SHANTILAL SHAH ENGINEERING COLLEGE

MECHANICAL ENGINEERING DEPARTMENT

PROGRESSIVE ASSESSMENT TEST SYLLABUS FOR AUGUST 2018

SEMESTER VII

**OPERATION RESEARCH (2171901)**

| SR NO. | TOPIC NAME | DESCRIPTION |
|---|---|---|
| 1 | Introduction to OR | Origin of Operation Research, Historical Standpoint, Methodology, Different Phases, Characteristics, Scope and Application of OR |
| 2 | Linear Programming Problem | Formulation of LPP, Graphical Method, Simplex method, Big-M method, Two Phase Method, Sensitivity Analysis |
| 3 | Transportation Problem | North-west corner method, Least cost method, Penalty method, Stepping stone method, MODI method, Transhipment problem, Prohibited Transportation, Profit Maximization problem |
| 4 | Game Theory | Introduction, Characteristics of Game Theory, Two Person, Zero sum games, Pure strategy. Dominance theory, Mixed strategies (2x2, mx2), Algebraic and graphical methods |

**Subject Convener: Prof. P V Parekh**

## COMPUTER AIDED MANUFACTURING (2171903)

| Sr. No. | Topic |
|---|---|
| 1. | **Computer Aided Manufacturing:** CAM Concepts, Objectives & scope, Nature & Type of manufacturing system, Evolution, Benefits of CAM, Role of management in CAM, Concepts of Computer Integrated Manufacturing, Impact of CIM on personnel, Role of manufacturing engineers, CIM Wheel to understand basic functions. |
| 2. | **Programmable Logic Controllers:** Relay Device components, Programmable controller architecture,, programming a programmable controller, tools for PLC logic design. |
| 3. | **Group Technology and CAPP:** Introduction, part families, part classification and coding systems: OPIT Z, PFA, FFA, Cell design, rank order clustering, composite part concepts, Benefits of group technology. Approaches to Process Planning, Different CAPP system, application and benefits. |
| 4. | **Flexible Manufacturing System:** Introduction & Component of FMS, Needs of FMS, general FMS consideration, Objectives, Types of flexibility and FMS |

**Subject Convener: Prof. V J Pandya**

**MACHINE DESIGN (2171909)**

| Sr. No. | Topic |
|---|---|
| 1. | **Gear Design:**<br>Recitation: Classification of gears, Selection of type of gears, Law of Gearing, Gear terminology, Standard system of gear tooth, force analysis, Interference and undercutting, number of teeth, gear tooth failures, selection of material. Spur and Helical Gears: Stress in gear tooth: Lewis formula, AGMA bending stress equation and AGMA pitting resistance formula, Gear quality and selection aspects.<br>Bevel and Worm gears: Specifications and design of bevel and worm gears.<br>[NO NUMERICALS] |
| 2. | **Bearing Design:-**<br>Hydrodynamic Bearing . Basic nomenclature, Bearing Materials, Bearing modulus, Design procedure Importance of Sommerfield number, Examples on Bearing Design Antifriction bearing , various types, applications and rating life and dynamic load |

**Subject Convener: Prof. R A Mehta**

## POWER PLANT ENGINEERING (2171910)

| Sr. No. | Topics |
|---|---|
| 1. | **Thermal Power Plant:** General layout of modern thermal power plant, Site selection. |
| 2. | **High Pressure Boilers:** (Unique features and advantages of high pressure boilers, La-Mont; Benson; Velox, Loeffler and Schmidt-Hartmann boilers. |
| 4. | **Draught System:** Natural draught – estimation of height of chimney, Maximum discharge condition, Forced; induced and balanced draught, Power requirement by fans. |
| 8. | **Feed Water Treatment:** Necessity of feed water treatment, Different impurities found in feed water, Effect of impurities, pH & its role in corrosion and scale formation, Internal & external water treatment systems – Hot lime soda process, Zeolite ion exchange process, Demineralization plants, Reverse osmosis process, Sea water treatment using reverse osmosis, De-aeration. |
| 12. | **Economics of Power Generation:** Load curves, Load duration curves, Connected load, Maximum load, Peak load, Base load and peak load power plants, Load factor, Plant capacity factor, Plant use factor, Demand factor, Diversity factor, Cost of power plant, Performance and operating characteristics of power plant, Tariff for electric energy. |

**Subject Convener: A.D.KALANI**

## METAL FORMING ANALYSIS (2171913)

| SR. NO. | PAT SYLLABUS |
|---|---|
| 1 | **Unit 1 :** Introduction to hot forming, cold forming, warm forming its advantages and disadvantages. Typical stress strain diagram for ductile materials Forming properties of metals and alloys (yield strength/flow stress, ductility, strain hardening, strain rate sensitivity, effect of temperature and hydrostatic pressure on yield strength) Classification of forming processes and advantages of metal forming |
| 2 | **Unit 2 :** Stress of stress at a point, stresses on an inclined plane, Principal stress, Two dimensional Mohr's circle for stress analysis, Deformation and strain, Stress of strain at a point |
| 3 | **Unit 3 :** Yield conditions, Von Mises' hypothesis of yielding, Tresca's hypothesis of yielding, graphical representation of yield criteria Elastic stress strain relations for isotropic elastic materials, Idealized stress strain relations in plastic deformations, Isotropic and kinematic work hardening |
| 4 | **Unit 5 :** FORGING processes : Introduction, classification of forging, forging machines, metal flow in forging, Analysis of plane strain compression, analysis of compression of circular disc with slab method |
| 5 | **Unit 6 :** EXTRUSION Processes : Introduction, calculation of extrusion load using slab method, slip line method & upper bound method Defects in extrusion. Direct & indirect extrusion. WIRE DRAWING Processes: Introduction, defects, maximum possible reduction. Wire drawing load calculation using slab method |
| 6 | **Unit 7 :** ROLLING Processes : Classification, types of mill, camber Analysis of longitudinal strip Analysis of longitudinal sheet rolling process calculation of roll separating force, torque & power, angle of bite, maximum reduction in rolling rolling defects, roll flattening, roll Introduction to Friction Introduction to forming forming processes |

**Subject Convener: Prof. S G Harsora**