Name of Subject : Mechanical Measurement & Metrology  
Subject Code : 2141901  
Semester : 4th  
Percentage of Mid Sem Exam Syllabus: 50%

<table>
<thead>
<tr>
<th>Chapter No.</th>
<th>Topic</th>
</tr>
</thead>
</table>
| 1           | **Mechanical Measurement:**  
| 2           | **Linear and angular measurements:**  
| 3           | **Displacement, Velocity/Speed, and Acceleration, Measurement:**  
Working principal of Resistive Potentiometer, Linear variable differential transducers, Electro Magnetic Transducers, Mechanical, Electrical and Photoelectric Tachometers, Piezoelectric Accelerometer, Seismic Accelerometer, |
| 4           | **Temperature measurement:**  
| 5           | **Metrology:**  
Basics of Metrology, Need for Inspection, Accuracy and Precision, Objectives, Standards of measurements. |
| 6           | **Metrology of Gears**  

Mandli Yagnesh  
Subject Coordinator  

Prof. Mit K.Shah  
HOD, Mech Engg Dept.
Name of Subject : Complex Numbers And Numerical Methods  
Subject Code : 2141905 
Semester : IV Sem.  
Percentage of Mid Sem Exam Syllabus: 56%

<table>
<thead>
<tr>
<th>Chapter No.</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Complex Numbers and Functions: Exponential, Trigonometric, De Moivre’s Theorem, Roots of complex numbers, Hyperbolic functions and their properties, Multi-valued function and its branches: Logarithmic function &amp; Complex Exponent function Limit, Continuity and Differentiability of complex function, Analytic functions, Cauchy-Riemann Equations, Necessary and Sufficient condition for analyticity, Properties of Analytic functions, Laplace Equation, Harmonic Functions, Harmonic Conjugate functions and their Engineering Applications</td>
</tr>
<tr>
<td>2</td>
<td>Roots of Algebraic and Transcendental Equations: Bisection, false position, Secant and Newton-Raphson methods, Rate of convergence</td>
</tr>
<tr>
<td>3</td>
<td>Eigen values by Power Methods</td>
</tr>
<tr>
<td>4</td>
<td>Solution of a System of Linear Equations: Gauss elimination, partial pivoting, Gauss-Jacobi method and Gauss-Seidel method</td>
</tr>
<tr>
<td>5</td>
<td>Numerical Integration: Newton-Cotes formula, Trapezoidal and Simpson’s formulae, error formulae, Gaussian quadrature formulae</td>
</tr>
<tr>
<td>7</td>
<td>Numerical solution of Ordinary Differential Equations: Euler and Runge-Kutta methods</td>
</tr>
</tbody>
</table>

Mid sem Exam Syllabus includes Tutorials : 1 to 5 And 7-8

Ms. Rachna K Trivedi  
Subject Coordinator

Prof. Mit K. Shah  
HOD, Mech Engg
**SILVER OAK COLLEGE OF ENGINEERING & TECHNOLOGY**  
**MECHANICAL ENGINEERING DEPARTMENT**  

**MID SEMESTER EXAMINATION SYLLABUS Summer 2015**

**Subject:** FLUID MECHANICS  
**Subject Code:** 2141906  
**Date:** 24.02.2015  
**Branch:** Mechanical  
**Semester:** 4  

**Percentage of Mid Sem Exam Syllabus:** 50

<table>
<thead>
<tr>
<th>Chapter No.</th>
<th>TOPIC NAME</th>
</tr>
</thead>
</table>
| 1           | Fluids and Their Properties:  
Introduction of fluid, fluid classifications, hypothesis of continuum, Shear stress in a moving fluid, molecular structure of material, fluid density, viscosity, causes of viscosity in gases and liquids, surface tension, capillary effect, vapor pressure, cavitation, compressibility and the bulk modulus. |
| 2           | Motion of Fluid Particles and Streams:  
Fluid flow, different types of flow, frames of reference, analyzing fluid flow, motion of a fluid particle, acceleration of a fluid particle, discharge and mean velocity, continuity of flow, continuity equations for 2-D and 3-D flow in Cartesian coordinates of system |
| 3           | Motion of Fluid Particles and Streams:  
Fluid flow, different types of flow, frames of reference, analyzing fluid flow, motion of a fluid particle, acceleration of a fluid particle, discharge and mean velocity, continuity of flow, continuity equations for 2-D and 3-D flow in Cartesian coordinates of system |
| 4           | The Energy Equation and its Application:  
Momentum and fluid flow, Momentum equation for 2-D and 3-D flow along a stream line, momentum correction factor, Euler’s equation of motion along a stream line, Mechanical energy of a flowing fluid – Bernoulli’s theorem, kinetic energy correction factor, pitot tube, determination of volumetric flow rate via pitot tube, changes of pressure in tapering pipe, principle of venturimeter, pipe orifices, theory of small orifices discharging to atmosphere, theory of large orifices, Rotameter, elementary theory of notches and weirs, flow in a curved path. |
| 5           | Two-Dimensional Ideal Fluid Flow:  
Rotational and ir-rotational flow, circulation and vorticity, streamlines and the stream functions, velocity potential and potential flow, relation between stream function and velocity potential; flow nets, stream function and velocity potential for uniform flow, vortex flow. |
| 6           | Dimensional Analysis And Similarities:  
Dimension reasoning, dimensional homogeneity, dimensional analysis using Rayleigh’s method, Buckingham π-theorem, significance of dimensionless, use of dimensionless numbers in experimental investigation, geometric similarity, dynamic similarity, Kinematic similarity, model testing-Model laws, Undistorted and Distorted models. |

Mr. Rohit Sahu  
Ms Swati Saini  
(Subject Coordinator)  
Prof. Mit K. Shah  
(Head, Mech. Engg. Dept.)
Name of Subject: Machine Design and Industrial Drafting

Subject Code: 2141907

Semester: 4th

Percentage of Mid Sem Exam Syllabus: 54%

<table>
<thead>
<tr>
<th>Chapter No.</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Concepts of stresses and Strain, Combinations of Axial, Shear, Torsional and Bending loads; Theories of Failures; Factor of safety, Crushing and Bearing stress. Eccentric Loading; Cotter and Knuckle Joints; Design and analysis of levers: Bell crank, Rocker arm.</td>
</tr>
<tr>
<td>3</td>
<td>Design of solid and hollow circular shaft subjected to torque and combined loading; Design of shaft for rigidity and stiffness; Design of Keys: Saddle, Sunk, Woodruff, Square, Flat, Kennedy key and Splines. Design of Couplings: Concept of rigid and flexible couplings, Design of: Rigid flange</td>
</tr>
<tr>
<td>5</td>
<td>Introduction, Basic Definitions, Maximum Metal Condition, Least Metal Condition, Grade of tolerance, Linear and Angular Tolerances, Fundamental deviations, Types of Fits and its basis, Gauge design. Basic terminology of GD &amp; T, Different tolerance characteristics, symbols and tolerance modifiers, Different aspects of datums, Parameters of surface texture and qualifications, Relation of surface roughness and various manufacturing processes, Surface Lay Indication</td>
</tr>
</tbody>
</table>

Hardik S. Shukla

Pradeeptta Taraphdar

Subject Coordinator

Prof. Mit K. Shah

HOD, Mech Engg

Dept.
Name of Subject : Manufacturing Processes-II

Subject Code : 2141908

Semester : 4\textsuperscript{TH}

Percentage of Mid Sem Exam Syllabus: 50%

<table>
<thead>
<tr>
<th>Chapter No.</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Manufacturing Processes:</strong> Basic Introduction, Importance of Manufacturing, Economics and Technological Definition, Classification and Selection of Manufacturing Processes</td>
</tr>
<tr>
<td>2</td>
<td><strong>Metal Casting Processes:</strong> Patterns, Types of patterns, allowances and material used for patterns, moulding materials, moulding sands, Moulding sands; properties and sand testing: Grain fineness, moisture content, clay content and permeability test. Core materials and core making. Moulding practices: Green, dry and loam sand moulding, pit and floor moulding; shell moulding; permanent moulding; carbon dioxide moulding. Metal casting: Review of casting processes, casting design considerations, capabilities and applications of casting processes; Gating and Rising design, fundamentals, casting defects.</td>
</tr>
<tr>
<td>4</td>
<td><strong>Metal Shaping and Forming:</strong> Metal working, Elastic and plastic deformation, Concept of strain hardening, Hot and cold working, Rolling, Principle and operations, Roll pass sequence, extrusion, Wire and tube drawing processes. Forging, Forging operations, extrusion, Wire and tube drawing processes. Forging: Method of forging, Forging hammers and presses, Principle of forging tool design,</td>
</tr>
</tbody>
</table>

Subject Coordinator

Pankaj Sharma

HOD, Mech engg

Prof. Mit K.Shah
## Mid Sem Exam Syllabus - Summer 2015

Name of Subject: Engineering Economics and Management  
Subject Code: 2140003  
Semester: 4\(^{th}\)  
Percentage of Mid Sem Exam Syllabus: 50%

<table>
<thead>
<tr>
<th>Unit No.</th>
<th>Topic</th>
</tr>
</thead>
</table>
| 1        | Introduction to Economics; Definitions, Nature, Scope, Difference between Microeconomics & Macroeconomics  
Theory of Demand & Supply; meaning, determinants, law of demand, law of supply, equilibrium between demand & supply  
Elasticity; elasticity of demand, price elasticity, income elasticity, cross elasticity |
| 2        | Theory of production; production function, meaning, factors of production (meaning & characteristics of Land, Labour, capital & entrepreneur)  
Law of variable proportions & law of returns to scale  
Cost; meaning, short run & long run cost, fixed cost, variable cost, total cost, average cost, marginal cost, opportunity cost.  
Break even analysis; meaning, explanation, numerical |
| 6        | Introduction to Management; Definitions, Nature, scope  
Management & administration, skill, types and roles of managers  
Management Principles; Scientific principles, Administrative principles, Maslow’s Hierarchy of needs theory |
| 7        | Functions of Management; Planning, Organizing, Staffing, Directing, Controlling (meaning, nature and importance)  
Organizational Structures; meaning, principles of organization, types-formal and informal, line, line & staff, matrix, hybrid (explanation with merits and demerits), span of control, departmentalization. |
| 8        | Introduction to Marketing management; Marketing Mix, concepts of marketing, demand forecasting and methods, market segmentation  
Introduction to Finance Management; meaning, scope, sources, functions |
For Detain Students (instead of Fluid Mechanics)

Name of Subject: ENGINEERING THERMODYNAMICS

Subject Code: 2131905

Semester: III

Percentage of Mid Semester Exam Syllabus: 50%

<table>
<thead>
<tr>
<th>Chapter No.</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Basic Concepts: Microscopic &amp; macroscopic point of view, thermodynamic system and control volume, thermodynamic properties, processes and cycles, Thermodynamic equilibrium, Quasi-static process</td>
</tr>
<tr>
<td>2</td>
<td>First law of Thermodynamics: First law for a closed system undergoing a cycle and change of state, energy, PMM1, first law of thermodynamics for steady flow process, steady flow energy equation applied to nozzle, diffuser, boiler, turbine, compressor, pump, heat exchanger and throttling process, filling and emptying process</td>
</tr>
<tr>
<td>6</td>
<td>Vapor Power cycles: Carnot vapor cycle, Rankine cycle, comparison of Carnot and Rankine cycle, calculation of cycle efficiencies, variables affecting efficiency of Rankine cycle, reheat cycle, regenerative cycle, reheat-regenerative cycle, feed water heaters</td>
</tr>
<tr>
<td>7</td>
<td>Gas Power cycles: Recapitulation of Carnot, Otto and Diesel cycle, Dual cycle, Comparison of Otto, Diesel and Dual cycles, air standard 10efficiency, mean effective pressure, brake thermal efficiency, relative efficiency, Brayton cycle, effect of reheat, regeneration, inter cooling and turbine and compressor efficiency on Brayton cycle</td>
</tr>
</tbody>
</table>

REEPEN SHAH

Prof. Mit K.Shah

Subject Coordinator
HOD, Mech Engg Dept.
For Detain Students (instead of MDID)

Name of Subject: Kinematics of Machine

Subject Code: 2131906

Semester: 4th

Percentage of Mid Sem Exam Syllabus: 50

<table>
<thead>
<tr>
<th>Chapter No.</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction of Mechanisms and Machines: Concepts of Kinematics and Dynamics, Mechanisms and Machines, Planar and Spatial Mechanisms, Kinematic Pairs, Kinematic Chains, Kinematic Diagrams, Kinematic Inversion, Four bar chain and Slider Crank Mechanisms and their Inversions, Degrees of Freedom, Mobility and range of movement - Kutzbach and Grubler’s criterion, Number Synthesis, Grashof’s criterion</td>
</tr>
<tr>
<td>4</td>
<td>Cams and Followers: Introduction: Classification of cams and followers, nomenclature, displacement diagrams of follower motion, kinematic coefficients of follower motion.</td>
</tr>
</tbody>
</table>

Hardik S. Shukla
Subject Coordinator

Prof. Mit K. Shah
HOD, Mech Engg Dept.
Name of Subject : Dynamics of machinery

Subject Code : 161901

Semester : 6th

Percentage of Mid Sem Exam Syllabus: (60%)

<table>
<thead>
<tr>
<th>Chapter No.</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Need for balancing, Static balance, balancing of rotating masses in same and different planes,</td>
</tr>
<tr>
<td>2</td>
<td>Dynamic balancing, balancing of reciprocating masses, numerical</td>
</tr>
<tr>
<td>3</td>
<td>Balancing of locomotives, Partial balancing of locomotives, swaying couple, hammer blow, variation in tractive effort,. numerical</td>
</tr>
<tr>
<td>4</td>
<td>Introduction, Degree of freedom, Types of vibrations, uses effects and remedy; free natural vibrations, Newton method and energy method for single degree of freedom. numerical</td>
</tr>
<tr>
<td>5</td>
<td>Damped vibrations; under damped, critically damped and over damped systems, response curves for single degree of freedom system. numerical</td>
</tr>
<tr>
<td>6</td>
<td>Forced vibrations with and without damping in single degree of freedom, rotating and reciprocating unbalance, base excitations, numerical</td>
</tr>
<tr>
<td>7</td>
<td>Vibration Isolation and transmissibility; Force transmissibility, Motion transmissibility. Forced vibration with rotating and reciprocating Unbalance. Materials used in vibration isolation, Numericals</td>
</tr>
<tr>
<td>8</td>
<td>whirling of shaft with a single disc without damping, and with damping numerical</td>
</tr>
</tbody>
</table>

1. Praveen Nagesh
2. Asheesh Kumar

Subject Coordinators

Prof. Mit K.Shah
HOD, Mech Engg Dept
Name of Subject : IC ENGINES  
Subject Code : 161902  
Semester : VI  

Percentage of Mid Sem Exam Syllabus: 60%

<table>
<thead>
<tr>
<th>Chapter No.</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Applications, actual working of IC engines, valve and port timing diagrams</td>
</tr>
<tr>
<td>2</td>
<td>Reasons for variation of specific heats of gases change of internal energy and enthalpy during a process with variable specific heats, isentropic expansion with variable specific heats, effect of variable specific heats on air standard cycles of Otto and diesel cycles.</td>
</tr>
<tr>
<td>3</td>
<td>Fuel air cycles, actual cycles and their analysis: Factors considered and assumptions made for fuel–air cycles, dissociation comparison of air standard and fuel air cycles, effect of operating variables on cycle analysis, difference between actual cycle and fuel air cycle for SI and CI engines.</td>
</tr>
<tr>
<td>5</td>
<td>Fuel supply systems for S.I engines: Fuel supply system for SI engines, properties of air-petrol mixture, mixture requirement for different loads and speeds, simple carburetor and its working,calculation of air-fuel ratio, types of carburetors, limitations of a single jetcarburetor, modern carburetors, problems in carburetors, altitude compensation, gasoline injection in SI engines, mpfi system for modern automobile engines.</td>
</tr>
<tr>
<td>7</td>
<td>Ignition system like battery, magneto, and electronic, spark plug, firing order. Governing system :quality, quantity &amp; hit and miss governing, intake and exhaust systems,-Scavenging systems:scavenging processes &amp; systems, scavenging pumps</td>
</tr>
<tr>
<td>8</td>
<td>Objects, types of superchargers. Supercharging of SI and CI engines, effects of supercharging, supercharging limits, methods of supercharging, turbocharging</td>
</tr>
<tr>
<td>9</td>
<td>Combustion in S.I. Engines: Stages of combustion, ignition lag and the factors affecting the ignition lag,flame propagation and factors affecting flame propagation, abnormal combustion and knocking in SI engines, factors affecting knocking, effects of knocking, control of knocking, combustion chambers for S.I. engines.</td>
</tr>
<tr>
<td>Chapter No.</td>
<td>Topic</td>
</tr>
<tr>
<td>-------------</td>
<td>-------</td>
</tr>
<tr>
<td>1</td>
<td><strong>Fundamentals of Cad:</strong> Introduction, Reasons for implementing a CAD system, Computer Aided Process application, conventional design vs CAD. Benefits, Hardware, CAD software, Elements of Programming, CAD programming. Technical specification of CAD workstation, computer software-operating system</td>
</tr>
<tr>
<td>2</td>
<td><strong>Computer Graphics:</strong> Scan conversions, DDA and Bresenham’s algorithm for generation of various figure, 2D and 3D transformations: Scaling, Translation, Rotation, Mirroring, Clipping, Homogeneous matrix.</td>
</tr>
<tr>
<td>3</td>
<td><strong>Geometrical Modeling:</strong> Types &amp; mathematical representation of curves, wire frame models, entities, representations, parametric representations Review of vector algebra, lines, circle, ellipse, parabolas, Parametric representation of synthetic curves, cubic curves, □ □-spline, Bezier spline, sweep curves</td>
</tr>
<tr>
<td>5</td>
<td><strong>Finite Element Analysis:</strong> Types of elements, types of error, derivation equitation finite element procedure, Stress – deflection – stiffness matrix, global matrix, conductivity table. Elimination approach, penalty approach, effect of temperature, principle of min. Potential energy</td>
</tr>
</tbody>
</table>
Name of Subject: Alternative Energy Resources  
Subject Code: 161904  
Semester: 6th  
Percentage of Mid Sem Exam Syllabus: 60%

<table>
<thead>
<tr>
<th>Chapter No.</th>
<th>Topic</th>
</tr>
</thead>
</table>
| 1 | Introduction:  
Man and energy, energy forms, World’s and India’s production and reserves of energy, Global and national energy scenarios, Need for alternate sources. |
| 2 | Solar Energy:  
Solar geometry, extraterrestrial radiation, spectral distribution, solar radiation at the earth’s surface, earth-sun angles, derived solar angles, sunrise, sunset and day length,  
2.1 Instruments for solar radiation measurements, estimation of average solar radiation, radiation on tilted surface. Solar collectors material, types and performance analysis,  
2.2 Collector efficiency, overall loss coefficient, collector efficiency factor, solar air heaters- types, performance, applications, focusing collector and its types, tracking, performance, non-focusing type collectors, CPC, optical losses. |
| 3 | Applications of Solar Energy:  
Solar water heaters, heating and cooling of buildings, solar pumping, solar cooker, solar still, solar drier, solar refrigeration and A/C, solar pond, solar power plant, heliostat, solar furnace, solar chimney power plant, photovoltaic system for power generation, solar cell modules and arrays, solar cell types, material, applications, advantages and disadvantages. |
| 5 | Biogas and Biomass:  
Introduction, types of biogas plants, biogas generation, factors affecting biogas generation, design consideration, advantages and disadvantages 5.1 site selection, applications, scope of biogas energy in India, biomass energy, energy plantation, gasification, types and application of gasifiers, design of gasifiers, |
| 7 | Geothermal Energy:  
Introduction, vapour dominated system, liquid dominated system, binary cycle, hot dry rock resources, magma resources, advantages and disadvantages, applications, geothermal energy in India: prospects |

Mit Patel, Abhishek Shah  
Subject Coordinator  
Prof. Mit K. Shah  
HOD, Mech Engg Dept.
Name of Subject : Control Engineering  
Subject Code : 161905  
Semester : 6th  

Percentage of Mid Sem Exam Syllabus: 60%

<table>
<thead>
<tr>
<th>Chapter No.</th>
<th>Topic</th>
</tr>
</thead>
</table>
| 1 | BASIC CONTROL SYSTEM:  
  System differential equation of electrical, mechanical, thermal, hydraulic and electromechanical network, analogy |
| 2 | THEORY OF AUTOMATIC CONTROL:  
  Concept of feedback referred to linear control systems in general, e.g. displacement and speed control, process control, definition and terminology, open loop and closed loop systems and its advantages,  
  2.1 Block diagrams and single flow graph representation of a physical system, block diagram algebra, transfer function from a block diagram. |
| 3 | HYDRAULIC SYSTEM:  
  Characteristic of hydraulic components control valves, sources of hydraulic power hydraulic meters, pistons and transmission, elements of circuit design, Accumulation control circuit such as position control and speed control circuit.  
  3.1 Hydraulic Systems: Reciprocating Pump, pressure intensifier, cranes, ram, press, lift. |
| 4 | PNEUMATIC SYSTEMS:  
  Introduction, Pneumatic power supply, FRL Unit |
| 5 | MICROPROCESSOR BASED DIGITAL CONTROL:  
  State space analysis optional and adaptive control systems, Industrial logic control system, programmable logic controller and its applications |
| 6 | FUZZY LOGIC:  
  Concept of fuggy logic, basic notions, linguistic variables of fuzzy control, comparison of design methodology, examples and case study |
Name of Subject : Heat & Mass Transfer  
Subject Code : 161906  
Semester : VIth

Percentage of Mid Sem Exam Syllabus: 60%

<table>
<thead>
<tr>
<th>Chapter No.</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fourier’s law of heat conduction, effect of temperature on thermal conductivity of metals, refractory and building materials, liquid and gases, derivation of generalized equation in Cartesian coordinates and its reduction to specific cases, three dimensional heat conduction equations in cylindrical and spherical coordinates.</td>
</tr>
<tr>
<td>2</td>
<td>One dimensional steady state conduction, heat conduction through plane and composite walls, hollow and composite cylinders, hollow and composite spheres, electrical analogy, overall heat transfer coefficient.</td>
</tr>
<tr>
<td>3</td>
<td>Critical thickness of insulation, transient heat conduction-lumped heat capacity analysis, time constant, transient heat conduction in solids with finite conduction and convective resistances.</td>
</tr>
<tr>
<td>4</td>
<td>Types of fin, heat flow through rectangular fin, infinitely long fin, fin insulated at the tip and fin losing heat at the tip.</td>
</tr>
<tr>
<td>7</td>
<td>Absorptivity, reflectivity and transmissivity, black, white and grey body, emissive power and emissivity, laws of radiation – Planck, Stefan Boltzmann, Wein’s displacement, Kirchoff, intensity of radiation and solid angle, Lambert’s cosine law</td>
</tr>
<tr>
<td>8</td>
<td>Radiation heat exchange between black bodies, shape factor, heat exchange between non-black bodies-infinite parallel planes and infinite long concentric cylinders, radiation shield, heat exchange between two grey surfaces, electrical analogy.</td>
</tr>
<tr>
<td>9</td>
<td>Types, heat exchanger analysis, LMTD for parallel and counter flow exchanger, condenser and evaporator, overall heat transfer coefficient, fouling factor, correction factors for multi pass arrangement, effectiveness and number of transfer unit for parallel and counter flow heat exchanger, introduction to heat pipe, compact heat exchangers</td>
</tr>
</tbody>
</table>

Mr. Mukesh Kumar  
Mr. Devendra singh  
SUBJECT CO-ORDINATORS

Prof. MIT. K. SHAH  
H.O.D MECH. DEPT.
Name of Subject: Industrial Engineering  
Subject Code: 161907  
Semester: 6th  
Percentage of Mid Sem Exam Syllabus: 60.00%

<table>
<thead>
<tr>
<th>Chapter No.</th>
<th>Topic</th>
</tr>
</thead>
</table>
| 1 | **Location Selection and Plant Layout:**  
Nature of Location Decision, Importance of Plant Location, Dynamic Nature of Plant Location, Choice of site for selection, State regulations on location, Government policies on decentralization. Industrial Estates, Economic Survey of Site selection, SEZ, Comparison of location,  
1.1 Principles of Plant layout and Types, factors affecting layout, methods, factors governing flow pattern, travel chart, analytical tools of plant layout, layout of manufacturing shop, repair shop and services sectors. |
| 2 | **Production Planning and Control:**  
Introduction:  
Types of production systems and their characteristics functions and objectives of P.P.C., product design and development including standardization and simplification,  
2.1 Sales forecasting, concept, techniques, application, production planning and process planning,  
2.2 Sequencing, loading and scheduling, techniques and their selection, line of balance, assembly line balancing, dispatching, progress control. |
| 4 | **Job Evaluation and Wage Plan:**  
Objective, Methods of job evaluation, job evaluation procedure, merit rating (performance appraisal), method of merit rating, wage and wage incentive plans |
| 5 | **Industrial Legislation**  
| 6 | **Inspection and Statistical Quality Control:**  
Inspection – functions, types, objectives and benefits, quality control – principles, Concepts of quality circles, Total quality management, Quality assurance, Quality audit, ISO, and six sigma. |
### Name of Subject: Refrigeration & Air Conditioning

#### Subject Code: 181901

#### Semester: 8th

#### Percentage of Mid Sem Exam Syllabus: 63%

<table>
<thead>
<tr>
<th>Chapter No.</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Refrigeration an introduction, heat load, development of refrigeration, aircraft refrigeration, Bell-Coleman cycle, Bootstrap air refrigeration system, types of air cycles, advantages and disadvantages.</td>
</tr>
<tr>
<td>2</td>
<td><strong>Vapour Compression system:</strong> Simple system on P-h diagram, analysis of the simple cycle, factors affecting the performance of the system, actual cycle considering different losses. <strong>Compound Compression System:</strong> Need, flash tank, Compound compression with flash and inter cooler, all evaporators working at the same temperature, evaporators with back pressure valves and with multiple expansion valves without flash inter cooling, analysis of two evaporators with flash inter cooler and individual and multiple expansion valve, estimation of power requirement and COP.</td>
</tr>
<tr>
<td>3</td>
<td><strong>Absorption refrigeration system:</strong> Characteristics of refrigerant, selection of pair, practical water -NH3 cycle Li – Br system and its working.</td>
</tr>
<tr>
<td>5</td>
<td><strong>Steam jet refrigeration system:</strong> Basic concepts, system analysis, performance of steam jet refrigeration equipments, application, advantages and disadvantages.</td>
</tr>
<tr>
<td>6</td>
<td><strong>Refrigerants:</strong> development, classification, designation of refrigerants, secondary refrigerants, future industrial refrigerants</td>
</tr>
<tr>
<td>7</td>
<td><strong>Psychrometry and psychrometric terms:</strong> properties of air, Daltons law of partial pressure, humidity, temperature, enthalpy of moist air, temperature and humidity measuring instruments, plotting psychrometric chart, psychrometric processes such as sensible heating, cooling, heating and humidification cooling and dehumidification, chemical dehumidification, adiabatic saturation.</td>
</tr>
<tr>
<td>8</td>
<td><strong>Human comfort:</strong> air temperature and human body, body thermoregulation, effective temperature, comfort chart and factors governing effective temperature.</td>
</tr>
<tr>
<td>9</td>
<td><strong>Load analysis:</strong> Site survey, outdoor design conditions. Indoor design conditions, classification of loads, Flywheel effect of building material and its use in design, effect of wall construction on cooling load, instantaneous heat gain (IHG) and instantaneous cooling load (ICL) heat transmission through sunlit and shaded glass using tables, method of reduction of solar heat gain thorough glass, total equivalent temperature difference, calculations of cooling load TETD due to sunlit and shaded walls using tables, air infiltration and load due to outside air, ventilation, heat gain from occupants, electric lights, product, electric motor and appliances, use of load estimation sheet.</td>
</tr>
</tbody>
</table>
Name of Subject : Machine Design-II  
Subject Code : 181902  
Semester : VIII  
Percentage of Mid Sem Exam Syllabus: 60 %

<table>
<thead>
<tr>
<th>Chapter No.</th>
<th>Topic</th>
</tr>
</thead>
</table>
| 1           | **SPUR GEARS AND PARALLEL AXIS HELICAL GEARS:**  
               Gear Terminology, Speed ratios and number of teeth, Force analysis, Tooth stresses, Dynamic effects, Fatigue strength, Factor of safety, Gear materials, Module and Face width-power rating calculations based on strength and wear considerations  
               **Parallel axis Helical Gears :**  
               Pressure angle in the normal and transverse plane, Equivalent number of teeth-forces and stresses. Estimating the size of the helical gears. |
| 2           | **BEVEL AND WORM GEARS:**  
               Straight and spiral bevel gear: Tooth terminology, tooth forces and stresses, equivalent number of teeth. Estimating the dimensions of pair of straight and spiral bevel gears. Worm Gear: Merits and demerit, - terminology, Thermal capacity, materials, forces and stresses, efficiency, estimating the size of the worm gear pair |
| 4           | **DESIGN OF I .C. ENGINE COMPONENTS:**  
               Selection of type, general design consideration, design of cylinder, cylinder liner, cylinder head, pistons, connecting rod |
| 5           | **DESIGN OF MATERIAL HANDLING EQUIPMENTS:** Introduction: material handling equipments, classification and their selection. Concept of material handling system design. |

Raghav S. Patel  
Subject Coordinator  

Prof. Mit K.Shah  
HOD, Mech Engg Dept.
Name of Subject : PRODUCTION TECHNOLOGY  
Subject Code :  (181903)  
Semester: 8th  
Percentage of Mid Sem Exam Syllabus: 73%  

<table>
<thead>
<tr>
<th>SR. NO.</th>
<th>TOPIC NAME</th>
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</thead>
</table>
| 1       | THEORY OF METAL CUTTING:  
Principles of metal machining, cutting tools and tool materials, tool signature, mechanics of chip removal, cutting forces and parameters effecting it, cutting fluids, tool wear, tool life, economics of machining. Multi point cutting tools, temperature measurement at tool-work interface and its Effects. |
| 2       | PRESSES AND PRESS WORK:  
Classification of presses, Classification of dies, cutting actions in dies, clearance, cutting forces, center of pressure design of press tools, methods of mounting of punches, scrap reduction, strip layout. |
| 3       | JIGS & FIXTURES:  
Definition, its usefulness in mass production, design principles, locating systems and types of locators & clamps, jig bushes, design of jigs and fixtures for various machining operations |
| 4       | Non-conventional Machining:  
EDM, IBM, ECM, ECG, CM, AJM, wire cut EDM, USM, LBM process principle, process parameters and their applications.. |

Mr. Bhagyadeep Kalal  
(Subject Coordinator)  
Prof. Mit K. Shah  
(Head, Mech. Engg. Dept)
Name of Subject : Thermal Engineering  
Subject Code : 181904  
Semester : VIII  
Percentage of Mid Sem Exam Syllabus: 60%

<table>
<thead>
<tr>
<th>Chapter No.</th>
<th>Topic</th>
</tr>
</thead>
</table>
| 1 | Steam Nozzles:  
Types of nozzles, velocity of steam, discharge through nozzle, critical pressure ratio and condition for maximum discharge, physical significance of critical pressure ratio, effect of friction and nozzle efficiency, general relationship between area, velocity and pressure in nozzle flow, supersaturated flow. |
| 2 | Steam turbine:  
Principle of operation, types of steam turbines, compounding of steam turbines, impulse turbine- velocity diagram, calculation of work, power and efficiency, condition for maximum efficiency, Reaction turbines – velocity diagram, degree of reaction, Parson turbine, work, power, efficiencies, blade height, condition for maximum blade efficiency for Parson turbine, reheat factor. |
| 3 | Gas turbine:  
Classification, open and closed cycle, gas turbine fuels, actual braytoncycle, optimum pressure ratio for maximum thermal efficiency, work ratio, air rate, effect of operating variables on the thermal efficiency and work ratio, and air rate means of improving efficiency and specific output of simple cycle- open cycle turbine with regeneration, reheating and Intercooling, combined steam and gas turbine plant. |

Mr. Nandlal Mina  
Subject Coordinator  

Prof. Mit K. Shah  
HOD, Mech. Engg. Dept
Name of Subject : Industrial Safety and Maintenance Engineering  
Subject Code : 181905  
Semester : VII  
Percentage of Mid Sem Exam Syllabus: 65 %

<table>
<thead>
<tr>
<th>Chapter No.</th>
<th>Topic</th>
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</table>
| 1           | Introduction to the development of industrial safety and management:  
History and development of Industrial safety: Implementation of factories act,  
Formation of various councils, Safety and productivity, Safety organizations.  
Safety committees, safety committee structure, Roll of management and roll of  
Govt. in industrial safety, Safety analysis. |
| 2           | Accident preventions, protective equipments and the Acts:  
Personal protective equipment, Survey the plant for locations and hazards, Part  
of body to be protected, Education and training in safety, Prevention causes and  
cost of accident, Housekeeping, First aid, Firefighting equipment, Accident  
reporting, Investigations, Industrial psychology in accident prevention, Safety  
trials. |
| 3           | Safety Acts:  
Features of Factory Act, Introduction of Explosive Act, Boiler Act, ESI Act,  
Workman’s compensation Act, Industrial hygiene, Occupational safety,  
Diseases prevention, Ergonomics, Occupational diseases, stress, fatigue, health,  
safety and the physical environment, Engineering methods of controlling  
chemical hazards, safety and the physical environment, Control of industrial  
office and protection against it, Code and regulations for worker safety and  
health. |
| 4           | Principles and practices of Maintenance planning:  
Basic Principles of maintenance planning – Objectives and principles of planned  
maintenance activity – Importance and benefits of sound Maintenance systems –  
Reliability and machine availability, Equipment Life cycle, Measures for  
Maintenance Performance: Equipments breakdowns, Mean Time Between Failures, Mean Time To Repair, Factors of availability, Maintenance  
organization, Maintenance economics. |

Miss Kajal Harsadani  
Subject Coordinator  

Prof. Mit K. Shah  