1999

Course Code: MEC-80*
Value Engineering
Course Credits: 03

S.No:	Topic	No. of Hrs
1.	Introduction to value engineering (VE) & value analysis (VA), Life Cycle of a product, Methodology of VE, Reasons for the existence of unnecessary costs. Quantitative definition of Value, use Value and Prestige value, Estimation of product Quality/Performance, Types of functions, Relationship between use functions and Esteem Functions in product design, Functional cost and functional worth, Effect of value improvement on profitability, Tests for poor value, Aims of VE systematic approach.	10
2.	Elementary introduction to VE, Job plan functional approach to value improvement, Various phases and techniques of the job plan, Factors governing project selection, Types of projects, Life cycle costing for managing the total value, concepts in LCC, Present value concept, Annuity concept, net present value, Pay Back period, internal rate of return on investment (1RR), Examples and Illustrations. Creative thinking and creative judgement, positive or constructive discontent, Tangible and intangible costs of implementation, False material, Labour and overhead saving, VE/VA yardsticks, Relationship between savings and probability of success, Reliability Estimation, system Reliability, Reliability elements in series and parallel.	10
3.	PHASES AND TECHNIQUES OF VE JOB PLAN: General Phase, Information phase, Function phase, Creativity/Speculation Phase, Evaluation Phase, Investigation Phase and Recommendation Phase: Value improvement recommendation theory, determination of cut-off point (cop), road blocks in implementation.	10
4.	Decision Matrix/Evaluation Matrix, Quantitative comparison of Alternatives, Estimation of weights factors and efficiencies, Utility transformation functions, Bench marking, Perturbation of weight factors (sensitivity analysis), and Examples. FAST Diagramming: Critical path of functions, HOW, WHY & WHEN Logic, Supporting and all time functions.	09
	Total number of Hours	39

S.No:	Text Books Recommended	Author	Publisher
1.	Value Engineering- A Systematic Approach	Mudge. A.E	McGraw Hill, 2000

S.No:	References Recommended	Author	Publisher
1.	Techniques of value Analysis and Engineering	Miles. L.D	McGraw Hill, 2007

Course Code: MEC-80*
Theory of Elasticity
Course Credits: 03

S.No:	Topic	No. of Hrs
1.	Introduction, Elasticity, stress components of stress and strain, Hooks law, equations in polar coordinates, plane stress and plane strain, strain at a point	08
2.	Mohr circle for strain rosette, differential equation of equilibrium, boundary conditions, compatibility equations, overview of Airys stress functions.	08
3.	Two dimensional problems in rectangular coordinates, solution by polynomials, St.Venants principles, determination of displacement, bending of beams, solution by Fourier series.	06
4.	Two dimensional problems in polar coordinates: equations in polar coordinates, equation about 1-axis, and pure bending in curved bars.	06
5.	Determination of strains and displacement, Effect of circular hole on stress distribution in plate concentrated and vertical loading of a straight boundary, circular disc, general solution and its applications, analysis of stress and strain in three dimensions.	06
6.	Stress at a point, principal stress, stress ellipsoid and stress director surface, homogenous deformation, strain at a point, principle strain rotation.	05
	Total number of Hours	39

S.No:	Text Books Recommended	Author	Publisher
1.	Theory of Elasticity	Timoshenko. S.P and Goodier. J.N	McGraw Hill Book Company, 2001

S.No:	References Recommended	Author	Publisher
1.	The Mathematical Theory of Elasticity	Love. A.E.H '	Dover Publications, 1995

Course Code: MEE-8117L
Refrigeration and Air-conditioning-Lab
Course Credits: 01

S.No:	Topic
1.	Test on Domestic Refrigerator for evaluation of EER.
2.	Test on vapor compression test rig.
3.	Test on air conditioning test rig.
4.	Test on ice plant test rig.
5.	Visit to Vapor absorption refrigeration plant.
6.	Estimation of cooling load of simple air conditioning system (case study).
7.	Case study on cold storage.
8.	Visit to any air conditioning plant.
9.	Thermal analysis of refrigeration cycle using suitable software.
10.	Installation and servicing of split air conditioner.