3rd Semester

MT – 601 COMPUTER AIDED MAINTENANCE MANAGEMENT

1. Introduction Definition Basic components of CMMS, Uses of Computers in Maintenance CAMSS Justification reasons for lack of CMMS effectiveness
2. Basic Hardware Components General Software categories, fundamentals of C, CH, Network Software, Networking CAMSS Softwares, Flowchart Algorithms & Programming.
3. Approach towards Computerization, selction of computer system, Master files, Maintenance files, Maintenance Module, classification records, Preventive and repair planning module, codification for Break down, job sequaning files/records.
4. Developing softwares:- Planning & Scheduling equipment & facilities control, work central Maintenance of spare parts and inventory centre performance reporting and other tools and techniques of Industrial engineering used in Maintenance Management.

Reference Books:

1.	Maintenance Engineering Hand book Kindly	lIndley and R Higgins
2.	Engineering Maintenance Management ,	Benjamin W.Niebel
3.	Industrial Maintenance Management	S.K. Shrivastava.
4.	Maintenance Planing & Central	Anthony kelly
5.		

MT-602 MAINTENANCE ECONOMICS AND TURNAROUND MANAGEMENT

Objective: To introduce the concepts of economic theory and behavior for preparing the strategic financial models for maintenance investment decisions.

Fundamentals concepts of economics: Scope, definition, characteristics of economic, relationship to the functional areas of business, theory of firm, its constraints and limitations, nature and function of profit, basics of demand and supply equilibrium.

Demand Analysis: Demand theory, demand estimation, simple multiple regression analysis, demand forecasting-qualitative forecasts; survey techniques, opinion polls, quantitative forecasts; time – series analysis, smoothing techniques input-output forecasting.

Production and Cost Analysis: Production theory and estimation, production function, returns to scale, comparative advantage, cost theory and estimation, short-run and long run costs, plant size and economies of scale, learning curve, cost-volume profit analysis and operating leverages, cost estimation based on project cost, types of costs, inter-alias, design, installed capital, commissioning and decommission costs, operating costs maintenance and opportunity costs, life cycle costs, cost output analysis and maintenance cost history .

Product/project Life Cycle: Concepts of product/project life cycle capital assets, reliability and risk, life cycle costs and its economic consequences for strategic development. Project financing and capital structure, financial leverages, working capital and capitalization.

Turnaround: Characteristics of the maintenance work load, critical path analysis and its use for the planning of large shutdowns, procedure of managing shut downs; Initiation, validation of work scope, organizing preparatory work , contractor packages, shutdown plan, manpower plan.

A typical shutdown operation-administrative and resource structures, site logistics plan and its preparation, cost profile, safety and quality plans, executing and controlling the shutdown, review procedures.

References:

1.	Managerial Economics	Salvatore
2.	Applied Economics for Engineers and Managers	S.K. Jain
3.	Engineering Economics	Tarachan
4.	Industrial maintenance management	Srivastava

MT – 611 MAINTENANCE OF CNC MACHINES

Introduction to DNC,FMS,CNC systems, failure in CNC systems, causes diagnosis and remedies.
Failure in hydraulic systems, monitoring strategies, fluid contaminent monitoring techniques, particle characterization, Iubricant analysis, operational parameters.
Electropneumatic systems – advantages of electropneumatic systems, valve failure, diagnostic displays. Introduction to Robotics, Maintenance of Robots. Black – out Industries.

Reference Books:

1. Handbook of condition monitoring BKN Rao (Elsevier advanced Tech.)
2. Maintenance Engg. Handbook Lindley R.Higgins

MT-612 RESTORATION REPAIRS & RETROFITTING

Restoration:

. Scheduled restoration and scheduled discard tasks.

. Restoration techniques for industrial equipments: Gear transmissions, key fittings, splines fitting, coupling & clutches, lead screw & nut, belt ,chain & sprocket wheels, bush bearing ball & roller bearings their shank & housings.

. Restoration of parts by welding metallisation, chromium plating, maintainability for given restoration time with weibull times to restore distribution, time to restore for given maintainability with a weibull time to restore distribution, steady state mean times to actively restore, repair and /or replace components in an equipment, equipment restoration time, efficiency & consistency.

Repair:

- Repair cycle, repair complexity, Assembly & dessembly of machine& omponents, repair of cracks, reclamation of worn & damaged parts, economics of reconditioning, reconditioning Vs replacements.
- Repair of Industrial equipments: Machine spindle, Hydraulic machines, tailstock, three jaw chucks, repair of cracks in C.I. Body , special features of the repair of cranes, hammers power press.

Retrofitting:

Retrofitting, objectives, classification of retrofitting, scope of retrofitting,
Cost effectiveness through retrofitting (economical aspects), circumstances leading to retrofitting, features & selection for retrofitting.

References:

1. Industrial maintenance : H.P.Garg
2. Maintenance engineering hand book : Lindley R Higgins
3. Reliability centered maintenance : John moubray
4. Maintainability, availability & operational readiness engineering : Dimitri Kececioglu

MT -613 MAINTENANCE OF TRANSPORT MACHINERY

Introduction and classification – Passenger vehicles, heavy load carriers, moderate capacity vehicles. Light motor vehicles. Fault diagnosis, rectification, servicing and repair of various components/system of transport vehicles e.g. engine fuels system lubrication, transmission, supervision and electrical system, fault diagnosis charts and service manuals. Maintenance scheduling predictive and preventive maintenance, machinery health monitoring systems, spare parts, inventory and maintenance, Social problems connected with public transport system.

Reference Books:

1. Journal of Institute of Rail Transport : Institute of Rail Transport (India)
2. Handbook of National Accounting Tackling Transport :H.TrischlerS.Zeilinger

MT – 614 MACHINERY VIBRATION MONITORING ANALYSIS

Vibration of Rotating Machinery.

Machine Faults And Frequency Range Of Symptoms.

Localised and Distributed Faults.

Impact Excited Resonance.

Vibration Level Classification.

ISO Standards.

Peak and RMS Levels.

Constant Percentage Bandwidth Spectra.

Use of Phase.

Cepstral Analysis.

Envelope Detection.

Time Domain Averaging.

Rolling Element Bearings.

Rotor Dynamics.

Orbit Analysis.

Static And Dynamic Balancing.

Gearbox Vibration.

Induction Motors.

Reciprocating Engines and Compressors.

References:

1.Machinery Vibration –Measurement and Analysis : W. Victor
2. Rotating Machinery Vibration : Maurice L.Adams

MT – 615 MAINTENANCE OF CHEMICAL PLANT MACHINERY

Maintenance scheduling, predictive and preventive maintenance, machine health monitoring systems, spare parts – inventory and maintenance.

Corrosion and corrosion problems in process equipments such as piping, pressure vessels, heat exchangers, process towers, chimneys, boilers etc. Corrosion and erosion control.

Maintenance problems associated with moving machinery such as blowers, pumps, gear drives, conveyors, electrical machines etc. And their rectification identification of special problems with different chemical plants and their solution.

Reference Books:

1. Fault Diagnosis in Complex Chemical Plants :J.C.Hoskins