Haryana Engineering College, Jagadhri

Lesson Plan of Mechanical Engineering Deptt. 6th Semester

Subject : Organizational Behaviour (HM-901A)

Objective of Course :

1. An overview about organizational behavior as a discipline and understanding the concept of individual behavior.
2. Understand the concept and importance of personality, emotions and its importance in decision making and effective leadership.
3. Enabling the students to know about the importance of effective motivation and its contribution in group dynamics and resolving conflicts.
4. Understand how to overcome organizational stress by maintaining proper organizational culture and effective communication

Day	Topic / Chapter Covered	Academic Activity	Test/Assignment
Day 1	Introduction to organizational behavior: Concept and importance of organizational behavior	Lecture	
Day 2	Role of Managers in OB	Lecture	
Day 3	Foundations or approaches to organizational behaviour	Lecture	
Day 4	Challenges and opportunities for OB.	Lecture	
Day 5	Foundation of individual behavior: Biographical characteristics	Lecture	
Day 6	Concept of abilities and learning	Lecture	
Day 7	Learning and learning cycle	Lecture	
Day 8	Components of learning	Lecture	Assignment 1
Day 9	Concept of values and attitude, types of attitude	Lecture	
Day10	Attitude and workforce diversity.	Lecture	
Day11	Introduction to personality and emotions: Definition and Meaning of Personality	Lecture	
Day12	Determinants of Personality	Lecture	
Day13	Personality Traits Influencing OB	Lecture	
Day14	Nature and Meaning of Emotions	Lecture	
Day15	Emotions dimensions	Lecture	
Day16	Concept of Emotional intelligence.	Lecture	
Day17	Perception and individual decision making: meaning of perception	Lecture	
Day18	Factors influencing perception	Lecture	Assignment 2
Day19	Rational decision making process	Lecture	
Day20	Concept of bounded rationality	Lecture	
Day21	Leadership-trait approaches	Lecture	
Day22	Behavioural approaches, situational approaches	Lecture	
Day23	Emerging approaches to leadership.	Lecture	
Day24	Motivation: Concept and theories	Lecture	

	of motivation		
Day25	Theories of motivation-Maslow, two factor theory	Lecture	
Day26	Theory X and Y	Lecture	
Day27	ERG Theory	Lecture	Assignment 3
Day28	McClelland's theory of needs	Lecture	
Day29	Goal setting theory	Lecture	
Day30	Application of theories in organizational scenario	Lecture	
Day31	Linkage between MBO and goal setting theory	Lecture	
Day32	Employee recognition and involvement program	Lecture	
Day33	Foundations of group behavior and conflict management: Defining and classifying of groups	Lecture	
Day34	Stages of group development, Informal and formal groups- group dynamics	Lecture	
Day35	Managing conflict and negotiation, a contemporary perspective of intergroup conflict	Lecture	Assignment 4
Day36	Causes of group conflicts, managing intergroup conflict through resolution	Lecture	
Day37	Introduction to Organizational Communication: Meaning and importance of communication process	Lecture	
Day38	Importance of organizational communication, effective communication	Lecture	
Day39	Organizational stress: definition and meaning sources and types of stress	Lecture	
Day40	Impact of stress on organizations, stress management techniques.	Lecture	
Day41	Introduction to Organization Culture: Meaning and nature of organization culture	Lecture	
Day42	Types of culture, managing cultural diversity	Lecture	
Day43	Managing change and innovation-change at work, resistance to change	Lecture	Assignment 5
Day44	A model for managing organizational change	Lecture	

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Haryana Engineering College, Jagadhri

Lesson Plan of Mechanical Engineering Deptt. 6th Semester

Subject : Manufacturing Technology (MEC-302A)

Objective of Course :

1. Students will be able to explain the fundamentals of casting processes and evaluate design parameters.
2. Students will be able to describe different metal forming processes and analysis.
3. Students will be able to explain different welding processes with their applications.
4. Students will be able to evaluate design parameters of powder metallurgy processes and explain different powder metallurgy and plastic shaping processes.

Day	Topic / Chapter Covered	Academic Activity	Test/Assignment
Day 1	Fundamentals of castings: Introduction to casting: basic requirements of casting processes	Lecture	
Day 2	Casting terminology	Lecture	
Day 3	Solidification process: cooling curves, prediction of solidification time	Lecture	
Day 4	The cast structure, molten metal problems	Lecture	Assignment 1
Day 5	Fluidity and pouring temperature, role of gating system, solidification shrinkage	Lecture	
Day 6	Riser and riser design, risering aids	Lecture	
Day 7	Patterns, design considerations in castings	Lecture	
Day 8	Expandable-mold casting processes: Sand casting, cores and core making	Lecture	Assignment 2
Day 9	Other expendable-mold processes with multiple use patterns	Lecture	
Day10	Expendable-mold processes with multiple use patterns	Lecture	
Day11	Shakeout, cleaning and finishing	Lecture	
Day12	Multiple-use-mold casting processes: Permanent mold casting, die casting	Lecture	
Day13	Squeeze casting and semisolid metal casting	Lecture	Assignment 3
Day14	Centrifugal casting, cleaning treating and heat treating of castings	Lecture	
Day15	Automation in foundry operations	Lecture	
Day16	Metal forming processes: classifications of metal forming processes	Lecture	
Day17	Bulk deformation processes,	Lecture	
Day18	Material behavior in metal forming,	Lecture	Assignment 4

	temperature in metal forming		
Day19	Rolling: flat rolling and its analysis, shape rolling, rolling mills	Lecture	
Day20	Forging: open-die forging, impression-die forging, flashless forging	Lecture	
Day21	Forging hammers, presses, and dies	Lecture	
Day22	Extrusion: types of extrusion, analysis of extrusion, extrusion dies and presses	Lecture	
Day23	Defects in extruded products, wire and bar drawing	Lecture	Assignment 5
Day24	Analysis of drawing, drawing practice, tube drawing	Lecture	
Day25	Sheet metal working: Cutting operations: shearing, blanking, and punching	Lecture	
Day26	Engineering analysis of sheet-metal cutting, other sheet-metal-cutting operations	Lecture	
Day27	Bending operations: v-bending and edge bending, engineering analysis of bending	Lecture	Assignment 6
Day28	Drawing: mechanics of drawing, engineering analysis of drawing, defects in drawing.	Lecture	
Day29	Joining processes: Principles of fusion welding processes	Lecture	Assignment 7
Day30	Arc welding processes-consumable electrodes	Lecture	
Day31	Shielded metal arc welding, gas metal arc weldingFlux-cored arc welding, submerged arc welding	Lecture	
Day32	Arc welding processes-non-consumable electrodes: gas tungsten arc welding	Lecture	
Day33	Plasma arc welding, resistance welding processes	Lecture	
Day34	Other fusion-welding processes: electron-beam welding	Lecture	
Day35	Laser-beam welding, electro-slag welding, thermit welding.	Lecture	Assignment 8
Day36	Principles of solid state welding processes: friction welding, explosive welding	Lecture	
Day37	Ultrasonic welding processes	Lecture	
Day38	Brazing, soldering, and adhesive bonding: Principles of adhesive, brazing and soldering processes	Lecture	
Day39	Origins of welding defects.	Lecture	
Day40	Powder metallurgy: Characterization of engineering powders: geometric features	Lecture	

Day41	Other features production of metallic powders: atomization: other production methods	Lecture	
Day42	Conventional pressing and sintering: blending and mixing of the powders	Lecture	
Day43	Compaction, sintering, heat treatment and finishing	Lecture	
Day44	Design considerations in powder metallurgy.	Lecture	
Day45	Shaping processes for plastics: Properties of polymer melts, extrusion	Lecture	
Day46	Production of sheet and film, fiber and filament production (spinning)	Lecture	Assignment 9
Day47	Coating processes, injection molding, compression and transfer molding	Lecture	
Day48	Blow molding and rotational molding, thermoforming	Lecture	

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Haryana Engineering College, Jagadhri

Lesson Plan of Mechanical Engineering Deptt. 6th Semester

Subject : Design of Machine Elements (MEC-304A)

Objective of Course :

1. Students will be able to explain the design procedures and methods, properties of engineering materials and their selection, design against static and fluctuating loads.
2. Students will be able to solve the design problems of different types of joints i.e. bolted, riveted joint and welded joint and the problems related to the design of springs under different loading conditions.
3. Students will be able to analyse the transmission shafts and keys.
4. Students will be able to solve the design problems related to clutches and brakes and selection of bearings from manufacturer's catalogue.

Day	Topic / Chapter Covered	Academic Activity	Test/Assignment
Day 1	Introduction: Basic procedure of the design of machine elements, standards in machine design	Lecture	
Day 2	Selection of preferred sizes, engineering materials, properties and selection	Lecture	
Day 3	BIS system of designation of steels.	Lecture	
Day 4	Design against static load: Modes of failure, factor of safety	Lecture	Assignment 1
Day 5	Stress concentration: causes and mitigation	Lecture	
Day 6	Design against fluctuating load: Fluctuating stresses, endurance limit	Lecture	
Day 7	Low cycle and high cycle fatigue, notch sensitivity	Lecture	
Day 8	Endurance limit-approximate estimation, reversed stresses-design for finite and infinite life	Lecture	
Day 9	Cumulative damage in fatigue	Lecture	
Day10	Soderberg and Goodman lines, Modified Goodman diagrams.	Lecture	
Day11	Bolted, riveted and welded Joints: Bolt of uniform strength, bolted joint- simple analysis	Lecture	
Day12	Eccentrically loaded bolted joints, riveted joints for boiler shell according to I. B. R.	Lecture	
Day13	Riveted structural joint, eccentrically loaded riveted joint	Lecture	Assignment 2
Day14	Types of welded joints, strength of welds under axial load	Lecture	
Day15	Welds under eccentric loading.	Lecture	
Day16	Springs: Types of spring, helical spring terminology	Lecture	

Day17	Design for helical springs, spring design-trial and error method	Lecture	
Day18	Design against fluctuating load, surge in springs	Lecture	
Day19	Design of leaf springs, rubber springs.	Lecture	
Day20	Transmission shafts: Shaft design on strength basis and torsional rigidity basis	Lecture	
Day21	ASME code for shaft design	Lecture	
Day22	Design of hollow shaft on strength basis and torsional rigidity basis	Lecture	
Day23	Keys: types of keys	Lecture	Assignment 3
Day24	Design of square and flat keys.	Lecture	
Day25	Clutches: Various types of clutches, design of friction clutches-single disc	Lecture	
Day26	Multi-disc, cone and centrifugal clutches, torque transmitting capacity	Lecture	
Day27	Friction materials, thermal considerations.	Lecture	
Day28	Brakes: Energy equations, block brake with short shoe, block brake with long shoe	Lecture	
Day29	Internal expanding brake, band brakes, disc brakes, thermal considerations.	Lecture	
Day30	Rolling contact bearings: Types of rolling contact bearing	Lecture	
Day31	Selection of bearing-type, static and dynamic load carrying capacity	Lecture	
Day32	Equivalent bearing load	Lecture	
Day33	load-life relationship	Lecture	
Day34	Selection of bearings from manufacturer's catalogue	Lecture	
Day35	Selection of taper roller bearing, design for cyclic loads and speeds	Lecture	Assignment 4
Day36	Bearing failure-causes and analysis.	Lecture	
Day37	Sliding contact bearings: Basic modes of lubrication	Lecture	
Day38	Raimondi and Boyd method	Lecture	
Day39	Bearing design-selection of parameters, bearing materials	Lecture	
Day40	Bearings failure-causes and remidies	Lecture	

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Haryana Engineering College, Jagadhri

Lesson Plan of Mechanical Engineering Deptt. 6th Semester

Subject : Internal Combustion Engine (MEP-302A)

Objective of Course :

1. Student will be able to describe the basic concepts of Internal and External combustion engines and different air standard cycles.
2. Students will be able to explain different types of injection systems, lubrication systems, carburetor; detonation, C.I. combustion chambers and their applications.
3. Students will be able to determine the performance parameters of S.I. and C.I. engines.
4. Students will be able to explain the basic concepts of reciprocating air compressors and gas turbine along with exhaust gas heat exchanger.

Day	Topic / Chapter Covered	Academic Activity	Test/Assignment
Day 1	Heat engines; Internal and external combustion engines	Lecture	
Day 2	Classification of I.C. Engines	Lecture	
Day 3	Cycle of operations in four strokes and two-stroke IC engines	Lecture	
Day 4	Wankle Engine.	Lecture	Assignment 1
Day 5	Air standard cycles: Assumptions made in air standard cycles	Lecture	
Day 6	Otto cycle; Diesel cycle; Dual combustion cycle	Lecture	
Day 7	Comparison of Otto, diesel and dual combustion cycles	Lecture	
Day 8	Sterling and Ericsson cycles, Air standard efficiency, Specific work output	Lecture	Assignment 2
Day 9	Specific weight; Work ratio; Mean effective pressure	Lecture	
Day10	Deviation of actual engine cycle from ideal cycle.	Lecture	
Day11	Carburetor and Injection systems: Mixture requirements for various operating conditions in S.I. Engines	Lecture	
Day12	Elementary carburetor, Calculation of fuel air ratio	Lecture	
Day13	The complete carburetor, Requirements of a diesel injection system	Lecture	
Day14	Type of injection system	Lecture	
Day15	Petrol injection; Requirements of ignition system	Lecture	
Day16	Types of ignition systems, ignition timing, Spark plugs	Lecture	
Day17	Engine parameters and knocking: S.I. engines	Lecture	
Day18	Ignition limits; Stages of	Lecture	Assignment 3

	combustion in S. I. Engines		
Day19	Ignition lag; Velocity of flame propagation	Lecture	
Day20	Detonation; Effects of engine variables on detonation	Lecture	
Day21	Theories of detonation; Octane rating of fuels	Lecture	
Day22	Pre-ignition; S.I. engine combustion chambers	Lecture	
Day23	Stages of combustion in C.I. Engines; Delay period	Lecture	
Day24	Variables affecting delay period; Knock in C.I. Engines; Cetane rating	Lecture	
Day25	C.I. Engine combustion chambers	Lecture	
Day26	Lubrication and cooling systems: Functions of a lubricating system	Lecture	
Day27	Types of lubrication system; Mist, Wet sump and dry sump systems	Lecture	Assignment 4
Day28	Properties of lubricating oil; SAE rating of lubricants	Lecture	
Day29	Engine performance and lubrication; Necessity of engine cooling	Lecture	
Day30	Disadvantages of overcooling	Lecture	
Day31	Cooling systems; Air-cooling, Water-cooling; Radiators	Lecture	
Day32	Heat balance and emission control: Performance parameters	Lecture	
Day33	BHP, IHP, Mechanical efficiency	Lecture	
Day34	Brake mean effective pressure and indicative mean effective pressure	Lecture	
Day35	Torque, Volumetric efficiency	Lecture	Assignment 5
Day36	Specific fuel consumption (BSFC, ISFC), Thermal efficiency; Heat balance	Lecture	
Day37	Basic engine measurements; Fuel and air consumption	Lecture	
Day38	Brake power, Indicated power and friction power, Heat lost to coolant and exhaust gases; Performance curves	Lecture	
Day39	Pollutants from S.I. and C.I. Engines	Lecture	
Day40	Methods of emission control, Alternative fuels for I.C. Engines, The current scenario on the pollution front.	Lecture	
Day41	Air compressor: Working of a single stage reciprocating air compressor; Calculation of work input	Lecture	
Day42	Volumetric efficiency; Isothermal	Lecture	

	efficiency; Advantages of multi stage compression		
Day43	Two stage compressor with inter-cooling; Perfect inter cooling	Lecture	
Day44	Optimum intercooler pressure; Rotary air compressors and their applications; Isentropic efficiency.	Lecture	Assignment 6
Day45	Gas turbine: Brayton cycle; Components of a gas turbine plant, Open and closed types of gas turbine plants; Optimum pressure ratio	Lecture	
Day46	Improvements of the basic gas turbine cycle; Multi stage compression with inter-cooling	Lecture	
Day47	Multi stage expansion with reheating between stages	Lecture	
Day48	Exhaust gas heat exchanger; Application of gas turbines	Lecture	

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Haryana Engineering College, Jagadhri

Lesson Plan of Mechanical Engineering Deptt. 6th Semester

Subject : Refrigeration & Air Conditioning (MEP-310A)

Objective of Course :

1. Students will be able to explain different refrigeration processes like ice refrigeration, evaporative refrigeration, refrigeration by expansion of air, steam jet refrigeration systems etc.
2. Students will be able to identify, formulate and solve air refrigeration, vapour refrigeration and vapour absorption refrigeration problems.
3. Students will be able to identify different refrigerants and discuss their uses.
4. Students will be able to describe psychrometric properties, psychrometric chart and its use for different cooling and heating processes along with humidification and dehumidification.
5. Students will be able to design various air-conditioning systems by including the internal and external heat gain.

Day	Topic / Chapter Covered	Academic Activity	Test/Assignment
Day 1	Introduction: Basics of heat pump & refrigerator, Carnot refrigeration and heat pump	Lecture	
Day 2	Units of refrigeration, COP of refrigerator and heat pump, Carnot COP	Lecture	
Day 3	Ice refrigeration, evaporative refrigeration, refrigeration by expansion of air, refrigeration by throttling of gas	Lecture	
Day 4	Vapour refrigeration system, steam jet refrigeration	Lecture	Assignment 1
Day 5	Thermo- electric cooling, adiabatic demagnetization.	Lecture	
Day 6	Air refrigeration: Basic principle of operation of air refrigeration system	Lecture	
Day 7	Bell Coleman air refrigerator, advantages of using air refrigeration in air craft, disadvantage of air refrigeration in comparison to other cold producing methods	Lecture	
Day 8	Simple air refrigeration in air craft, simple evaporative type	Lecture	Assignment 2
Day 9	Air refrigeration in air craft, necessity of cooling the aircraft.	Lecture	
Day10	Simple vapour compression refrigeration system: Simple vapour compression refrigeration system	Lecture	
Day11	Different compression processes	Lecture	

	(wet, dry and saturated Compression, superheated compression)		
Day12	Limitations of vapour compression refrigeration system if used on reverse Carnot cycle	Lecture	
Day13	Representation of theoretical and actual cycle on T-S and P-H charts, effects of operating conditions on the performance of the system	Lecture	
Day14	Advantages of vapour compression system over air refrigeration system	Lecture	
Day15	Advanced vapour compression refrigeration system: Methods of improving COP	Lecture	
Day16	Flash chamber, flash inter cooler, optimum inter stage pressure for two stage refrigeration system	Lecture	
Day17	Single expansion and multi expansion cases	Lecture	
Day18	Basic introduction of single load and multi load systems, cascade systems	Lecture	Assignment 3
Day19	Vapour absorption refrigeration system and special topics: Basic absorption system	Lecture	
Day20	COP and maximum COP of the absorption system	Lecture	
Day21	Actual NH_3 absorption system, function of various components, Li-Br absorption system	Lecture	
Day22	Selection of refrigerant and absorbent pair in vapour absorption system, Electro-Lux refrigerator	Lecture	
Day23	Comparison of compression and absorption refrigeration system	Lecture	
Day24	Nomenclature of refrigerants, desirable properties of refrigerants	Lecture	
Day25	Cold storage and Ice Plants.	Lecture	
Day26	Introduction: Difference between refrigeration and Air-conditioning	Lecture	
Day27	Psychrometric properties of moist air (wet bulb, dry bulb, dew point temperature, relative and specific humidity, temperature of adiabatic saturation)	Lecture	Assignment 4
Day28	Empirical relation to calculate P_v of moist air.	Lecture	
Day29	Psychrometry: Psychrometric chart, construction and use	Lecture	

Day30	Mixing of two air streams, sensible heating and cooling	Lecture	
Day31	Latent heating and cooling, humidification and dehumidification	Lecture	
Day32	Cooling with dehumidification, cooling with adiabatic humidification	Lecture	
Day33	Heating and humidification, By-pass factor of coil, sensible heat factor	Lecture	
Day34	ADP of cooling coil, Air washer.	Lecture	
Day35	Air-conditioning Systems: Classification, factors affecting air-conditioning systems	Lecture	Assignment 5
Day36	Comfort air-conditioning system, winter air-conditioning system, summer air-conditioning system	Lecture	
Day37	Year round air-conditioning system, unitary air-conditioning system	Lecture	
Day38	Central air-conditioning system, Room sensible heat factor	Lecture	
Day39	Grand sensible heat factor, effective room sensible heat factor	Lecture	
Day40	Cooling Load calculation: Inside design conditions, comfort conditions	Lecture	
Day41	Components of cooling load, internal heat gains (occupancy, lighting, appliances, product and processes)	Lecture	
Day42	System heat gain (supply air duct, A.C. fan, return air duct)	Lecture	
Day43	External heat gain (heat gain through building, solar heat gain through outside walls and roofs)	Lecture	
Day44	Sol-air temperature, solar heat gain through glass windows	Lecture	Assignment 6
Day45	Heat gain due to ventilation and infiltration.	Lecture	
Day46	Industrial and Commercial Application: Transport air conditioning	Lecture	
Day47	Evaporative condensers	Lecture	
Day48	Cooling towers, heat pumps	Lecture	

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