



M. TECH. MECHANICAL (PRODUCTION) ENGINEERING SYLLABUS SESSION 2013-14

| SUBJECT/ SEMESTER | Teaching Hrs/week | | Examination Scheme | | |
|---|----------------------|-----------|--------------------|-------------|----------------|
| | L | T/P | Max. Marks | | Total Marks |
| | | | Theory | Sessional | |
| FIRST SEMESTER | | | | | |
| 1 MPE1: NUMERICAL METHODS AND COMPUTER PROGRAMMING | 3 | 1 | 100 | 25 | 125 |
| 1 MPE2: SIMULATION, MODELLING AND ANALYSIS | 3 | 1 | 100 | 25 | 125 |
| 1 MPE3: APPLIED OPERATIONS RESEARCH | 3 | 1 | 100 | 25 | 125 |
| 1 MPE 4: ELECTIVE-I | 3 | 1 | 100 | 25 | 125 |
| 1 MPE5: MANUFACTURING LAB | - | 3 | 40 | 60 | 125 |
| TOTAL | 12 | 07 | 440 | 160 | 600 |
| SECOND SEMESTER | | | | | |
| 2 MPE1: OPTIMIZATION FOR ENGINEERING DESIGN | 3 | 1 | 100 | 25 | 125 |
| 2 MPE2: COMPUTER AIDED MANUFACTURING | 3 | 1 | 100 | 25 | 125 |
| 2 MPE3: ROBOTICS & CONTROL | 3 | 1 | 100 | 25 | 125 |
| 2 MPE4 : ELECTIVE-I | 3 | 1 | 100 | 25 | 125 |
| 2 MPE5: CAM LAB. | - | 3 | 40 | 60 | 100 |
| TOTAL | 12 | 07 | 440 | 160 | 600 |
| THIRD SEMESTER | | | | | |
| 3 MPE1: DESIGN OF PRODUCTION SYSTEMS | 3 | 1 | 100 | 25 | 125 |
| 3 MPE2 : ELECTIVE-I | 3 | 1 | 100 | 25 | 125 |
| 3 MPE3 : SEMINAR | - | 4 | 60 | 90 | 150 |
| 3 MPE4 : DISSERTATION PART I | - | 4 | - | 100 | 100 |
| TOTAL | 06 | 10 | 260 | 240 | 500 |
| FOURTH SEMESTER | | | | | |
| 4 MPE4: DISSERTATION PART II | - | 16 | - | 500 | 500 |
| TOTAL | - | 16 | - | 500 | 500 |
| GRAND TOTAL | 30 | 40 | 1170 | 1030 | 2200 |



LIST OF ELECTIVES

1 MPE 4: ELECTIVE-I

- 1MPE4.1 PRODUCT DESIGN AND DEVELOPMENT
- 1MPE4.2 PRODUCTION, PLANNING AND CONTROL
- 1MPE4.3 MANUFACTURING SYSTEM ANALYSIS

2 MPE 4: ELECTIVE-I

- 2MPE 4.1 ADVANCED MECHANICAL VIBRATIONS
- 2MPE4.2 INDUSTRIAL TRIBOLOGY
- 2MPE4.3 HEAT TREATMENT OF METALS

3 MPE 2: ELECTIVE-I

- 3MPE2.1 ACCOUNTING & FINANCIAL MANAGEMENT
- 3MPE2.2 INFORMATION SYSTEMS AND DATA MANEGEMNT

DETAILED SYLLABUS

SEMESTER I

1 MPE 1: NUMERICAL METHODS AND COMPUTER PROGRAMMING

Unit I

Solution of Algebraic and Transcendental Equation: Newton-Raphson method including method of complex roots, Graeffe's root square method (Computer based algorithm and programme for these methods)

Unit II

Interpolation and Approximation: Lagrange's and Newton-divided difference formula, Newton interpolation formula for finite differences, Gauss's forward and backward interpolation formulae, Bessel's and Laplace-Everett's formulae, Cubic spline, least squares approximation using Chebyshev polynomial.

Unit III

Solution of Linear Simultaneous Equations: Cholesky's (Crout's) method, Gauss-Seidel iteration and relaxation methods, Solution of Eigenvalue problems; Smallest, largest and intermediate Eigen values (Computer based algorithm and programme for these methods)



Unit IV

Numerical Differentiation and Integration: Numerical differentiation using difference operators, Simpson's 1/3 and 3/8 rules, Boole's rule, Weddle's rule.

Unit V

Solution of Differential Equations: Modified Euler's method, Runge-Kutta method of 2nd, 3rd and 4th orders, Predictor- Corrector method, Stability of Ordinary differential equation, Solution of Laplace's and Poisson's equations by Liebmann's method, Relaxation method.

Reference Books:

1. Numerical Method for Scientific and Engineering Computation, M.K. Jain, S.R.K. Iyenger and R.K. Jain, Wiley Eastern Ltd.
2. Numerical Methods for Engineers S.K. Gupta Wiley Eastern Ltd.
3. Numerical Methods B.S. Grewal Khanna Publications
4. Numerical Methods A.D. Booth Academic Press, NY
5. An Introduction to Numerical Analysis K.E. Atkinson John Wiley & Sons, NY
6. Introduction Methods of Numerical Analysis S.S. Sastry Prentice Hall of India
7. Elementary Numerical Analysis S.D. Conte McGraw Hill

1 MPE 2: SIMULATION, MODELLING AND ANALYSIS

Unit I

Introduction: A review of basic probability and statistics, random variables and their properties, Estimation of means variances and correlation.

Unit II

Physical Modelling: Concept of System and environment, Continuous and discrete systems, Linear and non-linear systems, Stochastic activities, Static and Dynamic models, Principles of modeling, Basic Simulation modeling, Role of simulation in model evaluation and studies, advantages of simulation

Unit III

System Simulation: Techniques of simulation, Monte Carlo method, Experimental nature of simulation, Numerical computation techniques, Continuous system models, Analog and Hybrid simulation, Feedback systems, Computers in simulation studies, Simulation software packages.



Unit IV

System Dynamics: Growth and Decay models, Logistic curves, System dynamics diagrams.

Unit V

Probability Concepts in Simulation: Stochastic variables, discrete and continuous probability functions, Random numbers, Generation of Random numbers, Variance reduction techniques, Determination of length of simulation runs.

Simulation of Mechanical Systems: Building of Simulation models, Simulation of translational and rotational mechanical systems, Simulation of hydraulic systems.

Simulation of Manufacturing Systems: Simulation of waiting line systems, Job shop with material handling and Flexible manufacturing systems, Simulation software for manufacturing, Case studies.

Reference Books:

1. System Simulation Geoffrey Gordon Prentice Hall
2. System Simulation: The Art and Science Robert E. Shannon Prentice Hall
3. System Modelling and Control J. Schwarzenbach and K.F. Gill Edward Arnold
4. Modelling and Analysis of Dynamic Systems Charles M Close and Dean K. Frederick Houghton Mifflin
5. Simulation of manufacturing Allan Carrie John Wiley & Sons

1 MPE 3: APPLIED OPERATIONS RESEARCH

Unit I

Introduction: Definition and scope of OR, Techniques and tools, model formulation, general methods for solution, Classification of Optimization problems, Optimization techniques.

Unit II

Linear Optimization Models: Complex and revised Simplex algorithms, Degeneracy and duality, Post optimum and Sensitivity analysis, Assignment, transportation and transshipment models, Traveling salesman problem, Integer and parametric programming.

Unit III

Game Problems: Minimax criterion and optimal strategy, two persons zero sum game, Games by Simplex dominance rules.

Unit IV



Waiting Line Problems: Classification of queuing problems, M/M/1 & M/M/1/N queuing systems, Steady state analysis of M/M/m queues, Discrete and continuous time Markov models, Chapman-Kolmogorov equation, Birth & death processes in manufacturing, Open and Closed queuing networks.

Unit V

Inventory Management: ABC analysis, deterministic and Probabilistic models

Unit VI

Dynamic Programming: Characteristics of dynamic programming problems, Bellman's principle of optimality, Problems with finite number of stages.

Stochastic Programming: Basic concepts of Probability theory, Stochastic linear programming.

Reference Books:

1. Elements of Queuing Theory Saaty Pitam
2. Nonlinear and Dynamic Programming Hadley Addison Wesley
3. Fundamentals of Operations Research Ackoff & Sasieni Wiley eastern
4. Principles of OR with Applications to Managerial Decisions Wagner Prentice Hall
5. Operations Research Taha McMillan
6. Operations Research R Panneerselvam Prentice Hall of India
7. Operations Research A P Verma S.K. Kataria & Sons
8. Introduction to Operations Research Hillier and Lieberman Prentice Hall

1 MPE 4.1: PRODUCT DESIGN AND DEVELOPMENT

Introduction, Sources of new ideas, Development processes, Product planning, Identification for Customer needs and technology potentials, Innovation and intellectual property rights, Product and process Patents, Patents and patenting processes.

Product specifications, Tolerance specifications, Taguchi loss factor concepts, Quality function deployment, Functional specifications of products, Form and function, Development of alternatives. Design for manufacture, Design for Assembly and design for economy, Prototyping and analytical prototyping, Stage-gate process of product development.

Holistic product development approaches-Form product concept to decommissioning, Environment requirements, Life cycle design, Product data management and Product life cycle management systems, Dependency and concurrent engineering in development of products Internet based approach to product development involving users. Democratization of innovation,



Connecting products to services, Experience innovation, Robust design, Patents and Intellectual properties, product Developments.

Reference Books:

1. Production Management K K Ahuja CBS Publishers
2. Production Design and Manufacturing A.K. Chitale & A.K. Gupta Prentice Hall of India
3. Management Development Alan Mumford Jaico Publishing House

1 MPE 4.2: PRODUCTION, PLANNING AND CONTROL

Function of production, planning and control, Its importance in an organization, Manufacturing systems, Product development and design, Product analysis, Product characteristics, Break even analysis, Step-wise cost function, Learning cost-profit-volume charts, Economics of new design, Sales forecasting and estimating, Sales trend analysis and activity charts, Production order, Quantity in batch production, Stock control, Minimum lot batch size, Production range, Maximum profit batch size, Maximum rate of return batch size.

Machine capacity, Machine operation, Multi machine supervision by one operator, Machine interface, Aschroft number, Balancing, Profit maximization, Scheduling, Different forms, Sequencing, Batch production, Scheduling-maximum profit for whole schedule, Maximum return to whole schedule, Elements of control procedure, Dispatching, Expediting, Computer aided production control.

Reference Books

1. Elements of Production, Planning and Control , Samuel Eilon.
2. Production, Planning and Control, SK Mukhopadhaya, Prentice Hall of India.
3. Modern Production Management ,Buffa .

1 MPE 4.3: MANUFACTURING SYSTEM ANALYSIS

Basic concept of manufacturing, manufacturing problems, Systems approach to manufacturing problems, Principle of modeling in mathematical and physical form, Types of model, Simulation in modeling, Sources of system error, Stability of linear and non-linear system, Adaptive control, System optimization techniques, Product design and part configuration project scheduling by PERT, GERT, flow graph, Productive maintenance.

Automation of production, Computer Aided Design, Computerised layout planning, Automated process planning, Automatic operation planning, Automatic and Computer Integrated Manufacturing, Automated assembly and Testing information systems for manufacturing,



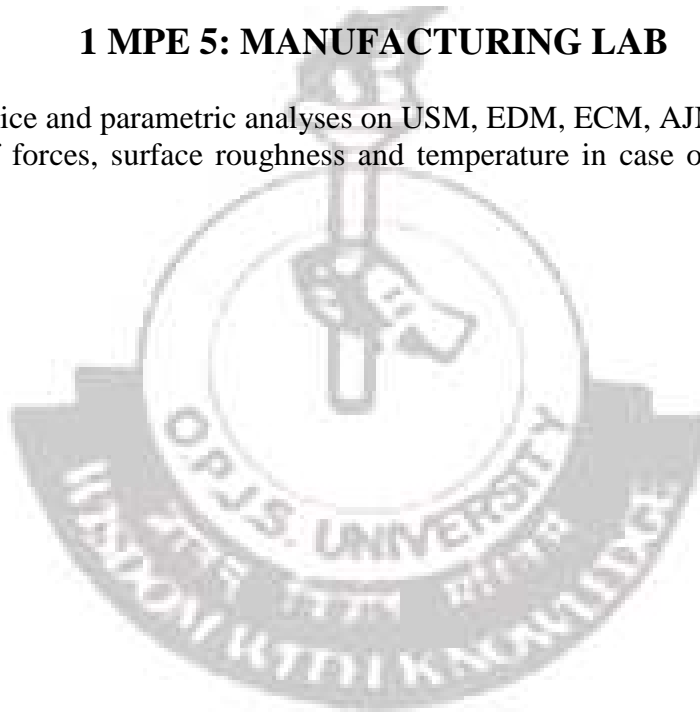
Fundamentals of information system, data bank, On-line production management systems, Parts oriented production information system, Production information and management systems.

Reference Books

1. Manufacturing Process & system, Ostwald Willey India Pvt. Ltd
2. Materials & Process in Manufacturing, E. Paul Degarmo, JT Black RA Kosher, Prentice Hall of India
3. Manufacturing Systems Design and Analysis, Wu B Kluwer Aca
4. Queuing Theory in Manufacturing Systems Analysis and Design, Papadopoulos, H T Chapman
5. Performance Analysis of Manufacturing Systems, Altiok Tayfur Springer-V

1 MPE 5: MANUFACTURING LAB

1. Machining practice and parametric analyses on USM, EDM, ECM, AJM.
2. Measurement of forces, surface roughness and temperature in case of milling and grinding operations.





DETAILED SYLLABUS

SEMESTER II

2 MPE 1: OPTIMIZATION FOR ENGINEERING DESIGN

Unit I

Introduction: Historical Developments, Engineering applications of Optimization

Unit II

Classical Optimization Techniques: Introduction, Review of single and multivariable optimization methods with and without constraints, Non-linear one-dimensional minimization problems, Examples.

Unit III

Constrained Optimization Techniques: Introduction, Direct methods - Cutting plane method and Method of Feasible directions, Indirect methods - Convex programming problems, Exterior penalty function method, Examples and problems

Unit IV

Unconstrained Optimization Techniques: Introduction, Direct search method - Random, Univariate and Pattern search methods, Rosenbrock's method of rotating co-ordinates, Descent methods - Steepest Decent methods- Quasi-Newton's and Variable metric method, Examples.

Unit V

Geometric Programming: Introduction, Unconstrained minimization problems, solution of unconstrained problem from arithmetic-geometric inequality point of view, Constrained minimization problems, Generalized polynomial optimization, Applications of geometric problems, Introduction to stochastic optimization.

Unit VI

Novel methods for Optimization: Introduction to simulated annealing, selection of simulated annealing parameters, simulated annealing algorithm; Genetic Algorithm (GA), Design of GA, Key concepts of GA, Neural Networks, A frame work for Neural Network models, Construction of Neural Network algorithm, Examples of simulated algorithm, genetic annealing and Neural Network method.



Reference Books:

1. Engineering Optimization, S. S. Rao, New Age International
2. Applied Optimal Design, E. J. Haug and J.S. Arora Wiley, New York
3. Optimization for Engineering Design, Kalyanmoy Deb Prentice Hall of India
4. Optimization G.V. Reklaites, A. Ravindran and K.M. Ragsdeth, Wiley, New York

2 MPE 2: COMPUTER AIDED MANUFACTURING

Unit I

Introduction: Introduction to Automation, Need and future of NC Systems and CAM, Advantages and Disadvantages, Open and Closed loop systems, Historical developments and future trends. Future of NC Machines, Difference between ordinary and NC Machine tools, Methods for improving accuracy and productivity.

Unit II

Control of NC Systems: Types of CNC Machine Tools systems devices, e.g. encoders and interpolators, Features of CNC Systems, Direct Numerical Control (DNC), Standard Controllers and General Programming features available in CNC Systems, Computer Process monitoring and Control, Adaptive control systems

Unit III

NC Part Programming: Manual Programming for simple parts, e.g., turning, milling, drilling, etc., Computer aided NC Programming in APT language, use of canned cycles, Generation of NC Programmes through CAD/CAM systems, Design and implementation of post processors.

Unit IV

Computer Aided Process Planning: Introduction, Manual process planning vs. Computer aided process planning, Basics of variant and generative process planning methods, Examples of automated process planning systems.

Unit V

Computer Integrated Manufacturing: Introduction, features and applications of CIM, key elements, advantages and disadvantages of CIM.

Artificial Intelligence in Manufacturing: Introduction, Elements of Expert Systems, Introduction to Neural Networks, Expert Systems application in manufacturing, Case studies.

Reference Books:

1. Computer Control of Manufacturing Systems, Koren



2. CAD/CAM Groovers Prentice Hall
3. NC Machine Tools S J Martin -
4. CAD/CAM P N Rao Tata McGraw Hill
5. CAD/CAM P Radhakrishnan, S Subramanyam, VRaju
6. Computer Aided Manufacturing, Chang, Wysk & Wang Prentice Hall of India

2 MPE 3: ROBOTICS & CONTROL

Unit I

Introduction: Definition, Classification of Robots, Geometric classification and control classification.

Unit II

Robot Elements: Drive systems, Control systems, sensors, End effectors, Gripper actuators and gripper design.

Unit III

Robot Coordinate Systems and Manipulator Kinematics: Robot co-ordinate system representation, Transformation, Homogeneous transforms and its inverse, Relating the robot to its world, Manipulators Kinematics, Parameters of links and joints, Kinematic chains, Dynamics of kinematic chains, Trajectory planning and control, Advanced techniques of kinematics and dynamics of mechanical systems, Parallel actuated and closed loop manipulators.

Unit IV

Robot Control: Fundamental principles, Classification, Position, path and speed control systems, adaptive control.

Unit V

Robot Programming: Level of robot programming, Language based programming, task level programming, Robot programming synthesis, robot programming for foundry, press work and heat treatment, welding, machine tools, material handling, warehousing assembly, etc., automatic storage and retrieval system, Robot economics and safety, Robot integration with CAD/CAM/CIM, Collision free motion planning.

Reference Books:

1. Robotic Technology (Vol. I-V), Phillipe Collet Prentice Hall
2. An Introduction to Robot Technology, Coiffet and Chirooza Kogan Page
3. Robotics for Engineers ,Y. Koren McGraw Hill
4. Robotics, K.S. Fu, R.C. Gonzalez & CSG Lee McGraw Hill International
5. Robotics, J.J. Craig Addison-Wesley



6. Industrial Robots Groover, Mitchell Weiss, Nagel Octrey McGraw Hill
7. Robots & Manufacturing Automation, Asfahl Wiley Eastern

2 MPE 4.1: ADVANCED MECHANICAL VIBRATIONS

Unit I

Introduction: Characterization of engineering vibration problems, Review of single degree freedom systems with free,damped and forced vibrations

Unit II

Two-degree of Freedom Systems: Principal modes of vibration, Spring coupled and mass coupled systems, Forcedvibration of an undamped close coupled and far coupled systems, Undamped vibration absorbers, Forced dampedvibrations, Vibration isolation.

Unit III

Multi-degree Freedom systems: Eigen-value problem, Close coupled and far coupled systems, Orthogonality of mode shapes, Modal analysis for free, damped and forced vibration systems, Approximate methods for fundamental frequency- Rayleigh's, Dunkerely, Stodola and Holzer method, Method of matrix iteration, Finite element method for close coupled and far coupled systems.

Unit IV

Continuous systems: Forced vibration of systems governed by wave equation, Free and forced vibrations of beams/ bars

Unit V

Transient Vibrations: Response to an impulsive, step and pulse input, Shock spectrum

Non-linear Vibrations: Non-linear systems, Undamped and forced vibration with non-linear spring forces, Self-excited vibrations.

Reference Books

1. Theory and practice of Mechanical Vibrations, J.S. Rao and K. Gupta, New Age International
2. Mechanical Vibrations, G.K. Groover, Nem Chand & Brothers
3. Mechanical Vibration Practice ,V. Ramamurti, Narosa Publications
4. Mechanical Vibrations, V.P. Sing,h Dhanpat Rai & sons



5. Textbook of Mechanical Vibrations, R.V. Dukkupati & J. Srinivas, Prentice Hall of India

2 MPE 4.2: INDUSTRIAL TRIBOLOGY

Unit I

Introduction: Definition and Scope of tribology, Contact of solids, Surface topology, Surface interaction.

Unit II

Friction: Definitions, Types, Friction laws, Modern theory of dry solid friction, Temperature of sliding surface, Mechanism of rolling friction, Friction instability, Friction of elastomers.

Unit III

Wear: Definition, Classification, Theories of adhesives, Abrasives, Surface fatigue and corrosive wear, Miscellaneous wear theory such as Erosive, cavitation and Fretting wear, Wear of miscellaneous machine components such as gears, Plane bearings and rolling elements.

Unit IV

Lubrication: Lubrication of bearing, Lubricant, Mineral Oil, Grease, Solid lubricant, Lubrication regime, Viscous flow, Reynolds equation and its limitations, Hydrodynamic lubrication, Hydrostatic lubrication, Elasto-hydrodynamic lubrication, Boundary lubrication, Squeeze films.

Unit V

Applications: Application of tribology in manufacturing processes, Metal machining, Metal cutting, Tool wear, Action of lubricants, Friction welding, Extrusion process.

Reference Books:

1. Engineering Tribology L P Sahoo, Prentice Hall of India
2. Principles and Applications of Tribology, D.F. Moore, Pergamon Press
3. Fundamentals of Tribology, Basu, Sengupta & Ahuja, Prentice Hall of India

2 MPE 4.3: HEAT TREATMENT OF METALS

Unit I



Introduction: Nature and alloys; Heat treatment process, Requirements, Theory, Advantages, Process variables.

Unit II

Heat Treatment of Ferrous Metals: Iron Carbon phase diagram; TTT diagram; different microstructures; transformations; Annealing, Stress relieving; Spheroidizing; Normalizing; Hardening; Tempering; Austempering; Martempering; Quenching; Quenchants; Quenching media; Surface hardening; Hardenability; Sub-zero treatment; Thermo-mechanical treatment; Chemical Treatment; Tool steel and their heat treatment; cast Iron and their heat treatment.

Unit III

Heat Treatment of Non-Ferrous Metals: Aluminium and its alloys; Heat treatable and non heat-treatable aluminum alloys; Classification of heat treatment of aluminum alloys; Heat treatment of Aluminum and its alloys; Heat treatment of Magnesium and its alloys; Heat treatment of Titanium and its alloys; Heat treatment of Copper and its alloys; Heat treatment of Nickel and its alloys, Energy Economy in heat treatment.

Reference Books

1. Principles of Heat Treatment of Steels, R.C. Sharma New Age International (P)
2. Heat Treatment Principle and Techniques, T.V. Rajan, C.P. Sharma and Ashok Sharma Prentice Hall India.

2 MPE 5: CAM LAB.

The experiments may be designed based on different aspects of computer aided manufacturing



DETAILED SYLLABUS

SEMESTER III

3 MPE 1: DESIGN OF PRODUCTION SYSTEMS

Unit I

Essential of Manufacturing Systems: Basic system concepts, System design, Manufacturing systems, Structural and transformation aspect of manufacturing systems, Integrated manufacturing systems and its frame work.

Unit II

Process System for Manufacturing: Modes of production-mass production, Multi-product small batch production, Group Technology based production, Cellular and flexible manufacturing systems, Automation systems for manufacturing, CAM/CIM, Economic evaluation of processes.

Unit III

Discrete Part Manufacturing Systems: Different types and management decision system models, Basic approach of modeling, Analytical vs Simulation models, Modelling approach, Long run analysis, deterministic models, Binomial approximation, Sample path analysis, Markov models, Examples.

Unit IV

High Volume Production System: Automated flow lines, Method of work part transport, Transfer mechanism, Automation for machining operations, Analysis of automated flow lines, Automated flow lines with/without buffer storage, computer simulation of automated flow lines, Automated assembly system, design for automated assembly, Analysis of multi-station assembly machines, Assembly systems and line balancing.

Unit V

Manufacturing Process Design: Process planning and design, Process design operation design, Optimum routing analysis, Facility location and layout planning, Single and multiple facility placement problem, Continuous facility location, Computer Aided plant layout, Material



handling system design, Storage & warehousing, Automated storage and retrieval systems, Simultaneous development of plant layout and material handling.

Unit VI

Management systems for Manufacturing: Managerial information flow in manufacturing systems, Decision problem in managerial information, flow, Production planning and scheduling, Production control, Scope and problems; Quality control & function deployment.

Information Systems for Manufacturing: Fundamentals of Information technology information systems, Information networking, Computerised manufacturing information systems

Reference Books:

1. Manufacturing Hitomi -
2. Manufacturing Facilities Sule -
3. Automation, Production Systems & Computer Aided Manufacturing Groover

3 MPE 2.1: ACCOUNTING & FINANCIAL MANAGEMENT

Accounting: Balance sheet; profit and Loss concepts; Accounting principles and mechanics; Inventory valuation and depreciation accounting; ratio and Fund flow analysis; Introduction to cost accounting; Various method of cost determination and cost accounting systems such as activity based costing systems and responsibility accounting; use of costing systems in decision making, Case studies.

Financial Management: Fund and cash flow analysis; Working capital management; determination of capital structure of the firm; Cost of capital; Capital asset pricing models; Leverages; Investment analysis; Portfolio management; Debt management; Dividend policy; Concept of financial strategy; Case studies.

Reference Books:

1. Advanced Accounting ,S.P. Jain & K.L. Narang -
2. Accounting for Management, S.K. Bhattacharya & John Dearden -
3. Financial Management, I.M. Pandey -
4. Financial Management and Accounting, P Mohan Rao Deep and Deep Publications
5. Construction Accounting and Financial Management, Palmer Willman, McGraw Hill
6. Construction Management and Accounting, B L Gupta Standard Publishers
7. Fundamentals of Financial Management, Chandra Prasun



3 MPE 2.2: INFORMATION SYSTEMS AND DATA MANEGEMNT

Unit I

Introduction: Role of information system; Function of information system; Determination of information need.

Unit II

Information Processing Concepts: Historical perspective, Today's status; System approach and analysis; Concepts of data and information, Data collection, Data or information reduction; Data and information storage; Data processing and information generation; Transmission of data and information and the information economics of information.

Unit III

Information System Analysis: Overview of system; Management and fom lal information system; Hierarchical and system approach to information system design and their applications; Tailoring the information system to meet specific information requirements using filtering monitoring, interrogative and external methods.

Unit IV

Data Base Management System: Introduction to database concepts; difference between a file system and a database system; Goals of DBMS including data independence consistency, data security and integrity; DBMS model hierarchical network and relational; Data description and query language; Physical database design, case studies; System R, Ingress, IDMS etc.; Introduction to distributed database, Concurrency control bases recovery etc.

Reference Books:

1. Information Systems Concepts for Managemen,t Henry C. Lucas Jr. McGraw Hill
2. Information System theory and Practice, Burch and Strater Hamilton Publishing Co.
3. Computer Based Information System, D.W. Walker Pergamon Press
4. Data Base Management system, A.F. Cardenas