

Haryana Engineering College, Jagadhri

Lesson Plan of Mechanical Engineering Deptt. 8th Semester

Subject : Automobile Engineering (ME-402N)

Objective of Course :

1. Students will be able to Develop a strong base for understanding future developments in the automobile industry.
2. Students will be able to Explain the working of various parts like engine, transmission, gear box etc.
3. Students will be able to Describe how the brakes and the suspension systems operate.
4. Students will be able to Understand the steering geometry and emission control system.

Day	Topic / Chapter Covered	Academic Activity	Test/Assignment
Day 1	Brief history of automobiles, Main components of an automobile, Brief description of each component	Lecture	
Day 2	Brief description of constructional details and working of a four stroke I.C. Engine	Lecture	
Day 3	S.I. Engines and C.I. Engines including lately developed overhead cam shaft	Lecture	
Day 4	Multi-cylinder engines, Introduction to recent developments in I.C Engine	Lecture	
Day 5	Direct injection systems, Multi-point fuel injection systems	Lecture	
Day 6	Introduction, Brief description of different components of Transmission System.	Lecture	
Day 7	Introduction to Clutch and its different types	Lecture	
Day 8	Principle of Friction Clutch, Clutch Lining and friction materials used in Friction Clutches	Lecture	Assignment 1
Day 9	Torque transmitted, Brief description of Cone Clutch, Single Plate and Multiplate	Lecture	
Day10	Clutches	Lecture	
Day11	Dry and wet clutches, Automatic clutch action ,Centrifugal clutches	Lecture	
Day12	Electromagnetic clutches, Fluid Flywheel	Lecture	
Day13	Gear Box Air resistance, Gradient resistance and rolling resistance coming across a moving automobile	Lecture	
Day14	Tractive effort, Variation of tractive effort with speed	Lecture	
Day15	Performance curves (object and	Lecture	

	need of a gear box), Sliding mesh gear box		
Day16	Control mechanism, Sliding type selector mechanism, Ball type selector mechanism	Lecture	
Day17	Steering column gear shift control, Constant mesh gear box	Lecture	
Day18	Synchromesh device, Automatic transmission in general, AP automatic gear box	Lecture	Assignment 2
Day19	Torque converter, Torque converter with direct drive, Lubrication of Gear Box	Lecture	
Day20	Functions and requirements of a propeller shaft, Universal Joint	Lecture	
Day21	Constructional forms of universal joints, Flexible-ring joints	Lecture	
Day22	Rubber-bushed flexible joints. Constant- velocity joints	Lecture	
Day23	Principle operation of Differential, Constructional details of a typical Differential unit	Lecture	
Day24	Multi-plate clutch type traction control device, Brake Functions and methods of operation, Brake efficiency	Lecture	
Day25	Elementary theory of shoe brake & shoe adjustments, A modern rear-wheel brake	Lecture	
Day26	Disc brakes, Brake linkages, Leverage and adjustment of the brake linkage	Lecture	
Day27	Servo- and power operated brakes, Vacuum brake operation	Lecture	Assignment 3
Day28	Hydraulic Brakes-constructional details and working, Direct action vacuum servos,	Lecture	
Day29	Power-operated brakes	Lecture	
Day30	A dual power air brake system, Suspension principles, Road irregularities and human susceptibility	Lecture	
Day31	Suspension system, Damping, Double tube damper, Single tube damper, Lever arm type damper, Springs-Leaf springs, Coil and torsion springs	Lecture	
Day32	variable rate springs, Composite leaf springs, Rubber springs, Air springs, Adjustable and self-adjusting suspensions	Lecture	
Day33	Interconnected air and liquid suspensions, Independent suspension system, Different	Lecture	
Day34	independent suspension layouts	Lecture	

Day35	Steering Geometry -Castor, Camber, Kingpin inclination, Combined angle, Toe-in, Steering system-basic aims, Ackerman linkage	Lecture	Assignment 4
Day36	Steering linkages for independent suspension, Center point steering, Co-starring or trailing	Lecture	
Day37	Action	Lecture	
Day38	Cornering power, Self-righting torque, Steering characteristics-over steer and under	Lecture	
Day39	steer, Axle beam	Lecture	
Day40	Stub-axle construction, Steering column, Reversible and irreversible steering, Rack- and-pinion steering mechanism	Lecture	
Day41	Effect of toe-in on steering, Power steering, Vickers System	Lecture	
Day42	Emission control through catalytic converter, Double catalytic converter, Aspects of pollution control in Automobiles	Lecture	

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Haryana Engineering College, Jagadhri

Lesson Plan of Mechanical Engineering Deptt. 8th Semester

Subject : Foundry Engineering (ME-422N)

Objective of Course :

1. Express Knowledge about the fundamentals of the casting, basic terminology related to casting process.
2. Decide the alternative method for the manufacturing of component for engineering Applications.
3. Select the methods of the casting and Decide correct melting practice of different cast alloy & different melt-treatments.
4. Demonstrate the ability to select the proper molding material, type of furnace with relevant refractory material, use appropriate casting design and temperature measurement device to obtain quality cast products.
5. Minimize the defects generated during casting.

Day	Topic / Chapter Covered	Academic Activity	Test/Assignment
Day 1	Introduction to metal casting and foundry industry in modern industrial scenario	Lecture	
Day 2	Advantages and limitations of casting methods	Lecture	
Day 3	Classification of foundries. Different sections in a foundry and their functions.	Lecture	
Day 4	Important cast metals and alloys- their composition, properties and uses.	Lecture	Assignment 1
Day 5	Types of patterns, brief classification of pattern making materials	Lecture	
Day 6	Consideration in selection of pattern materials	Lecture	
Day 7	Color coding, pattern allowances, core boxes, types of core boxes	Lecture	
Day 8	Ingredients of common type of moulding and core making sands	Lecture	Assignment 2
Day 9	Core making sands, their properties and behavior, testing of sands and clay	Lecture	
Day10	Classification of molding processes and casting processes	Lecture	
Day11	Brief description of all processes such as green sand dry sand, loam sand floor	Lecture	
Day12	Pit and machine molding	Lecture	
Day13	Shell molding, CO ₂ silicate process	Lecture	Assignment 3
Day14	Investment casting process, permanent moulding process	Lecture	
Day15	Gravity and pressure die casting	Lecture	
Day16	Centrifugal casting process	Lecture	

Day17	Classification, basic consideration in gating design	Lecture	
Day18	Gating ratio, gating practice for ferrous and nonferrous alloys, pouring equipment	Lecture	Assignment 4
Day19	Function of riser, directional and progressive solidification	Lecture	
Day20	Centerline feeding resistance, riser efficiency	Lecture	
Day21	Riser design consideration, risering curves	Lecture	
Day22	Cain's, N.R.L and modulus method	Lecture	
Day23	Feeding distance feeding aids, blind and atmospheric risers.	Lecture	Assignment 5
Day24	Melting of cast iron, Mechanical features of cupola	Lecture	
Day25	Operational steps of cupola operation	Lecture	
Day26	Principles of cupola operation	Lecture	
Day27	Advanced practices in the cupola operation	Lecture	Assignment 6
Day28	Melting of aluminum based alloys	Lecture	
Day29	Mold treatments of aluminum based alloys such as dressing	Lecture	Assignment 7
Day30	Grain refining, and modification of copper based alloys	Lecture	
Day31	Melting of copper based alloys	Lecture	
Day32	Mold treatments of copper based alloys such as dressing	Lecture	
Day33	Grain refining, and modification of copper based	Lecture	
Day34	Alloys	Lecture	
Day35	Casting defects, their causes and remedies	Lecture	Assignment 8
Day36	Shop floor quality control tests such as composition control	Lecture	
Day37	Wedge test, fluidity, temperature measurement	Lecture	
Day38	Casting Modification by different methods like Friction stir processing	Lecture	

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Lesson Plan of Mechanical Engineering Deptt. 8th Semester

Subject : Manufacturing Management (ME-426N)

Objective of Course :

1. Students will be able to attain the theoretical knowledge of production & operation management.
2. Students will be able to attain the theoretical knowledge of the concept of plant location and layout.
3. Students will be able to attain the theoretical knowledge of material handling and management.
4. Students will be able to attain the theoretical knowledge of Waste Management & Automation.

Day	Topic / Chapter Covered	Academic Activity	Test/Assignment
Day 1	Introduction	Lecture	
Day 2	Historical evolution of production and operation management	Lecture	
Day 3	Concept of Production	Lecture	
Day 4	Production system	Lecture	Assignment 1
Day 5	Production Management	Lecture	
Day 6	Operation system	Lecture	
Day 7	Operation management	Lecture	
Day 8	Managing global operation	Lecture	
Day 9	Scope of production	Lecture	
Day10	Operation management	Lecture	
Day11	Introduction and Meaning, Need for Selecting a Suitable Location	Lecture	
Day12	Factors influencing Plant location	Lecture	
Day13	Plant location	Lecture	Assignment 2
Day14	Location theories	Lecture	
Day15	Location models, Location economics	Lecture	
Day16	Plant layout, Classification of layout	Lecture	
Day17	Design of Product layout, Design of Process layout	Lecture	
Day18	Service layout, Organization of physical facilities.	Lecture	
Day19	Introduction, Objectives of Material Handling, Principles of Material Handling	Lecture	
Day20	Selection of Material Handling Equipment, Evaluation of Material Handling System	Lecture	
Day21	Material Handling Equipment	Lecture	
Day22	Guidelines for Effective Utilization of Material Handling Equipment	Lecture	
Day23	Relationship Between Plant Layout and Material Handling	Lecture	Assignment 3
Day24	Scope and Function of Material	Lecture	

	Management		
Day25	Material Planning and Control, Inventory Control	Lecture	
Day26	Standardization, Simplification	Lecture	
Day27	Ergonomics	Lecture	
Day28	Just-in-Time(JIT) Manufacturing	Lecture	
Day29	Introduction, Reasons for Generation and Accumulation of Obsolete	Lecture	
Day30	Surplus and Scrap Items	Lecture	
Day31	Identification and Control of Waste	Lecture	
Day32	Disposal of Waste	Lecture	
Day33	Introduction, Types of Automation	Lecture	
Day34	Computer Integrated Manufacturing	Lecture	
Day35	Reasons for Automation, Advantages and Disadvantages of Automation, Automation Strategies	Lecture	Assignment 4
Day36	Automated Flow Lines	Lecture	
Day37	Automated Guided Vehicles System	Lecture	
Day38	Automated Storage/Retrieval System.	Lecture	

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Lesson Plan of Mechanical Engineering Deptt. 8th Semester

Subject : Power Plant Engineering (ME-404N)

Objective of Course :

1. To introduce about the different sources of energy, hydrology and hydro power generation.
2. To analyze the steam power cycles, steam generators, fuels and different handling systems in power plants.
3. To understand the concept of combined cycles power generation and diesel engine power plants.
4. To know about the nuclear energy and the economics of power generation.

Day	Topic / Chapter Covered	Academic Activity	Test/Assignment
Day 1	Conventional and non conventional sources of energy, geothermal power plants	Lecture	
Day 2	Tidal power plants, windmills, solar power plants	Lecture	
Day 3	Solar thermal and solar photovoltaic	Lecture	
Day 4	Direct energy conversion systems, Energy sources in India, Recent development in power plants	Lecture	Assignment 1
Day 5	Hydrology, rainfall and runoff	Lecture	
Day 6	Hydrographs and flow duration curves	Lecture	
Day 7	Site selection for hydro power plants and classification of hydro power plants	Lecture	
Day 8	Storage type hydro power plant and its operation, Estimation of power availability	Lecture	Assignment 2
Day 9	Selection of water turbines. combination of hydroplants with steam plants.	Lecture	
Day10	Advantages and disadvantages of hydropower plants	Lecture	
Day11	Applications of diesel engine in power field, Advantages and disadvantages of diesel plants over thermal power plants	Lecture	
Day12	Schematic arrangement of diesel engine power plant, Different systems of diesel power plants	Lecture	
Day13	Performance characteristics of supercharging, layout of diesel engine power plant	Lecture	
Day14	Gas turbine cycles, the ideal brayton cycle and the non ideal brayton cycle	Lecture	

Day15	Modification of the brayton cycle, Gas turbine characteristics	Lecture	
Day16	Combined cycles with heat recovery boiler. The STAG Combined cycle power plant	Lecture	
Day17	Combined cycle with multipressure ,Combined cycle for nuclear power plants	Lecture	
Day18	The carnot, The ideal rankine cycle, externally irreversible rankine cycle	Lecture	Assignment 3
Day19	Superheat, Reheat, Regeneration, Internally irreversible rankine cycle	Lecture	
Day20	Open feed water heaters, closed type feed water heaters, Typical layout of steam power plant, efficiency and heat rate	Lecture	
Day21	Introduction to steam generators, Steam generator control, Fluidized bed boilers	Lecture	
Day22	Modern high pressure boilers, super critical boilers, ultra supercritical technology, advanced ultra super critical technology, flue gas de nitrification and desulphurization	Lecture	
Day23	Fabric filters and bag houses, feed water treatment, boiler blow down, steam purity	Lecture	
Day24	Basic theory and terminology, Nuclear fission and fusion processes	Lecture	
Day25	Fission chain reactions, Moderation, Fertile materials	Lecture	
Day26	Nuclear fuels, General components of nuclear reactor	Lecture	
Day27	Different types of reactors PWR,BWR,GCR etc.	Lecture	Assignment 4
Day28	India nuclear power programme, disposal of nuclear waste and related issues	Lecture	
Day29	Introduction to economics of power generation	Lecture	
Day30	Different terms and definitions	Lecture	
Day31	Selection of power plant equipment	Lecture	
Day32	Factors affecting economics of generation and distribution of power	Lecture	
Day33	Performance and operating characteristics of power plants, Economic load sharing	Lecture	
Day34	Tariff for electrical energy	Lecture	

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Lesson Plan of Mechanical Engineering Deptt. 8th Semester

Subject : Quality Assurance & Reliability (ME-406N)

Objective of Course :

1. Students will understand the concepts of quality, quality assurance and management.
2. Students will be able to demonstrate the ability to use the methods of statistical process control and able to use and interpret control charts for variables.
3. Students will be able to use and interpret control charts for attributes, also able to understand sampling inspection.
4. Understand the concepts of reliability, carry out reliability data analysis, Get acquainted with computation of system reliability and reliability improvement methods.

Day	Topic / Chapter Covered	Academic Activity	Test/Assignment
Day 1	Definition of Quality, Quality function	Lecture	
Day 2	Dimensions of Quality, Brief history of quality methodology	Lecture	
Day 3	Statistical methods for quality improvements	Lecture	
Day 4	Quality costs, Introduction to Quality function deployment.	Lecture	Assignment 1
Day 5	Introduction, Definition, Management principles in QA	Lecture	
Day 6	Forms of QA, QA in different stage	Lecture	
Day 7	Quality planning, QA program	Lecture	
Day 8	Quality in material management, Vendor selection & development	Lecture	Assignment 2
Day 9	Introduction to statistical process control, Concept of variation	Lecture	
Day10	Assignable & Chance causes, Attributes & variables	Lecture	
Day11	Attributes & variables, Frequency distribution curve & its types	Lecture	
Day12	Problems on FD curve & ND curve	Lecture	
Day13	Definition, Formulae	Lecture	Assignment 3
Day14	its problems	Lecture	
Day15	Control chart patterns	Lecture	
Day16	Process capability	Lecture	
Day17	Process capability	Lecture	
Day18	Process capability Process capability	Lecture	Assignment 4
Day19	Definition for control chart for attributes	Lecture	
Day20	Formulae & its problems	Lecture	
Day21	Problems on p, c charts.	Lecture	
Day22	Choice between variables and attributes control charts	Lecture	
Day23	Guidelines for implementing control charts.	Lecture	Assignment 5

Day24	Sampling: Definition, types of sampling	Lecture	
Day25	importance, benefits and limitations of sampling	Lecture	
Day26	Average Outgoing Quality Curve	Lecture	
Day27	Operating Characteristic Curve	Lecture	Assignment 6
Day28	Errors in Making Inferences from Control Charts (Type I and II errors).	Lecture	
Day29	Introduction of Reliability concepts	Lecture	Assignment 7
Day30	Failure density, Probability of failure, ,	Lecture	
Day31	Reliability of series and parallel connected systems and examples, Logic diagrams,	Lecture	
Day32	Improvement of system reliability, Element	Lecture	
Day33	Redundancy,	Lecture	
Day34	Unit redundancy, Standby redundancy	Lecture	
Day35	Unit redundancy, Standby redundancy	Lecture	Assignment 8
Day36	Mortality rate, Mean time to failure	Lecture	
Day37	Unit redundancy, Standby redundancy	Lecture	

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