

**TAMIL NADU PUBLIC SERVICE COMMISSION**

**POST OF PRINCIPAL / ASSISTANT DIRECTOR (TRAINING)**

**INCLUDED IN THE TAMIL NADU EMPLOYMENT AND TRAINING SERVICE**

**INDUSTRIAL ENGINEERING (DEGREE STANDARD)**

**UNIT I - Work System Design**

Total work content and ineffective time - productivity – concepts and measurements, factors affecting productivity, method study – tools and techniques, micro-motion study, principles of motion economy; work measurement – stop watch time study, work sampling, standard data, PMTS - incentive schemes and wage administration, Form design and control.

**UNIT II - Operations Research**

Linear programming – problem formulation, simplex method, duality and sensitivity analysis; transportation and assignment models; network models, constrained optimization - Lagrangean method; simple queuing models; dynamic programming; – Integer programming – branch and bound algorithm, PERT and CPM, Project costing and control.

**UNIT III - Ergonomics and Safety**

Objectives, man – machine concept, measurement of energy expenditure – physiological fatigue, work rest schedule, physical fitness test, work place design – problems of body size, anthropometry measures and work posture, design of displays and control and VDT work station, industrial accidents, effect of environment – heat, cold and noise.

**UNIT IV - Production and Operations Management**

Forecasting methods – causal and time series models, moving average, exponential smoothing, trend and seasonality; aggregate production planning; master production scheduling; MRP – lot sizing methods, MRP-II; scheduling and priority dispatching; push and pull production systems, Inventory – functions, costs, classifications, deterministic and probabilistic inventory models, quantity discount; perpetual and periodic inventory control systems.

## **UNIT V - Product Design and Development**

Principles of good product design, quality and cost considerations; product life cycle; standardization, simplification, diversification, value engineering and analysis, Design for manufacturing, Intellectual Property rights – patents, copy rights, industrial design and trade marks.

## **UNIT VI - Engineering Economy and Cost Estimation**

Objectives of managerial economics, cost estimation, classification and elements of cost, Estimation of material, labour and overhead cost, break-even analysis, Estimation of operational cost – sheet metal, machine shop and welding.

## **UNIT VII - Facilities Planning and Layout**

Factors affecting location decisions - evaluation of alternate locations; types of plant layout - evaluation; computerised layout design – CRAFT, ALDEP and CORELAP; assembly line balancing – Methods- Kilbridge and Wester, RPW, COMSOAL; materials handling systems – principles, types of equipments.

## **UNIT VIII - Quality Management**

Quality – concept and costs, quality circles, quality assurance; statistical quality control, acceptance sampling, zero defects, six sigma; total quality management; ISO 9000; design of experiments – Taguchi method.

## **UNIT IX - Supply Chain and Logistics Management**

Supply chain drivers and metrics, network design, factors affecting transportation decision, sourcing and coordination – supplier selection, IT in supply chain – Bullwhip effect.

## **UNIT X - Reliability and Maintenance**

Reliability, availability and maintainability; distribution of failure and repair times; determination of MTBF and MTTR, reliability models; system reliability determination; preventive maintenance and replacement, total productive maintenance – concept and applications.