OPERATION RESEARCH

[AS PER CHOICE BASED CREDIT SYSTEM (CBCS) SCHEME]

Subject Code : 15MA71 IA Marks : 20
No. of Lecture Hrs./ Week : 04 Exam Hours : 03
Total No. of Lecture Hrs. : 50 Exam Marks : 80

MODULE -1

Introduction: Evolution of OR, Definitions of OR, Scope of OR, Applications of OR, Phases in OR study. Characteristics and limitations of OR, models used in OR, Linear Programming Problem (LPP), Generalized LPP- Formulation of problems as L.P.P. Solutions to LPP by graphical method (Two Variables). 08 Hours

MODULE -2

LPP: Simplex method, Canonical and Standard form of LP problem, slack, surplus and artificial variables, Solutions to LPP by Simplex method, Big-M Method and Two Phase Simplex Method, Degeneracy in LPP. Concept of Duality, writing Dual of given LPP. Solutions to L.P.P by Dual Simplex Method. 12 Hours

MODULE -3


Assignment Problem- Formulation, Solutions to assignment problems by Hungarian method, Special cases in assignment problems, unbalanced, Maximization assignment problems. Travelling Salesman Problem (TSP). Difference between assignment and T.S.P, Finding best route by Little’s method. Numerical Problems. 12 Hours

MODULE -4

Network analysis: Introduction, Construction of networks, Fulkerson’s rule for numbering the nodes, AON and AOA diagrams; Critical path method to find the expected completion time of a project, determination of floats in networks, PERT networks, determining the probability of completing a project, predicting the completion time of project; Cost analysis in networks. Crashing of networks- Problems.
**Queuing Theory**: Queuing systems and their characteristics, Pure-birth and Pure-death models (only equations), Kendall & Lee’s notation of Queuing, empirical queuing models – Numerical on M/M/1 and M/M/C Queuing models. **10 Hours**

**MODULE -5**


**Sequencing**: Basic assumptions, Johnson’s algorithm, sequencing ‘n’ jobs on single machine using priority rules, sequencing using Johnson’s rule-‘n’ jobs on 2 machines, ‘n’ jobs on 3 machines, ‘n’ jobs on ‘m’ machines. Sequencing of 2 jobs on ‘m’ machines using graphical method. **08 Hours**

**TEXT BOOKS:**


**REFERENCE BOOKS:**


2. Operations Research, Paneerselvan, PHI


**Scheme of Examination**: Two questions to be set from each module. Students have to answer five full questions, choosing at least one full question from each module.
Module 1: Introduction to Fluid Power Systems

Fluid power system: components, advantages and applications. Transmission of power at static and dynamic states. Pascal’s law and its applications.

Fluids for hydraulic system: types, properties, and selection. Additives, effect of temperature and pressure on hydraulic fluid. Seals, sealing materials, compatibility of seal with fluids. Types of pipes, hoses, and quick acting couplings. Pressure drop in hoses/pipes. Fluid conditioning through filters, strainers; sources of contamination and contamination control; heat exchangers.  

10 Hours

Module 2: Pumps and Actuators

Pumps: Classification of pumps, Pumping theory of positive displacement pumps, construction and working of Gear pumps, Vane pumps, Piston pumps, fixed and variable displacement pumps, Pump performance characteristics, pump selection factors, problems on pumps. Accumulators: Types, selection/ design procedure, applications of accumulators. Types of Intensifiers, Pressure switches /sensor, Temperature switches/sensor, Level sensor. 

Actuators: Classification cylinder and hydraulic motors, Hydraulic cylinders, single and double acting cylinder, mounting arrangements, cushioning, special types of cylinders, problems on cylinders. Construction and working of rotary actuators such as gear, vane, piston motors, and Hydraulic Motor. Theoretical torque, power, flow rate, and hydraulic motor performance; numerical problems. Symbolic representation of hydraulic actuators (cylinders and motors).  

10 Hours

Module 3: Components and Hydraulic Circuit Design

Components: Classification of control valves, Directional Control Valves-symbolic representation, constructional features of poppet, sliding spool, rotary type valves solenoid
and pilot operated DCV, shuttle valve, and check valves. Pressure control valves - types, direct operated types and pilot operated types. Flow Control Valves -compensated and non-compensated FCV, needle valve, temperature compensated, pressure compensated, pressure and temperature compensated FCV, symbolic representation. **Hydraulic Circuit Design:** Control of single and Double -acting hydraulic cylinder, regenerative circuit, pump unloading circuit, double pump hydraulic system, counter balance valve application, hydraulic cylinder sequencing circuits, cylinder synchronizing circuit using different methods, hydraulic circuit for force multiplication; speed control of hydraulic cylinder-metering in, metering out and bleed off circuits. Pilot pressure operated circuits. Hydraulic circuit examples with accumulator.  

**Module 4: Pneumatic Power Systems**

**Introduction to Pneumatic systems:** Pneumatic power system, advantages, limitations, applications, Choice of working medium. Characteristics of compressed air and air compressors. Structure of pneumatic control System, fluid conditioners-dryers and FRL unit.  

**Pneumatic Actuators:** Linear cylinder – types of cylinders, working, end position cushioning, seals, mounting arrangements, and applications. Rotary cylinders- types, construction and application, symbols. **Pneumatic Control Valves:** DCV such as poppet, spool, suspended seat type slide valve, pressure control valves, flow control valves, types and construction, use of memory valve, Quick exhaust valve, time delay valve, shuttle valve, twin pressure valve, symbols.  

**Module 5: Programmable Logic Controller**


**TEXT BOOKS:**


REFERENCE BOOKS:


3. FESTO, Fundamentals of Pneumatics, Vol I, II and III.


5. Thomson, Introduction to Fluid power, Prentcie Hall, 2004


CONTROL ENGINEERING

[AS PER CHOICE BASED CREDIT SYSTEM (CBCS) SCHEME]

Subject Code : 15MA73  IA Marks : 20
No. of Lecture Hrs./ Week : 04  Exam Hours : 03
Total No. of Lecture Hrs. : 52  Exam Marks : 80

MODULE I

Introduction: Concept of automatic controls, Open loop and closed loop systems, Concepts of feedback, requirements of an ideal control system, Types of controllers-Proportional, Integral, Differential, Proportional & Integral, Proportional Differential and Proportional Integral Differential controllers (Basic Concepts Only).  6 Hours

MODULE 2

Modeling of Physical Systems: Mathematical Models of Mechanical, Electrical, Thermal, Hydraulic and Pneumatic Systems.  3 Hours

Analogous Systems: Direct and inverse analogs for mechanical, thermal and fluid systems.  4 Hours

Block diagram Algebra: General representation of a feedback control system, transfer functions, rules of block diagram algebra, reduction of block dia. to obtain closed loop transfer function.

Signal flow graphs: Mason’s gain formula  6 Hours

MODULE 3

Steady state operation: Steady state analysis for general block dia. for a control system, steady state characteristics, equilibrium in a system.  3 Hours

Transient Response: Transient response and steady state analysis of unit, step input, general operational representation for a differential equation of control system, distinct, repeated and complex conjugate zeros, general form of transient response, Routh’s stability criterion for a control system.  4 Hours

Root Locus Plots: Root locus method: Significance of Root locus, angle and magnitude conditions, breakaway points, angles of departure and arrival, construction of Root locus using general rules and steps, Lead and Lag compensation  6 Hours
MODULE 4

**Frequency Domain Analysis**: Relationship between time and frequency response, Polar plot, Bode’s Plot, Nyquist plot and Nyquist stability criterion, Relative Stability, Phase and Gain Margins  

**12 Hours**

MODULE 5

**System Compensation and State Variable Characteristics of Linear Systems**: Series and feedback compensation, Introduction to state concepts, state equation of linear continuous data system. Matrix representation of state equations, controllability and observability, Kalman and Gilberts test.  

**8 Hours**

TEXT BOOKS:


REFERENCE BOOKS:

1. **Feedback Control Systems** – Schaum’s series.
PROFESSIONAL ELECTIVE – III
FACILITY PLANNING AND DESIGN

[AS PER CHOICE BASED CREDIT SYSTEM (CBCS) SCHEME]

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MODULE 1

PLANT LOCATION AND LAYOUT: Factors influencing plant location, Theories of plant location and location economics. PLANT LAYOUT: Objectives of plant layout, Principles of plant layout, types of plant layout, their merits and demerits.

MATERIAL HANDLING: Definition, principles, system design and selection of equipment, UNIT load concepts, basic layout types – immer, Nadler, Muther, Apple James and Ree’s approaches to plant layout, Modular design concept, Production Line balancing.

10 Hours

MODULE 2

COMPUTER AIDED LAYOUT: CRAFT, COFAD, PLANET, CORELAP, ALDEP.

CONSTRUCTION OF THE LAYOUT: Methods of constructing the layout, evaluation of layout, efficiency indices, presenting layout to management, implementing layout.

10 Hours

MODULE 3

SPACE DETERMINATION AND AREA ALLOCATION: Factors for consideration in space planning, receiving, storage, production, shipping, other auxiliary service actions, Establishing total space requirement, area allocation factors to be considered, expansion, flexibility, aisles column and area allocation procedure. Design of layout using Travel chart, plot plan, block plan, Sequence demand straight line method and non-directional method.

10 Hours

MODULE 4

QUANTITATIVE APPROACHES TO FACILITIES PLANNING: Deterministic models – Single and multi facility location models, Location allocation problems.

10 Hours

MODULE 5

PROBABILISTIC MODELS: Conveyor models, waiting line models and simulation models. Evaluation, selection, implementation and maintenance of the facilities plan.  

10 Hours

TEXT BOOKS:

1. Facilities Planning -Thompkins, J A and White, J. A.
2. Facility layout and Location -Francies, R.L. and White, J.A..

REFERENCE BOOKS:

NON TRADITIONAL MACHINING

[AS PER CHOICE BASED CREDIT SYSTEM (CBCS) SCHEME]

Subject Code : 15MA752 IA Marks : 20
No. of Lecture Hrs./ Week : 03 Exam Hours : 03
Total No. of Lecture Hrs. : 50 Exam Marks : 80

MODULE 1

INTRODUCTION: Introduction to Non-traditional machining, Need for Non-traditional machining process, Comparison between traditional and non-traditional machining, general classification Nontraditional machining processes, classification based on nature of energy employed in machining, selection of non-traditional machining processes, Specific advantages, limitations and applications of non-traditional machining processes. **08 hours**

MODULE 2


MODULE 3

MODULE 4

ELECTRICAL DISCHARGE MACHINING (EDM) Introduction, mechanism of metal removal, EDM equipment: spark erosion generator (relaxation type), dielectric medium-its functions & desirable properties, electrode feed control system. Flushing types; pressure flushing, suction flushing, side flushing, pulsed flushing. EDM process parameters: Spark frequency, current & spark gap, surface finish, Heat Affected Zone. Advantages, limitations & applications of EDM, Electrical discharge grinding, Traveling wire EDM. PLASMA ARC MACHINING (PAM) Introduction, non-thermal generation of plasma, equipment mechanism of metal removal, Plasma torch, process parameters, process characteristics. Safety precautions. Safety precautions, applications, advantages and limitations. 10 hours

MODULE 5

LASER BEAM MACHINING (LBM) Introduction, generation of LASER, Equipment and mechanism of metal removal, LBM parameters and characteristics, Applications, Advantages & limitations. ELECTRON BEAM MACHINING (EBM) Introduction, Principle, equipment and mechanism of metal removal, applications, advantages and limitations. 10 hours

Text Books:


Reference Books

1. New Technology, Dr. Amitabha Bhattacharyya, The Institute of Engineers (India), 2000
PROCESS PLANNING

[AS PER CHOICE BASED CREDIT SYSTEM (CBCS) SCHEME]

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MODULE 1

INTRODUCTION TO PROCESS PLANNING
Introduction- methods of process planning-Drawing interpretation-Material evaluation – steps in process selection-.Production equipment and tooling selection

MODULE 2

PROCESS PLANNING ACTIVITIES
Process parameters calculation for various production processes-Selection jigs and fixtures election of quality assurance methods - Set of documents for process planning-Economics of process planning- case studies

MODULE 3

INTRODUCTION TO COST ESTIMATION
Importance of costing and estimation –methods of costing-elements of cost estimation – Types of estimates – Estimating procedure- Estimation labor cost, material cost- allocation of over head charges- Calculation of depreciation cost

MODULE 4

PRODUCTION COST ESTIMATION
Estimation of Different Types of Jobs - Estimation of Forging Shop, Estimation of Welding Shop, Estimation of Foundry Shop

MODULE 5

MACHINING TIME CALCULATION
Estimation of Machining Time - Importance of Machine Time Calculation- Calculation of Machining Time for Different Lathe Operations, Drilling and Boring - Machining Time Calculation for Milling, Shaping and Planning - Machining Time Calculation for Grinding
TEXT BOOKS:


REFERENCES:

MODULE 1
CONCEPTS OF ACCURACY AND MACHINE TOOLS

MODULE 2
STIFFNESS, THERMAL EFFECTS AND FINISH MACHINING

MODULE 3
DIMENSIONING
Definition of terms – Key dimension – Superfluous dimension – dimensional stepped shaft – assigning tolerances in the constituent dimensions – dimensional chains.

MODULE 4
MICRO-MACHINING

MODULE 5
SMART STRUCTURES, MATERIALS AND MICRO ACTUATORS

TEXT BOOKS:

REFERENCES:

PROFESSIONAL ELECTIVE – IV

OPERATION MANAGEMENT

[AS PER CHOICE BASED CREDIT SYSTEM (CBCS) SCHEME]

Subject Code : 15MA761  IA Marks : 20
No. of Lecture Hrs./ Week : 03  Exam Hours : 03
Total No. of Lecture Hrs. : 50  Exam Marks : 80

MODULE 1

OPERATION MANAGEMENT CONCEPTS: Introduction, Historical development, The trend: information and Non- manufacturing systems, Operations management, Factors affecting productivity; International dimensions of productivity, the environment of operations, Production systems decisions – a look ahead.

OPERATION DECISION MAKING: Introduction, Management as a science, Characteristics of decisions, Framework for decision making, Decision methodology, Decision support systems, Economic Models, Statistical models.  12 Hours

MODULE 2

SYSTEMS DESIGN AND CAPACITY: Introduction, Manufacturing and service systems, Design and systems capacity, Capacity planning.

FORECASTING DEMAND: Forecasting objectives and use, Forecasting variables, Opinion and Judgemental methods, Time series methods, Exponential smoothing, Regression and correlation method, application and control of forecasts.  10 Hours

MODULE 3

AGGREGATE PLANNING AND MASTER SCHEDULING: Introduction – Planning and scheduling, Objectives of aggregate planning, aggregate planning methods, Master scheduling objectives, Master scheduling methods.  8 Hours

MODULE 4

MATERIAL AND CAPACITY REQUIREMENTS PLANNING: Overview: MRP and CRP, MRP: Underlying concepts, System parameters, MRP logic, System refinements, Capacity management, CRP activities.  8 Hours
MODULE 5

SCHEDULING AND CONTROLLING PRODUCTION ACTIVITIES: Introduction, PAC objectives and data requirements, Scheduling strategy and guidelines, Scheduling methodology, Priority control, Capacity control.

SINGLE MACHINE SCHEDULING: Concept, measures of performance, SPT rule, Weighted SPT rule, EDD rule, Minimizing the number of tardy jobs.

FLOW – SHOP SCHEDULING: Introduction, Johnson’s rule for ‘n’ jobs on 2 and 3 machines, CDS heuristic.

JOB-SHOP SCHEDULING: Types of schedules, Heuristic procedure, scheduling 2 jobs on ‘m’ machines. 12 Hours

TEXT BOOKS:

2. Production and Operations Management - Pannerselvam. R., PHI.
3. Operations management - Productions & by Adam & Ebert.

REFERENCE BOOKS:

RELIABILITY ENGINEERING

[AS PER CHOICE BASED CREDIT SYSTEM (CBCS) SCHEME]

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MODULE 1
CONCEPTS OF RELIABILITY, SYSTEM AND MODELS

MODULE 2
DESIGN FOR RELIABILITY AND MAINTAINABILITY

MODULE 3
OPTIMIZATION OF SYSTEM RELIABILITY
Optimization techniques for system reliability with redundancy – heuristic methods applied to optimal system reliability- redundancy allocation by dynamic programming – reliability optimization by non linear programming. 8 Hours

MODULE 4
THE ANALYSIS OF FAILURE DATA AND RELIABILITY TESTING
Data collection – empirical methods – ungrouped and grouped complete, censored data – static life estimation – test time calculation – burn in testing, acceptance, sequential, binomial testing – accelerated life testing – their acceleration models – experimental design –

8 Hours

MODULE 5
PACKAGING AND TRANSPORTATION FOR RELIABILITY

10 Hours

TEXT BOOKS:


REFERENCES:

MATERIALS MANAGEMENT

[AS PER CHOICE BASED CREDIT SYSTEM (CBCS) SCHEME]

Subject Code : 15MA763  IA Marks : 20
No. of Lecture Hrs./ Week : 03  Exam Hours : 03
Total No. of Lecture Hrs. : 50  Exam Marks : 80

MODULE - 1

10 Hours

MODULE - 2

10 Hours


10 Hours

Tariff-Registration of Licenses at Port. Governmental Purchasing: Policy and Procedures, Tenders. Registration of Firms, Procedure for Registration, Terms of Registration, Removal of the Firms from the List, Blacklisting of Firms, Banning of Firms, Suspension of Firms. Inventory Management and Control Systems: Definition of Inventories, The Need for Inventory Audits Control, Types of Inventories, Inventory Control, Max-Min System, Inventories and Demand Uncertainty, Determining Safety Stock.

**MODULE-5** Q-system or Quantity Control System or Re-order Point System-Effect of Quantity Discounts, P-system or Periodic Review or Periodic Count System or Replenishment System, Optional Replenishment System or "S, s" Policy. Discussion on ABC Analysis, advantages and disadvantages. MRP system and MPS system Stores Management and Operation: Storage System, Stores Location and Layout, Materials Management Information System and Computer: MIS - Management and MM, Computer System for MIS and MM, In-process Materials and Management Control.

**10 Hours**


SMART MATERIALS

[AS PER CHOICE BASED CREDIT SYSTEM (CBCS) SCHEME]

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MODULE 1


MODULE 2


MODULE 3

MODULE 4


MODULE-5


TEXT BOOKS:


REFERENCES:


PART-A

1. Stress analysis of a plate with circular hole
2. Stress analysis of rectangular L bracket
3. Stress analysis of beam
4. Mode frequency analysis of beam
5. Harmonic analysis of a 2D component
6. Stress analysis of an axi – symmetric component
7. Thermal stress analysis of a 2D component
8. Conductive heat transfer analysis of a 2D component
9. Convective heat transfer analysis of a 2D component

PART-B

1. Introduction to MAT LAB
2. Simulation of spring-mass system using MAT LAB
3. Simulation of cam and follower mechanism using MAT LAB

Suggested Packages:

1. ANSYS, NISA, NASTRAN, MAT LAB

Scheme for Examination:
One Question from Part A - 32 Marks (08 Write up +24)
One Question from Part B - 32 Marks (08 Write up +24)
Viva-Voce - 16 Marks
Total 80 Marks
PART – A


2. Application of 4/3 position tandem centre configuration, DCV/Manually operated Valve to demonstrate application in forklifts.


4. Application of Hydraulic accumulator as stand by hydraulic energy source during power failures.

5. Design a circuit and conduct experiment to press a work piece in a fixture by means of a hydraulic cylinder. After the pressing pressure was reached, the hydraulic cylinder is to retract automatically

PART-B

LOGIC GATES

1. To draw the ladder program for various logic gates using STEP 7 software and to verify the correctness of the same using the PLC.

DEMORGAN LAW

2. To draw the ladder diagrams for De Morgan’s laws and to verify the truth tables of the same using the PLC.

ARITHMETIC OPERATIONS

3. To draw and verify the ladder diagram for arithmetic operations using the PLC.

TWO MOTOR SYSTEM (USE OF OFF DELAY TIMER)

4. To draw and verify the ladder diagram for the given problem using the PLC.

TWO MOTOR SYSTEM (USE OF ON DELAY TIMER)

5. To draw and verify the ladder diagram for the given problem using the PLC.
SELECTION COMMITTEE

6. To draw and verify the ladder diagram for the given problem using the PLC.

RAILWAY PLATFORM SIGNALLING

7. To draw and verify the ladder diagram for the given problem using the PLC.

Scheme for Examination:
One Question from Part A - 32 Marks (08 Write up +24)
One Question from Part B - 32 Marks (08 Write up +24)
Viva-Voce - 16 Marks
Total 80 Marks
### PROJECT WORK, PHASE-I SEMINAR

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**Duration:** SEE CIA
Module - 1

Module - 2
Leadership: Definition, characteristics of quality leaders, leadership concept, characteristics of effective people, ethics, the Deming philosophy, role of TQM leaders, implementation, core values, concepts and framework, strategic planning communication, decision making.

Module - 3
Customer Satisfaction and Customer Involvement: Customer Satisfaction: customer and customer perception of quality, feedback, using customer complaints, service quality, translating needs into requirements, customer retention, case studies.

Employee Involvement – Motivation, employee surveys, empowerment, teams, suggestion system, recognition and reward, gain sharing, performance appraisal, unions and employee involvement, case studies.

Module - 4
Continuous Process Improvement: process, the Juran trilogy, improvement strategies, types of problems, the PDSA Cycle, problem-solving methods, Kaizen, reengineering, six sigma, case studies.
Statistical Process Control: Pareto diagram, process flow diagram, cause and effect diagram, check sheets, histograms, statistical fundamentals, Control charts, state of control, out of control process, control charts for variables, control charts for attributes, scatter diagrams, case studies 

10 Hours

Module - 5

Tools and Techniques: Benching marking, information technology, quality management systems, environmental management system, and quality function deployment, quality by design, failure mode and effect analysis, product liability, total productive maintenance.

10 Hours

TEXT BOOKS:


REFERENCE BOOKS:


Scheme of Examination: Two question to be set from each module. Students have to answer five full questions, choosing at least one full question from each module.
INDUSTRIAL ROBOTICS

[AS PER CHOICE BASED CREDIT SYSTEM (CBCS) SCHEME]

Subject Code : 15MA82   IA Marks : 20
No. of Lecture Hrs./ Week : 04   Exam Hours : 03
Total No. of Lecture Hrs. : 50   Exam Marks : 80

MODULE – 1

Automation in Manufacturing: Introduction: Automation and robotics, brief history of robotics, social and economic aspects of robots, advantages of using robots, advantages and disadvantages of using robots in industries. Overview of robots-present and future applications. Classification and Structure of Robotic System: Classifications, geometrical configuration, wrist and its motions and effectors and its types, links and joints. Robot drive system: Hydraulic, electric and pneumatic drive system, resolution, accuracy and repeatability, advantages and disadvantages of drive systems. 10 Hours

MODULE - 2

Control System and Components: Basic control system concepts and models, transformation and block diagram of spring mass system, controllers-ON and OFF, promotional integral proportional and integral transient and response to second order system. Robot Programming: Introduction, Manual teaching, lead through teaching, programming languages, programming with graphics, storing and operating. Task programs. 10 Hours

MODULE - 3

Robot Motion Analysis: Kinematics-Introduction, direct and inverse kinematics, rotation matrix, composite rotation matrix, rotation matrix about an arbitrary axis, Euler angles representation, homogeneous transformations, links, joints and their parameters, D-H representations. Geometrical approach to direct and inverse kinematics. 10 Hours

MODULE - 4

Robot Arm Dynamics: La Grange Euler formulations-joint velocities, kinetic energy potential energy and motion equations of robot manipulator.
Trajectory Planning: Introduction, general considerations on trajectory planning, joint interpolated trajectories, 4-3-4-trajectory example.  

10 Hours

MODULE - 5

Sensors: State and external state sensors, tactile sensors, non-tactile sensors, proximity sensing, range sensing, and force-torque sensors. Elements of computer vision, sensing and digitizing function in machine vision-image device-lighting techniques-analog to digital signal convention-sampling-quantitization – encoding - image – storage, Image processing and analysis.  

10 Hours

TEXT BOOKS:

1. **Industrial Robotics** - Groover, PHI, New Delhi

REFERENCE BOOKS:

1. **Robot Manipulators, Mathematics, programming and control** -Richard paul.,
3. **Fundamentals of Robotics** - Robert J. Schiling
4. **Robotic Engineering** - Richard D Klafer,”, PHI
PROFESSIONAL ELECTIVE – V
NON DESTRUCTIVE TESTING

[AS PER CHOICE BASED CREDIT SYSTEM (CBCS) SCHEME]

Subject Code : 15MA831 IA Marks : 20
No. of Lecture Hrs./ Week : 03 Exam Hours : 03
Total No. of Lecture Hrs. : 50 Exam Marks : 80

MODULE 1
NON-DESTRUCTIVE TESTING: AN INTRODUCTION

Introduction to various non-destructive methods- Comparison of Destructive and Non destructive Tests, Need for Non-destructive testing, merits, limitations and applications. Visual Inspection, Optical aids used for visual inspection, Comparison and selection of various NDT techniques

MODULE 2
LIQUID PENETRANT TESTING AND MAGNETIC PARTICLE TESTING
Physical principles, procedure for penetrant testing, Penetrant testing materials, Penetrant testing methods – Applications Principle of MPT, Magnetising technical and procedure used for testing a component, Equipment used for MPT, Applications.

MODULE 3
EDDY CURRENT TESTING AND ACOUSTIC EMISSION TESTING

MODULE 4
ULTRASONIC TESTING
Principle, Ultrasonic transducers, Inspection Methods – Normal Incident Pulse echo Inspection, Through – transmission Testing, angle Beam Pulse-echo testing, Techniques for
Normal Beam Inspection, Ultrasonic Flaw detection Equipment, Modes of display – A-Scan, B-Scan & C-Scan- Applications.

10 Hours

MODULE 5
RADIOGRAPHY & HOLOGRAPHY

10 Hours

TEXT BOOKS:

REFERENCES:
PRODUCT LIFE CYCLE MANAGEMENT

[AS PER CHOICE BASED CREDIT SYSTEM (CBCS) SCHEME]

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MODULE 1
Introduction to Product Life Cycle Management (PLM): Definition, PLM Lifecycle model, Threads of PLM, Need for PLM, Opportunities and benefits of PLM, Views, Components and Phases of PLM, PLM feasibility study, PLM visioning.

PLM Concepts, Processes and Workflow: Characteristics of PLM, Environment driving PLM,PLM Elements, Drivers of PLM, Conceptualization, Design, Development, Validation, Production, Support of PLM. 10 Hours

MODULE 2
Product Data Management (PDM) Process and Workflow: PDM systems and importance, reason for implementing a PDM system, financial justification of PDM implementation. Versioning, check-in and checkout, views, Metadata, Lifecycle, and workflow. 10 Hours

MODULE 3
Collaborative Product Development: Engineering vaulting, product reuse, smart parts, engineering change management, Bill of materials and process consistency, Digital mock-up and prototype development, design for Environment, virtual testing and validation, marketing collateral.

Tools of Communication for collaborative work: Creation of 3DXML and CAD drawing using CAD software. Creation of an animation for assembly instructions on 3D via composer, creation of an acrobat 3D document. 10 Hours

MODULE 4
Knowledge and optimization of design products: Know how, best practices, parameterization of design, Applied problems and Solution on optimization of products using
MODULE 5

Digital Manufacturing – PLM: Digital manufacturing, benefits manufacturing, manufacturing the first-one, Ramp up, virtual learning curve, manufacturing the rest, production planning.

Developing a PLM strategy and conducting a PLM assessment: Strategy, Impact of strategy, implementing a PLM strategy, PLM initiatives to support corporate objectives. Infrastructure assessment, assessment of current systems and applications. 10 Hours

TEXT BOOK


REFERENCES

2. Robert J. Thomas, “NDP: Managing and forecasting for strategic processes”.
MANAGEMENT INFORMATION SYSTEM

[AS PER CHOICE BASED CREDIT SYSTEM (CBCS) SCHEME]

Subject Code : 15MA833 IA Marks : 20
No. of Lecture Hrs./ Week : 03 Exam Hours : 03
Total No. of Lecture Hrs. : 50 Exam Marks : 80

MODULE 1


MODULE 2


MODULE 3


MODULE 4

BUSINESS APPLICATIONS: The internet worked E-business Enterprise – The Internet, Intranets and Extranets in Business


MODULE 5


TEXT BOOKS:


REFERENCE BOOKS:

3. Information systems for modern management - G.R. Murdick PHI
FLEXIBLE MANUFACTURING SYSTEMS

[AS PER CHOICE BASED CREDIT SYSTEM (CBCS) SCHEME]

Subject Code : 15MA834        IA Marks : 20
No. of Lecture Hrs./ Week : 03        Exam Hours : 03
Total No. of Lecture Hrs. : 50        Exam Marks : 80

MODULE 1
PLANNING, SCHEDULING AND CONTROL OF FLEXIBLE MANUFACTURING SYSTEMS
Introduction to FMS– development of manufacturing systems – benefits – major elements –
types of flexibility – FMS application and flexibility – single product, single batch, n – batch
scheduling problem – knowledge based scheduling system. 10 Hours

MODULE 2
COMPUTER CONTROL AND SOFTWARE FOR FLEXIBLE MANUFACTURING SYSTEMS
Introduction – composition of FMS– hierarchy of computer control – computer control of
work center and assembly lines – FMS supervisory computer control – types of software
specification and selection – trends. 10 Hours

MODULE 3
FMS SIMULATION AND DATA BASE
Application of simulation – model of FMS– simulation software – limitation – manufacturing
data systems – data flow – FMS database systems – planning for FMS database. 10 Hours

MODULE 4
GROUP TECHNOLOGY AND JUSTIFICATION OF FMS
Introduction – matrix formulation – mathematical programming formulation – graph
formulation – knowledge based system for group technology – economic justification of
FMS- application of possibility distributions in FMS systems justification. 10 Hours
MODULE 5
APPLICATIONS OF FMS AND FACTORY OF THE FUTURE

10 Hours

TEXT BOOKS

REFERENCES:
### INTERNSHIP/ PROFESSIONAL PRACTICE

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### PROJECT WORK, PHASE II

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### SEMINAR

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