PGDPM-01

Operations Research for Managerial Application

BLOCK – 1

UNIT – 1 Operation Research – An Overview –

History, Approach, Techniques and Tools, Relationship between O. R. Specialist and Manager, Typical Applications of O.R, Phases and Processes of O.R.Study, Limitations of Operations Research ,

UNIT – 2 Review of Probability and Statistics –

Random Experiment and Probability, Random Variable : Discrete v/s Continuous, Probability Distribution and Summary Statistics, Some Important Discrete Probability Distributions, Some Important Continuous Probability Distributions

BLOCK – 2

UNIT – 3 Linear Programming –

Graphical Method – Formulation of a Linear Programming Problem, Formulation with Different Types of Constraints, Graphical Analysis, Graphical Solution, Multiple, Unbounded Solution and Infeasible Problems, Application of Linear Programming in Business and Industry

UNIT – 4 Linear Programming –

Simplex Method – Principle of Simplex Method, Computational aspect of Simplex Method, Simplex Method with several Decision Variables, Two Phase and M-method, Multiple Solution, Unbounded Solution and Infeasible Problem, Sensitivity Analysis, Dual Lineal Programming Problem,

UNIT – 5 Transportation Problem –

Basic Feasible Solution of a Transportation Problem, Modified Distribution Method, Stepping Stone Method, Unbalanced Transportation Problem, Degenerate Transportation Problem, Transhipment Problem,

Maximisation in a Transportation Problem,

UNIT – 6 **Assignment Problem –**

Solution of the Assignment Problem, Unbalanced Assignment Problem, Problem with Some Infeasible Assignments Maximisation in an Assignment Problem, Crew Assignment Problem.

BLOCK – 3

UNIT – 7 **Concepts of goal programming,**

Goal programming model formulation, Graphical method of goal programming, The simplex method of goal programming, Application areas of goal programming. Application areas of goal programming,

UNIT – 8 **Some Integer Programming**

Formulation Techniques, Unimodularity, Cutting Plane Method, Branch and Bound Method,

UNIT – 9 **Dynamic Programming Methodology:**

An Example, Definitions and Notations, Dynamic Programming Applications,

UNIT – 10 **Solution of a Non-linear Programming**

Problem, Convex and Concave Functions, Kuhn-Tucker Conditions for Constrained Optimisation, Quadratic Programming, Separable Programming

BLOCK – 4

UNIT – 11 **Inventory Control – Deterministic Models –**

Inventory : An Essential Requirement, Objectives of Inventory, Functions of Inventory, Classifications of Inventory, factions Affecting, Inventory Modelling, Deterministic Single Item Inventory Models, Deterministic Multi-Item Inventory Models

UNIT – 12 **Inventory Control –**

Probabilistic Models – Inventory Models with Probabilistic Demand, Single Period Probabilistic Models, Inventory control Systems, Fixed Order

Quantity System, Periodic Review System, Other Variants of Probabilistic Models.

UNIT – 13 **Queueing Models –**

Characteristics of a queueing model. Natations and Symbols, Statistical methods in queueing, The M/M/I System, The M/M/C System, The M/Mk/I System, Decision problems in queueing.

BLOCK-5

UNIT – 14 **Competitive Situations: Game Theory –**

Definitions and explanation of some important terms, Saddle points, Dominance, Mixed strategies: Games without saddle points, 2xn games, Exploiting an opponent's mistakes.

UNIT – 15 **Simulation –**

Reasons for using simulation, Limitations of simulation, Steps in the simulation process, Some practical applications of simulation, Two typical examples of hand-computed simulation Computer Simulation

BLOCK-6

CASE-1 Insulator India Limited

CASE-2 Use of Operations Research Techniques: A Case Study of ECS Corporation

PGDPM-02

Project Management

BLOCK -1 Project Formulation and Appraisal

UNIT- 1 Project management: An Overview –

Project Management Its Role & Scope, History of PERT/CPM, Need for Project Management, Some Major Project Management Concepts, Tools and Techniques in Project Management, Success factors in Project Management

UNIT- 2 Feasibility and Technical Analysis –

Nature of Project Decision, The Project Development Cycle, Opportunity Studies, Pre-Feasibility and Feasibility Studies, Technical Analysis.

UNIT- 3 Market and Demand Analysis –

Forecast Verses Prediction, Time Horizon of Demand Forecasting, Need for Demand Forecasting, Uncertainties in Demand Forecasting, Levels of Demand Forecasting, Determinants of Demand for Capital Goods, Criteria for a Good Forecasting Method, Methods of Forecasting Demands, Errors in Demand Forecasting.

UNIT- 4 Economic and Financial Analysis –

Financial Analysis of Projects, Return on Investment, Pay Back Period, Discounted Cash Flow Techniques, Net Present Value, Internal Rate of Return, Profitability Projections, Economic Analysis of Projects.

UNIT- 5 Formulation of Detailed Project Reports –

Planning as an Essence of Design Phase, Market Planning, Equipment and Process Technology, Location of the Project, Layout of the Project, Material Balance of the Project, Specification of Main Plant and Equipment, Environment impact Assessment, Operations, Commercial Aspects, Financial Aspects, Socio-Economic Aspects, Doubled Project Report.

BLOCK -2 Project Planning and Scheduling

UNIT- 6 Planning Time Scale Network Analysis –

Network Diagramming of Projects Diagrams, Time - Analysis of Networks, Probabilistic Durations, Project Scheduling. Importance of Materials and Equipment, Network –Based Materials Management, Sectionalizing Planning of Materials, Longest Delivery term and Project Duration, Beating the Critical; Path, Combating Inflation, Construction Equipment and Materials, Supporting Services for Construction Equipment and Materials.

UNIT- 7 Materials and Equipment –

Importance of Materials and Equipment, Network-based Materials Management, Sectionalising Planning of Materials, Longest Delivery Item and Project Duration, Beating the Critical Path, Combating inflation, Construction Equipment and material, Supporting Services for Construction Equipment and Materials.

UNIT- 8 Human Resources –

Project Goals, Planning and Scheduling, Human Being as a Human Resource, Balancing Human Resources, Types of Problems in Balancing Human Resources, Conceptual Resource Leveling, Methods of resource Profile, Methods of Resource Allocation, Harnessing Potential of Human Resources.

UNIT- 9 Project Costing and Financing –

Costing of Projects, Costing and Pricing of Projects, types of cost Estimates in Projects, Project Scoping Project Financing, Sources of Long Term Funds, Rupee Loans and Free Exchange, Sources of Short term Rupee Funds.

UNIT- 10 Organisation Structures in Projects –

Types of Organisations Structures, Hierarchical Organisations Structures, Integrating Projects in Fundamental Organisations, Evolution of

Organisations Structures in projects, Matrix Organisations, Complexities of Matrix Organisations Structure, Advantages of Matrix Organisations Structures, Fitting Matrix Structure into the Organisations, Types of Matrix Organisations Structure, Organisations Structure in Twenty –Fist Century.

BLOCK -3 Implementation and Control

UNIT- 11 Project Management Information System –

Objective of Project Management Information System, Planning by Network Analysis, Cost Control Systems, Integrated Project Management Information System, Project Monitoring and Reporting, System automation and Computerisation

UNIT- 12 Material and Equipment –

Importance of Material and Equipment in Project Implementation and Control, Financial aspects of Materials and Equipment, Contracting of Materials and Equipment, Fail-Safe management of Material and Equipment

UNIT- 13 Human Resources –

Schematic of Planning and Control, Project Implementation, Concept of Project Driver, Directing Individuals and Teams, Reinforcement of Commitment and Excitement, Informing Everyone on the Project, Vitalizing Project Teams, Empowering Project Personnel, Risk Taking and Creativity, Feed forward Project Control.

UNIT- 14 Financial Aspects-

Accounting System, Implementing the Financing Plan, Authorisation of Expenditure, The Concept of Control, Factors Affecting Control of Project Cost, The PERT-COST System, Project Control Curves, Variance Analysis Approach to Cost Control, The performance Analysis Approach, Integrated Cost/ Schedule Graph.

BLOCK -4 Project Completion and Evaluation

UNIT- 15 Integrated Project Management Control System –

Computer Applications, Computer Softwares, Project Management Software Packages, and Computer Applications in Project Appraisal

UNIT- 16 Managing Transition From Project to Operation–

Objective of Commissioning, Organisations Matrix for Commissioning, Planning for Commissioning, Forecasting Requirements of Commissioning, Quality Assurance during Manufacturing, Quality Checks of Equipment on Arrival at site, Concept of Total Quality Management in Projects, Handing Over/ Taking Over Procedures, Proofing Runs &Trial Production, Costing and Capitalisation of Assets.

UNIT- 17 Project Completion and Evaluation-

Project Review – Invisibility Of Planning &Control in Projects, Importance of Project Review, Project Cc-ordination Procedures, Elements of Control in Projects, Concept of Cybernetics, Project Planning Procedures, Project Reporting, Monitoring and Motivation, Teamwork in Projects

PGDPM-03

Management of Machines and Materials

BLOCK -1

UNIT- 1 **Operations Management- An Overview –**

Systems Concept in Operation Management, Objectives in Operation Management, Operations Management Decisions, Types in Production systems, Management of Materials in Production systems, Concepts in Systems Life-Cycle, Role of Scientific Method in Operation Management, Brief History of Operation Management

BLOCK-2

UNIT- 2 **Product Selection –**

The Product Selection Process, Selection of the products, Product Development, Product Design.

UNIT- 3 **Process Selection –**

Forms of Transformation Process, The Project form, Intermittent and Continuous Flow Process, Processing Industries, Selection of the Process

UNIT- 4 **Facilities Location –**

Meaning, Location Decision, Steps in the Facility Location Study, Subjective, Qualitative and Semi-Quantitative Techniques, Location Break–Even Analysis, And Quantitative Models for Facility Location

UNIT- 5 **Facilities Layout and Material Handling –**

Basic Layout of Plant Layouts, Plant Layout Factors, Layout Design Procedure, Flow and Activity Analysis, Space determination and Area Allocation, Computerized Layout Planning, Evaluation, Specification, Presentation and Implementation, Materials Handlings Systems, Material Handling Equipment

UNIT- 6 **Capacity Planning –**

Meaning, Process for Capacity Planning, Predicting Future Capacity Requirements, Generation of Capacity Plans, Evaluation of Alternate Capacity Plans

BLOCK- 3

UNIT- 7 **Work Design –**

Introduction to Work Design, The Work study Approach: An Overview, Method Study, Work Measurement, Work Study application.

UNIT- 8 **Job Design –**

Introduction To Job Design, Design Factors, Environmental and organizational Factors, Behavior Dimensions of job Design, Socio- technical Approach to Job Design

BLOCK- 4

UNIT- 9 **Planning and Control for Mass Production –**

Mass Production, Features of Mass Production System, Notion of a Assembly Lines and Fabrication Lines, Design of an Assembly Line, Line Balancing Methods, Problems and Prospects of Mass Production, Modular Production and Group Technology, Automation and Robotics.

UNIT- 10 **Planning and Control for Batch Production –**

Features of Batch Production, Determining Optimum Batch Size, Aggregate Production Planning, Material Requirements Planning, The Line of Balance for Production Control and Monitoring, Problems and prospects of Batch Production.

UNIT- 11 **Planning and Control for Job shop Production–**

Variety of Problems in Job Production, n Jobs One Machine Case, n Jobs two Machine case, Two jobs m Machine case, Scheduling Rules for job Shops, Problems and Prospects of Job Production.

UNIT- 12 **Planning and Control of Projects -**

Projects, Network Representation of Projects, Time Management of the Projects, critical path Method, Programme Evaluation and Review Technique, Time Cost Relationship and Project Crashing, Resource Allocation, Project Updating and Monitoring

UNIT- 13 **Maintenance Management –**

Introduction to Maintenance Management, Tero-Technology, Objectives of Maintenance, Objectives of Maintenance, Failure Analysis. Types of Maintenance Systems, Preparation, Operation and Progression of Maintenance planning and Control, Maintenance Costing and Budgeting, Maintenance Performance Indices

BLOCK- 5

UNIT- 14 **Value Engineering –**

Basic Concepts in Value Engineering, Historical Perspectives, Functions and Value, Value Engineering Plan, Fast Diagram as Value Engineering Tool, Behavioral and Organisational aspects of Value Engineering, Benefits of Value Engineering and Concluding Remarks.

UNIT- 15 **Quality Assurance –**

Concept of Quality, Cost of Quality, Quality Management, Quality Organisations, Acceptance Sampling, Process control, Use of Computers in Quality Control

BLOCK- 6

UNIT- 16 **Purpose System and Procedure-**

Role of Purchasing Function, Inputs, Restraints and Factors, Purchasing Decision, Purchasing Organisations, Procedures, Forms, Records and Reports, Evaluation of Departmental Procedures, Vendor Evaluation and Rating, Computerised Purchasing Systems, Purchasing in Government Organisations.

UNIT- 17 **Inventory Management –**

Introduction to Inventory Systems, Functions of Inventory, Classification of Inventory systems, Selective Inventory Management, Exchange Curve and Aggregate Inventory Planning, Deterministic Inventory Models, Probabilistic Inventory Models, Inventory Control of Slow Moving Items, Recent Developments in Inventory Management

UNIT- 18 **Stores Management –**

Stores Functions, Stores Organisations, Stores Systems and Procedures, Stores Accounting and Verification Systems, Stores Address Systems, Store Location and Layout, Store Equipment, Automated Storage/Retrieval.

UNIT- 19 **Standardization, Codification and Variety Redefine–**

Classification of Materials, Codification, Standardization and Variety Reduction

UNIT- 20 **Waste Management –**

Introduction, Complementarity of Waste Management and Resource Management, Taxonomy of Wastes, Definition of Wastivity: Gross and Net Wastivity, The Functional Classification of Waste Management, Outline of I-O-W(input–output-Waste) Model, Treatment of Waste in Cost accounts.

PGDPM-04

Management of New and Small Enterprises

BLOCK -1

UNIT- 1 **Entrepreneurship and Small Scale Enterprises-**

Role in Economic Development – Definition of Small Scale. Characteristics and Relevance of Small scale enterprises, Relation of Small to Large, Employment Creation, Regional Balance and Rural Development, Role of Entrepreneurship in SSE and Economic Development, A Conceptual Model, Problems and Support Needs of SSEs, Role of Government In SSE Development

UNIT- 2 **Entrepreneurial Competencies –**

Entrepreneurial Competencies- Meaning, Major Entrepreneurial Competencies- A Research Study, Developing Entrepreneurial Competencies

UNIT- 3 **Institutional Interface for Small Scale Enterprises-**

Industrial interface-The Concept, Government Policy - Industrial Policy Resolutions, The Administrative and Institutional Set up.

BLOCK-2

UNIT- 4 **Opportunity Scanning and Identification-**

Understanding Entrepreneurship, Alternative Fields of self-employment, Identification of an Opportunity, The Zeroing in Process- Final stage, An Attempt at integration

UNIT- 5 **Market Assessment For SSE –**

Market Orientation, Need for Market Assessment, Market demand Analysis, Analysing Competitive situation, Understanding Trade Practices

UNIT- 6 **Choice of Technology and Selection of SITE –**

Product/service Design, Technology Determination, Selection of Site.

BLOCK- 3

UNIT- 7 **Financing the New/Small Enterprises –**

Financial Planning- Assessing the Financing Requirements, Providing Bank Finance- The Indian Perspective, Financial Institutions Which Provide Assistance to Small Enterprises, Types of Loans, Institutions and their Role, Self-Employment scheme for Educated Unemployed Youth.

UNIT- 8 **Preparation of the Business Plan –**

Project report – Significance and Scope, Executive Summary of the Plan, Product Description, Location Criteria and Checklist, Plant and Machinery – Space consideration, Technical Feasibility and Know –how, Raw Materials, Working Capital Computation- A Checklist, Project Cost Components, Cost of Production and Profitability Projection, Case Flow Statement, Break-even Analysis, Drawing up an Implementation Schedule, Common Errors in Business Plan Formulations.

UNIT- 9 **Ownership Structure's and Organisational Framework –**

Forms of Business Organisations, Proprietorship, Partnership, Company, Forms of Ownership-Advantages and Disadvantages, Taxation and Legal Forms of Organisations, Zeroing in – Making the selection

BLOCK- 4

UNIT- 10 **Financial Management Issue's in SSE-**

Business Success or Failure, Evaluating Performance Principle of Conservatism, Asset Management, growth Strategy –the Financial Implication, Managing Liabilities, and Maintaining Accounts

UNIT- 11 **Operational Management Issue's in Small Scale Enterprise –**

Product/products Selection, Development and

Design, Development of Prototype and Selection of Process and Plant and Machinery, Plant Location, Plant Layout, Industrial Engineering, Production Planning and Control, work services and Their Management, Quality Control.

UNIT- 12 **Marketing Management Issue's in SSE –**

Market Segmentation, Marketing Mix, Product, Pricing, Promotion and Place

UNIT- 13 **Organisational Relation's in SSE –**

Human Factor in Small Industry, HRM in Small Industry, Human Resource Planning, Recruitment, Selection, Training and Development, Remuneration and Benefits, Working Conditions and Personal Relations, Relationship with Employees, Improving Personnel Relations.

BLOCK- 5

UNIT- 14 **Management Performance Assessment and Control –**

A Total Performance Index, Short term Measures: Control of Cash Flow, Measures of Marketing Performance, Production Schedule as a Evaluation and Control Tool, Asset <Measures of Performance: Some Financial Ratios, A Comprehensive Check List to Rate Yourself.

UNIT- 15 **Strategies for Stabilisation and Growth-**

Stages of Growth, Stabilisation Strategies, Growth Strategies, Strategy Structure and Systems, Changing Management Demands

UNIT- 16 **Managing Family Enterprises –**

Family Business in India, Family Business Defined, Family Control, Viability of Family Business, Family Management Practices, Issues and Problems in Family Business, Coping Strategies

PGDPM-05

Production/Operations Management

BLOCK-1

UNIT-1 **Production and Operations Management: An Overview-**

Scope and Significance, Systemic View of Operations Management, Factors of Production, Productive Use of Resources, Environmental Concerns of Operations, Social Concerns of Operations, Multidisciplinary Nature of Operations, Whither Operations Management in India

UNIT-2 **Production System: Issues and Environment –**

Role of Production Management, Production/ Operations Management: A System View Point, Production System Design, Productivity Improvement, Upcoming Issues of Production System. Production Systems and Information Technology

UNIT-3 **Total Quality Management (TQM)-**

TQM : a Historical Perspective, Quality Terminology, Understanding and Improving the Process, Employee Involvement and Empowerment, ISO 9000: The International Quality System Standard

BLOCK-2

UNIT-4 **Need and Importance of Forecasting –**

Concept of Forecast, Need of Forecast in Production/Operations Management, General Steps in the Forecasting Process, Importance and Application of Forecast in Production/Operation Management

UNIT-5 **Qualitative Methods of Forecasting –**

Judgmental Forecasting, The Delphi Technique, Opinion-Capture Technique, The Operational Details, The Forecasting Delphi, The Decision-Analysis Delphi, Delphi as a Group Process, Guidelines for Conducting a Delphi Study, Guidelines for Selecting the Delphi Panelists, Advantages, Common Pitfalls of Delphi, variants of Delphi, Final Remarks on Delphi and its Variants, Forecasting Based on Cross –Impact

Analysis, History of Development, The Basis Concepts of a Cross-Impact Matrix, The Cross-Impact Theory based on Bayesian Rules, Deterministic Dynamic Simulation based upon Cross-Impact (kane,1972).

UNIT-6 **Quantitative Methods of Forecasting –**
Forecasting, Application to Different Functional Areas, Forecasting in Operations Management, Specific Forecasting Methods, Main Classes of Quantitative Models Time Series Models, Causal Models, Forecast Error, Selecting a Suitable Forecasting Method

BLOCK-3

UNIT-7 **Capacity Planning –**
Aspect of Capacity Planning, Determination of Capacity Requirement, Capacity Planning for a Single-stage System, Capacity Planning for a Multiple-stage system, Evaluation of Alternative Plant Size, Traditional Economic Requirements for a Single Production Stage, Determination of the Stage Efficiency Sage E

UNIT-8 **Facilities Planning –**
What is Facility Planning? Need for Facility Planning, Facility Planning-Objectives, Types of Layouts, Product on Live Layout, Fixed Position Layout, /combination Layout, Combinational Approach for Developing Process Layout,

UNIT-9 **Work System Design –**
Job Design Job design Techniques, Work Measurement, Work Measurement Techniques, Compensation

UNIT-10 **Management Information for Production System-**
The Information-Oriented Costly and Corporate Activities, Need for the System, Cross Functions System and Operational Planning, Need of Production Management and Work Organisation, Information Need the Business Appraisal Objectives of the Appraisal, Potential Benefits in Improving Management Information System, Information, Common Information Systems/ Databases, Quality, Development of Production- Material Information

System.

BLOCK-4

UNIT-11 **Aggregate Production Planning –**
Linkage Between Long Term and Short Term Planning, The Purpose of Aggregate Planning, Steps in Aggregate Planning, Dimension of Production Capacity, Managerial Importance of Aggregate Planning

UNIT-12 **Just-in-Time (JIT)-**
Stock Points in a Production- Distribution, Just-In-Time, Characteristics of Just-In-Time Systems, The Just-In-Time Manufacturing Philosophy, Prerequisite for JIT manufacturing, Elements of Manufacturing, Eliminating Waste, Enforced Problem Solving and Continuous Improvements, Benefits of JIT Manufacturing, JIT Purchasing, The Implementation in Industries

UNIT-13 **Scheduling & Sequencing –**
Situations Requiring Scheduling, Classifying Production Systems, Scheduling Mass Production Systems, Scheduling Batch Production Systems, Scheduling Jobshop Production Systems, General Principles of Scheduling,

BLOCK – 5

UNIT – 14 **Issues in Materials Management –**
The Concept of Materials, Importance of Materials, Need for Materials, Management, Issues in Materials Management

UNIT – 15 **Independent Demand Inventory Systems –**
Models with Uncertain Demand, Selective Control of Inventory,

UNIT – 16 **Dependent Demand Inventory Systems –**
What is MRP? , Material Requirement Planning (MRP), MRP versus Order Point Systems, Some Important elements of MRP, Manufacturing Resource Planning (MRP II), MRP Computations, MRP Implementation, Some Misconception About MRP, Comparison with JTT.