# M.E. QUALITY ENGINEERING AND MANAGEMENT (FT & PT)

## SEMESTER I

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<td>Materials Management</td>
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<td>Product Innovation and Development</td>
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OBJEKTIVE:
- To learn the concepts of operations research applied in business decision making.

OUTCOME:
- To facilitate quantitative solutions in business decision making under conditions of certainty, risk and uncertainty.

UNIT I  INTRODUCTION TO LINEAR PROGRAMMING (LP)  12
Introduction to applications of operations research in functional areas of management. Linear Programming formulation, solution by graphical and simplex methods (Primal - Penalty, Two Phase), Special cases. Dual simplex method. Principles of Duality. Sensitivity Analysis.

UNIT II  LINEAR PROGRAMMING EXTENSIONS  12

UNIT III  INTEGER PROGRAMMING AND GAME THEORY  12
Solution to pure and mixed integer programming problem by Branch and Bound and cutting plane algorithms. Game Theory-Two person Zero sum games-Saddle point, Dominance Rule, Convex Linear Combination (Averages), methods of matrices, graphical and LP solutions.

UNIT IV  INVENTORY MODELS, SIMULATION AND DECISION THEORY  12

UNIT V  QUEUING THEORY AND REPLACEMENT MODELS  12
Queuing Theory - single and Multi-channel models – infinite number of customers and infinite calling source. Replacement Models-Individuals replacement Models (With and without time value of money) – Group Replacement Models.

TOTAL: 60 PERIODS

TEXTBOOKS

REFERENCES
UNIT I  LINEAR MEASUREMENT AND ANGULAR MEASUREMENT  12

UNIT II  STANDARDS FOR LINEAR AND ANGULAR MEASUREMENTS  8
Shop floor standards and their calibration, light interference, Method of coincidence, Slip gauge calibration, Measurement errors, Limits, fits, Tolerance, Gauges, Gauge design.

UNIT III  MEASUREMENT APPLICATION  8

UNIT IV  MODERN CONCEPTS  8
Image processing and its application in Metrology, Co-ordinate measuring machine, Types of CMM, Probes used, Application, Non-contact CMM using Electro-optical sensors for dimensional metrology.

UNIT V  MEASUREMENT SYSTEMS  9
System configuration, basic characteristics of measuring devices, Displacement, force and torque measurement, standards, Calibration, Sensors, Basic principles and concepts of temperature, Pressure and flow measurement, Destructive testing – Nondestructive testing.

TOTAL: 45 PERIODS

TEXT BOOK:

REFERENCES:
UNIT V  WORK STUDY
Introduction to method study and time study.

REFERENCES:

TOTAL: 45 PERIODS

MA8160  PROBABILITY AND STATISTICAL METHODS  L T P C
3 1 0 4

OBJECTIVE:
• To introduce the basic concepts of one dimensional and two dimensional Random Variables.
• To provide information about Estimation theory, Correlation, Regression and Testing of hypothesis.
• To enable the students to use the concepts of multivariate normal distribution and principle components analysis.

OUTCOMES:
• The course aims at providing the basic concepts of Probability and Statistical techniques for solving mathematical problems which will be useful in solving Engineering problems.

UNIT I  ONE DIMENSIONAL RANDOM VARIABLES  (9+3)
Random variables - Probability function – Moments – Moment generating functions and their properties – Binomial, Poisson, Geometric, Uniform, Exponential, Gamma and Normal distributions – Functions of a Random Variable.

UNIT II  TWO DIMENSIONAL RANDOM VARIABLES  (9+3)
Joint distributions – Marginal and Conditional distributions – Functions of two dimensional random variables – Regression Curve – Correlation.

UNIT III  ESTIMATION THEORY:  (9+3)

UNIT IV  TESTING OF HYPOTHESES:  (9+3)
Sampling distributions - Type I and Type II errors - Tests based on Normal, t, Chi-Square and F distributions for testing of mean, variance and proportions – Tests for Independence of attributes and Goodness of fit.

UNIT V  MULTIVARIATE ANALYSIS:  (9+3)

TOTAL: 60 PERIODS

BOOKS FOR STUDY:

REFERENCES:

QE8151 TOTAL QUALITY MANAGEMENT

UNIT I INTRODUCTION

UNIT II TQM PRINCIPLES
Leadership, Customer Satisfaction, Employee Involvement, Continuous Process Improvement, Supplier Partnership, Performance Measures, Cost of Quality.

UNIT III TOOLS AND TECHNIQUES –1

UNIT IV TOOLS AND TECHNIQUES- 2
QFD, FMEA, Quality Circles, TPM, Traditional Quality Tools and Management tools.

UNIT V IMPLEMENTATION OF TQM
Steps in TQM implementation, national and international quality awards, case studies.

TOTAL: 45 PERIODS

REFERENCES:

QE8201 QUALITY BY DESIGN

UNIT I INTRODUCTION
Perception of quality, Taguchi’s definition of quality – quality loss function, Planning of experiments, design principles, terminology, normal probability plot, Analysis of variance, Linear regression models.

UNIT II FACTORIAL EXPERIMENTS
Design and analysis of single factor and multi-factor experiments, tests on means, EMS rules.
UNIT III  SPECIAL DESIGNS

$2^k$ Factorial designs, Fractional factorial designs, Nested designs, Blocking and Confounding.

UNIT IV  ORTHOGONAL EXPERIMENTS

Selection of orthogonal arrays (OA’s), OA designs, conduct of OA experiments, data collection and analysis of simple experiments, Modification of orthogonal arrays.

UNIT V  ROBUST DESIGN

Variability due to noise factors, Product and process design, Principles of robust design, objective functions in robust design - S/N ratios, Inner and outer OA experiments, optimization using S/N ratios, fraction defective analysis, case studies.

T=15, TOTAL: 60 PERIODS

REFERENCES:


QE8202  STATISTICAL QUALITY CONTROL  L  T  P  C

UNIT I  INTRODUCTION

3  0  0  3


UNIT II  CONTROL CHARTS

12
Chance and assignable causes of process variation, statistical basis of the control chart, control charts for variables- $\bar{X}$, R and S charts, attribute control charts - p, np, c and u- Construction and application.

UNIT III  SPECIAL CONTROL PROCEDURES

8
Warning and modified control limits, control chart for individual measurements, multi-vari chart, $\bar{X}$ - chart with a linear trend, chart for moving averages and ranges, cumulative-sum and exponentially weighted moving average control charts.

UNIT IV  STATISTICAL PROCESS CONTROL

8
Process stability, process capability analysis using a Histogram or probability plots and control chart. Gauge capability studies, setting specification limits.

UNIT V  ACCEPTANCE SAMPLING

10
The acceptance sampling fundamental, OC curve, sampling plans for attributes, simple, double, multiple and sequential, sampling plans for variables, MIL-STD-105D and MIL-STD-414E & IS2500 standards.

TOTAL: 45 PERIODS

REFERENCES:

3. IS 2500 Standard sampling plans
UNIT I  SOFTWARE QUALITY  5
Definition of Software Quality, Quality Planning, Quality system – Quality Control Vs Quality Assurance – Product life cycle – Project life cycle models.

UNIT II  SOFTWARE ENGINEERING ACTIVITIES  10

UNIT III  SUPPORTING ACTIVITIES  10
Metrics, Reviews – SCM – Software quality assurance and risk management.

UNIT IV  SOFTWARE QUALITY MANAGEMENT TOOLS  10
Seven basic Quality tools – Checklist – Pareto diagram – Cause and effect diagram – Run chart – Histogram – Control chart – Scatter diagram – Poka Yoke – Statistical process control – Failure Mode and Effect Analysis – Quality Function deployment – Continuous improvement tools – Case study.

UNIT V  QUALITY ASSURANCE MODELS  10

TOTAL: 45 PERIODS

TEXT BOOK

REFERENCES

UNIT I  DEMAND ANALYSIS AND FORECASTING  10

UNIT II  PRODUCTION FUNCTION AND COST ANALYSIS  10

UNIT III  MARKET COMPETITION AND PRICING  10

UNIT IV  PROFIT ANALYSIS  07
The concept of profit: Profit planning, control and measurement of profits. Profit maximisation – Cost volume profit analysis – Investment Analysis.

UNIT V  NATIONAL INCOME AND POLICY  08

REFERENCES:
UNIT I  SCHEDULING BASICS

UNIT II  SINGLE MACHINE MODEL
Pure sequencing – Minimizing $\bar{T}$, $\bar{F}$ – Hodgson’s algorithm – Smith’s rule – WI algorithm – Dynamic programming – Branch and Bound – Non simultaneous arrivals – Dependent jobs – Sequence dependent set up times.

UNIT III  PARALLEL MACHINE MODEL
Minimizing makespan: McNaughton’s algorithm – Heuristic procedures – Minimizing $\bar{T}_C$: $H_l$ & $H_m$ heuristics – Hu’s algorithm – Muntz Coffman algorithm.

UNIT IV  FLOW SHOP MODEL

UNIT V  JOB SHOP MODEL

REFERENCES:

TOTAL: 45 PERIODS
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<td>SOFTWARE PROCESS MEASUREMENT AND ANALYSIS</td>
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UNIT I SOFTWARE MEASURES AND METRICS
Measurement theory- Categories of data (Nominal data, Ordinal data, Absolute data (Attribute), Interval data, Ratio data (Continuous Data) - Aspects of Data Quality (correctness, Accuracy, precision, Consistency, Completeness, repeatability) - Base Measures (Size, Cost, Effort, Schedule, Defects, Resources and Changes), Product & Process Metrics.

UNIT II METRICS FRAMEWORK
Goal Question Indicator Metric (GQ (I) M) Framework- Data Collection & Analysis Plan- Data Collection Systems, Data Validation, Management by Metrics- Key Metrics for each project type.

UNIT III ANALYSIS AND IMPROVEMENTS
Arriving Organizational capability baselines, Arriving Organization Norms – COQ, Productivity, Effort distribution, Phase wise Defect distribution - Using the baselines for Estimation and planning - continual improvement, Corrective and Preventive actions.

UNIT IV ESTIMATION MODELS
Types of Estimation – Effort estimation models – COCOMO-FPA-SLIM.

UNIT V PREDICTION MODELS
Product Quality Prediction Models – Raleigh model, Exponential model.

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:

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UNIT I INTRODUCTION TO SUPPLY CHAIN MANAGEMENT
UNIT II DESIGNING THE SUPPLY CHAIN NETWORK

UNIT III SOURCING, TRANSPORTATION AND PRICING

UNIT IV COORDINATION AND TECHNOLOGY

UNIT V EMERGING CONCEPTS
3PL- 4PL- Global Logistics -Reverse Logistics; Reasons, Activities, Role. Warehouse Management-RFID Systems; Components, applications, implementation. Lean supply Chains-Sustainable supply Chains

REFERENCES

QE8252 DISCRETE SYSTEM SIMULATION

OBJECTIVES:
• To understand the importance and advantages of applying simulation techniques for solving various problems on discrete event systems.
• To teach various random number generation techniques, its use in simulation, tests and validity of random numbers etc. development of simulation models, verification, validation and analysis.
• To understand the applications of random probability distributions in real time environments.
• Train students to solve discrete event problems through hand simulation and to develop simulation models using Extend simulation software.

OUTCOMES:
Students will:
1. Learn to simulate models matching real life scenarios and obtain superior results
2. Develop capabilities of taking up consultancy projects.
UNIT I  INTRODUCTION:  3
Systems, modeling, general systems theory, concept of simulation, simulation as a decision
making tool, types of simulation.

UNIT II  RANDOM NUMBERS:  5
Methods of generating random numbers, Pseudo random numbers and random variates, discrete
and continuous random probability distributions, tests for random numbers.

UNIT III  DESIGN OF SIMULATION:  8
Problem formulation, data collection and reduction, time flow mechanism, key variables, logic flow
chart, starting condition, run size, experimental design consideration, output analysis and
interpretation, validation.

UNIT IV  SIMULATION SOFTWARE:  14
Study and selection of simulation languages, Use of simulation software such as GPSS, Extend,
Matlab, Simulink, LabView etc., for simulation.

UNIT V  CASE STUDIES IN SIMULATION:  15
Development of simulation models for queuing systems, production systems, inventory systems,
Industrial scheduling problems.

TOTAL: 45 PERIODS

REFERENCES:
group, First Indian reprint, 2012.

IL8071  APPLIED OBJECT ORIENTED PROGRAMMING  L  T  P  C
3  0  0  3

UNIT I  FUNDAMENTALS OF OBJECT ORIENTED PROGRAMMING  5
Elements of OOP, classes, subjects, messaging, inheritance, polymorphism, OOP paradigm
versus procedural paradigm, object-oriented design.

UNIT II  C++ Basics  15
Expression and statements, operators, precedence, type conversion, control statements, loops,
Arrays structures, functions, argument passing, reference argument, overloaded function.

UNIT III  C++ CLASS  5
Definition, class objects, member functions, , class argument, , operator overloading, user defined
conversions.

UNIT IV  CLASS DERIVATION  10
Derivation specification, public and private base classes, standard conversions under derivation,
class scope, initialization and assignment under derivation.

UNIT V  APPLICATION  10
OOP’s applications in Industrial Engineering.

TOTAL: 45 PERIODS

REFERENCES
UNIT I BUSINESS EXCELLENCE MODELS
Business Excellence Concepts – Need for BE models – Pioneers in the model MBNQA, EFQM and DEMING award

UNIT II MBNQA
Criteria : : LEADERSHIP , Strategic planning , Customer and Market focus , Measurement analysis and Knowledge Management , Human resource focus, process management , business results

UNIT III BUSINESS EXCELLENCE AWARDS IN INDIA
Models in Business excellence: RBNQA CII EXIM Award, Tata BE Model etc

UNIT IV IMPLEMENTING BUSINESS EXCELLENCE MODEL
Basic concepts – Training -Report writing – Internal audit-Report submission – Initial assessment - Site visit – Scoring – Criteria for Award, Award finalization

UNIT V CASE STUDY

TEXT BOOK:

REFERENCES:
http://www.baldrige.nist.gov
http://www.baldrige21.com/
www.imc.org
www.qimpro.com
www.imcrbnqa.com
www.efqm.org
www.juse.or.jp/e/deming/index.html

UNIT I STATISTICAL DATA ANALYSIS

UNIT II DATA ANALYSIS I
Introduction – Basic concepts – Uni-variate, Bi-variate and Multi-variate techniques – Types of multivariate techniques – Classification of multivariate techniques – Guidelines for multivariate analysis and interpretation – Approaches to multivariate model building.

UNIT III DATA ANALYSIS II
Simple and Multiple Linear Regression Analysis – Introduction – Basic concepts – Multiple linear regression model – Least square estimation – Inferences from the estimated regression function – Validation of the model.
Factor Analysis: Definition – Objectives – Approaches to factor analysis – Methods of estimation – Factor rotation – Factor scores - Sum of variance explained – Interpretation of results.
Canonical Correlation Analysis - Objectives – Canonical variates and canonical correlation – Interpretation of variates and correlations.
UNIT IV DATA ANALYSIS III
Multiple Discriminant Analysis - Basic concepts – Separation and classification of two populations - Evaluating classification functions – Validation of the model.

UNIT V DATA ANALYSIS IV
Multi Dimensional Scaling – Definitions – Objectives – Basic concepts – Scaling techniques – Attribute and Non-Attributes based MDS Techniques – Interpretation and Validation of models.
Advanced Techniques – Structural Equation modeling

TOTAL: 45 PERIODS

REFERENCES
UNIT I  OPERATIONAL SAFETY  9
Hot metal operation, boiler, pressure vessels – heat treatment shop – gas furnace operation –
electroplating – hot bending pipes – safety in welding and cutting, Cold – metal operation – safety
in machine shop – cold bending and chamfering of pipes- metal cutting – shot blasting, grinding,
painting – power press and other machines. Management of toxic gases and chemicals –
industrial fires and prevention – road safety – highway and urban safety – safety of sewage
disposal and cleaning – control of environmental pollution – managing emergencies in industries–
planning security and risk assessments, on – site and off site. Control of major industrial hazards.

UNIT II  SAFETY APPRAISA LAND ANALYSIS  9
Human side of safety – personal protective equipment – causes and cost of accidents. Accidents
prevention program – specific hazard control strategies – HAZOP training and development of
employees – first aid – fire fight devices – accident reporting, investigation. Measurement of safety
performance, accident reporting and investigation – plant safety inspection, job safety analysis –
safety permit procedures. Product safety – plant safety rules and procedures – safety sampling –
safety inventory systems. Determining the cost effectiveness of safety measurement.

UNIT III  OCCUPATIONAL HEALTH  9
Concept and spectrum of health functional units and activities of operational health service –
occupational and related disease – levels of prevention of diseases – notifiable occupational
diseases Toxicology Lead – Nickel, chromium and manganese toxicity – gas poisoning (such as
CO, Ammonia Chlorise, So2, H2s.) their effects and prevention – effects of ultra violet radiation
and infrared radiation on human system.

UNIT IV  SAFETY AND HEALTH REGULATIONS  9
Safety and health standards – industrial hygiene – occupational diseases prevention welfare
facilities. The object of factories act 1948 with special reference to safety provisions, model rules
123a, history of legislations related to safety – pressure vessel act – Indian boiler act – the
environmental protection act – electricity act – explosive act.

UNIT V  SAFETY MANAGEMENT  9
Evaluation of modern safety concepts – safety management functions – safety organization, safety
department- safety committee, safety audit – performance measurements and motivation –
employee participation in safety - safety and productivity.

TOTAL: 45 PERIODS

TEXT BOOKS:
1. John. V. Grimaldi and Rollin. H Simonds, “Safety Managenent”, All India traveler Book seller,

REFERENCES:
1. Occupational Safety Manual BHEL.
2. Industrial Safety and the law by P.M.C Nair Publishers, Trivandum.
   company, New Delhi, 1996.
   company, New Delhi, 1996.
UNIT I  INTRODUCTION TO LEAN MANUFACTURING AND SIX SIGMA  
Introduction to Lean- Definition, Purpose, features of Lean; top seven wastes, Need for Lean, Elements of Lean Manufacturing, Lean principles, the lean metric, Hidden time traps. Introduction to quality, Definition of six sigma, origin of six sigma, Six sigma concept, Critical success factors for six sigma.

UNIT II  LEAN SIX SIGMA APPROACH  
Evolution of lean six sigma, the synergy of Lean and six sigma, Definition of lean six sigma, the principles of lean six sigma, Scope for lean six sigma, Features of lean six sigma, The laws of lean six sigma, Benefits of lean six sigma, Introduction to DMAIC tools.

UNIT III  INITIATION FOR LEAN SIX SIGMA  

UNIT IV  PROJECT SELECTION FOR LEAN SIX SIGMA  
Resource and project selection, Selection of Black belts, Selecting projects – Benefit/Effort graph, Process mapping, value stream mapping, Balanced score card for project identification, project suitable for lean six sigma.

UNIT V  THE DMAIC PROCESS AND INSTITUTIONALIZING THE LSS  
Predicting and improving team performance, Nine team roles, Team leadership, DMAIC process, Institutionalizing lean six sigma, Design for lean six sigma, Case study presentations.

TOTAL: 45 PERIODS

REFERENCES:
5. Rother M. and hook J., Learning to See: Value Stream Mapping to add value and Eliminate Muda, Lean Enterprise Institute, Brookline, MA.
UNIT IV  FREIGHT TRANSPORT  9
International logistics: modal choice - Maritime transport - Air transport - Rail and intermodal transport- Road freight transport: vehicle selection, vehicle costing and planning and resourcing- International transportation systems in Global perspective.

UNIT V  OPERATIONAL MANAGEMENT  9
Cost and performance monitoring- Benchmarking- Information and communication technology in supply chain- Outsourcing: services and decision criteria, the selection process - Outsourcing management- Security and safety in distribution - Logistics and the environment.

TOTAL: 45 PERIODS

REFERENCES:
1. Alan Rushton, Phil Croucher and Peter Baker(Eds.),The Handbook of Logistics and Distribution Management, Kogan Page, 2010.

IL8078  MANAGEMENT ACCOUNTING AND FINANCIAL MANAGEMENT  L T P C
            3 0 0 3
UNIT I  FINANCIAL ACCOUNTING  10

UNIT II  COST ACCOUNTING  10

UNIT III  BUDGETING  10
Requirements for a sound budget, Fixed budget – Preparation of sales and Production budget, Flexible budgets, Zero base budgeting and budgetary control.

UNIT IV  FINANCIAL MANAGEMENT  10
Investment decisions – Capital investment process, Type of investment proposals, Investment appraisal techniques – Payback period method, Accounting rate of return, Net present value method, Internal rate of return and Profitability index method.

UNIT V  FINANCIAL DECISIONS  5
Cost of capital – Capital structure – Dividend policy – Leasing.

TOTAL: 45 PERIODS

REFERENCES
IL8079          MULTIVARIATE DATA ANALYSIS               L T P C
                        3 0 0 3

UNIT I        REGRESSION                       9
Simple Regression and Correlation – Estimation using the regression line, Correlation analysis,
Multiple regression and Correlation analysis – Finding the Multiple Regression equation, Modelling
techniques, Making inferences about the population parameters.

UNIT II       MULTIVARIATE METHODS            9
An overview of Multivariate methods, Multivariate Normal distribution, Eigen values and Eigen
vectors.

UNIT III      FACTOR ANALYSIS                9
Principal Component Analysis – Objectives, Estimation of principal components, Testing for
independence of variables, Factor analysis model – Factor analysis equations and solution.

UNIT IV       DISCRIMINANT ANALYSIS          9
Discriminant analysis – Discrimination for two multivariate normal Populations – Discriminant
functions.

UNIT V        CLUSTER ANALYSIS              9
Cluster analysis – Clustering methods, Multivariate analysis of Variance.

TOTAL: 45 PERIODS

REFERENCES

IL8080          PRODUCTIVITY MANAGEMENT AND RE-ENGINEERING          L T P C
                        3 0 0 3

UNIT I        PRODUCTIVITY                        9
Productivity Concepts – Macro and Micro factors of productivity – Dynamics of Productivity
Productivity Cycle Productivity Measurement at International, National and Organization level
Productivity measurement models

UNIT II       SYSTEMS APPROACH TO PRODUCTIVITY MEASUREMENT         9
Conceptual frame work, Management by Objectives (MBO), Performance Objectivated
Productivity (POP) – Methodology and application to manufacturing and service sector.

UNIT III      ORGANISATIONAL TRANSFORMATION       9
Elements of Organizational Transformation and Reengineering-Principles of organizational
transformation and re-engineering, fundamentals of process re-engineering, preparing the
workforce for transformation and re-engineering, methodology, guidelines, LMI CIP Model –
DSMC Q & PMP model.

UNIT IV       RE-ENGINEERING PROCESS IMPROVEMENT MODELS         9
PMI models, PASIM Model, Moen and Nolan Strategy for process improvement, LMICIP Model,
NPRDC Model.

UNIT V        RE-ENGINEERING TOOLS AND IMPLEMENTATION          9
Analytical and process tools and techniques – Information and Communication Technology –
Implementation of Reengineering Projects – Success Factors and common implementation
Problem – Cases.

TOTAL: 45 PERIODS
REFERENCES:

IL8081 PROJECT MANAGEMENT

UNIT I STRATEGIC MANAGEMENT AND PROJECT SELECTION 9
Project selection models, Project portfolio process, Analysis under uncertainty, Project organization, Matrix organization

UNIT II PROJECT PLANNING 9

UNIT III PROJECT IMPLEMENTATION 12

UNIT IV MONITORING AND INFORMATION SYSTEMS 9
Information needs and the reporting process, computerized PMIS, Earned value analysis, Planning-Monitoring-Controlling cycle, Project control: types of control processes, design of control systems, control of change and scope.

UNIT V PROJECT AUDITING 6
Construction and use of audit report, Project audit life cycle, Essentials of audit and evaluation, Varieties of project termination, the termination process, The Final Report – A project history.

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:

IL8082 RELIABILITY ENGINEERING

UNIT I RELIABILITY CONCEPTS 9
UNIT II LIFE DATA ANALYSIS

UNIT III RELIABILITY ASSESSMENT
Different configurations – Redundancy – k out of n system – Complex systems: RBD – Baye’s approach – Cut and tie sets – Fault Trees – Standby systems.

UNIT IV RELIABILITY MONITORING

UNIT V RELIABILITY IMPROVEMENT

TOTAL: 45 PERIODS

REFERENCES:

IL8083 SERVICES OPERATIONS MANAGEMENT

UNIT I INTRODUCTION TO SERVICES
Manufacturing and Services, Definition of Service, Characteristic of Service, Nature of Services, Importance of Activity, Impact of technology

UNIT II GLOBALIZATION AND STRATEGY
Types of Globalized Services, Outsourcing, issues in Globalization, Service strategies

UNIT III OPERATIONS ISSUES
Forecasting, Inventory, capacity Planning, Scheduling

UNIT IV SERVICE QUALITY AND PRODUCTIVITY
Importance of Quality, Models for Service Quality, GAPS model, issues in productivity measurement, Work measurement

UNIT V TOOLS FOR SERVICES
Data Envelopment Analysis, Queueing models, Vehicle Routing models

TOTAL: 45 PERIODS

REFERENCES:

IL8084 SYSTEMS ANALYSIS AND DESIGN

UNIT I SYSTEMS ANALYSIS FUNDAMENTALS
Information systems analysis overview, Classification of information systems, Systems development life cycle, Role of systems analyst, and Role of case tools

23
UNIT II  INFORMATION REQUIREMENT ANALYSIS  9
Sampling and investigating hard data, Interviewing, Using Questionnaires, Developing prototype, System requirements specification, Feasibility analysis

UNIT III  ANALYSIS PROCESS  9
Data flow diagrams, Data dictionary, Process specifications, Presenting the systems proposal

UNIT IV  ESSENTIALS OF DESIGN  9
Designing effective output, designing the database, designing the user interface, Designing data entry procedures

UNIT V  SOFTWARE ENGINEERING AND IMPLEMENTATION  9
Quality assurance through software engineering, Implementation approaches, Implementing distributed systems, Object oriented systems analysis and design

TOTAL: 45 PERIODS

REFERENCES:

IL8085  TECHNOLOGY MANAGEMENT  L T P C
3 0 0 3

UNIT I  INTRODUCTION  9
Technology management - Scope, components, and overview. Technology and environment, Technology and society, Technology Impact analysis, environmental, social, legal, political aspects, techniques for analysis - steps involved. Technology policy strategy: Science and technology Policy of India, implications to industry, The dynamics of technology change

UNIT II  TECHNOLOGY FORECASTING  9

UNIT III  TECHNOLOGY CHOICE AND EVALUATION  9
Issues in the development new high tech products, Methods of analyzing alternate technologies, Techno-economic feasibility studies, Need for multi-criteria considerations such as, social, environmental, and political, Analytic hierarchy method, Fuzzy multi-criteria decision making, and other methods.

UNIT IV  TECHNOLOGY TRANSFER AND ACQUISITION  9
Import regulations, Implications of agreements like Uruguay Round and WTO, Bargaining process, Transfer option, MOU: Technology Adoption and Productivity - Adopting technology-human interactions, Organisational redesign and re-engineering, Technology productivity.

UNIT V  TECHNOLOGY ABSORPTION AND INNOVATION  9
Present status in India, Need for new outlook, Absorption strategies for acquired technology, creating new/improved technologies, Innovations, Technology Measurement- Technology Audit, Risk and exposure, R&D portfolio management

TOTAL: 45 PERIODS

REFERENCES:
5. Irvin M. Rubin, Organisational behavior an experimental approach, Prentice Hall, 1995
UNIT I  PLANT LOCATION
Plant location analysis – factors, costs, location decisions – single facility location models, multi facility location models - set covering problem – warehouse location problems.

UNIT II  FACILITIES LAYOUT
Facilities requirement, need for layout study – types of layout, Designing product layout-Line balancing.

UNIT III LAYOUT DESIGN
Design cycle – SLP procedure, computerized layout planning procedure – ALDEP, CORELAP, CRAFT

UNIT IV GROUP TECHNOLOGY AND LINE BALANCING
Group technology – Production Flow analysis (PFA), ROC (Rank Order Clustering) – Line balancing.

UNIT V MATERIAL HANDLING
Principles, unit load concept, material handling system design, handling equipment types, selection and specification, containers and packaging.

REFERENCES:

TOTAL: 45 PERIODS

QE8071 MATERIALS MANAGEMENT

OBJECTIVE:
• To understand the importance of materials management system and its concepts

OUTCOME:
• To introduce the concepts of materials management with the emphasis on the various material planning, purchasing policies, purchasing system and the concepts of materials management.

UNIT I INTRODUCTION
Introduction to materials management and productivity, functions, organization structures and role of material management. Materials and profitability and Profit center concept, Contribution to profits, policy manual, internal interface, External Environment, Centralized Purchasing, Decentralization, Delegations of powers.

UNIT II MATERIAL PLANNING
Material Planning, definition, influencing factors, use of standard deviation, Importance of materials Research, Advantages of MIS, Techniques of Materials Intelligence, Environment Conditions, Source of information, Materials requirement planning (MRP) and Manufacturing resource Planning (MRPII) ,Evolution to ERP and Distribution Requirements Planning (DRP), Pull systems.
UNIT III  PURCHASING  9
Importance and objectives of good purchasing system, Prime and organizational functions, purchasing policy and procedures, responsibility and limitations, purchasing decisions, purchasing role in new product development, role of purchasing in cost reduction, negotiations and purchase, purchasing research: identification of right sources of supply, Vendor relation and selection, vendor rating and standardization, vendor certification plans, supply reliability, developing new source of supply.

UNIT IV  COST REDUCTION  9
Cost control vs Cost reduction, price analysis, material cost reduction techniques, variety reduction, cost reduction and value improvement, material holding cost, Acquisition cost, Settlement of Bills, Accounting, Audit in Materials Management, Internal Audit, Operational Audit, techniques of cost control, cost effectiveness, cost analysis for material management, material flow cost control.

UNIT V  INVENTORY MANAGEMENT  9
Inventory vs Stores, Functions and types of inventory, Types of inventory control, Handling Uncertainties and safety stock, inventory build-up, EOQ for various inventory models, inventory models with quantity discount, exchange curve concept, coverage analysis, optimal stocking policies, inventory management of perishable commodities, ABC-VED analysis, design of inventory distribution systems, spare parts inventory management, information systems for inventory management, cases studies.

REFERENCES:

QE8072  PRODUCT INNOVATION AND DEVELOPMENT  L T P C
UNIT I  PRODUCT DEVELOPMENT AND CONCEPT SELECTION  10

UNIT II  PRODUCT ARCHITECTURE  7
Product architecture – Implication of the architecture – Establishing the architecture – Related system level design issues.

UNIT III  INDUSTRIAL AND MANUFACTURING DESIGN  10
Need for industrial design – Impact of industrial design – Industrial design process. Assessing the quality of industrial design- Human Engineering consideration -Estimate the manufacturing cost – Reduce the component cost – Reduce the assembly cost – Reduce the support cost – Impact of DFM decisions on other factors

UNIT IV  PROTOTYPING AND ECONOMIC ANALYSIS  9
Principles of prototyping – Planning for prototypes - Elements of economic analysis – Base case financial model – Sensitivity analysis – Influence of the quantitative factors
UNIT V  MANAGING PRODUCT DEVELOPMENT PROJECTS
Sequential, parallel and coupled tasks - Baseline project planning – Project Budget- Project
evaluation – Project evaluation- patents- patent search-patent laws-International code for patents.
TOTAL: 45 PERIODS

TEXT BOOK :

REFERENCES:
2. Charles Gevirtz, Developing New products with TQM, McGraw – Hill International editions,
   1994.