SWAMI VIVEKANAND UNIVERSITY, SIRONJA, SAGAR (M.P.)

SYLLABUS

For

M.TECH MECHANICAL
(CAD /CAM)
I AND II SEM

Swami Vivekanand University, Sironja Sagar
2013-2014

M.Tech. I SEMESTER MECHANICAL(CAD/CAM)

SUBJECT CODE	SUBJECT
MCAD-101	Advanced Machine Design
MCAD-102	Computer Aided Machine Design
MCAD-103	Computer Aided Production Management
MCAD-104	Advanced Materials and Processes
MCAD-105	Mechanical Engineering for Mechatronics
MCAD-106	Communication & Research Skills
MCAD-107	CAD & Solid Modeling Lab
MCAD-108	CAPM & Programming Lab

SUBJECT CODE	THEORY								PRACTICAL								CREDIT		TOTAL	TH- THEORY MS- MID SEM TQ- THEORY QUIZ TW- THEORY TERM WORK PR- PRACTICAL LW- LAB WORK PQ- PRACTICAL QUIZ G - GRADE GP- GRADE POINT F$-ABSENT #-GRACE
	TH		MS		TQ		TW		PR		LW		LQ							
	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN			TH	PR	MAX	
MCAD-101	70	22	20	-	10	-	-	-	-	-	-	-	-	-			4	-	100	
MCAD-102	70	22	20	-	10	-	-	-	-	-	-	-	-	-			4	-	100	
MCAD-103	70	22	20	-	10	-	-	-	30	9	20	-	-	-			4	2	150	
MCAD-104	70	22	20	-	10	-	-	-	30	9	20	-	-	-			4	2	150	
MCAD-105	70	22	20	-	10	-	-	-	–	–	–	-	-	-			4	-	100	
MCAD-106	70	22	20	-	10	-	-	-	–	–	–	-	-	-			4	-	100	
MCAD-107	-	-	-	-	-	-	-	-	-	-	-	–	50	-			-	2	50	
MCAD-108	-	-	-	-	-	-	-	-	-	-			50	-			-	2	50	

M.Tech. II SEMESTER MECHANICAL(CAD/CAM)

SUBJECT CODE	SUBJECT
MCAD-201	Finite Element Method
MCAD-202	Computer Aided Manufacturing
MCAD-203	Robotic Engineering
MCAD-204	Automation in Production and Hydraulic control
MCAD-205	Modern Machining Methods
MCAD-206	Principles of Management
MCAD-207	FEM & Software Lab
MCAD-208	CAM & Software Lab

SUBJECT CODE	THEORY								PRACTICAL								CREDIT		TOTAL
	TH		MS		TQ		TW		PR		LW		LQ						
	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN			TH	PR	MAX
MCAD-201	70	22	20	-	10	-	-	-	-	-	-	-	-	-			4	-	100
MCAD-202	70	22	20	-	10	-	-	-	-	-	-	-	-	-			4	-	100
MCAD-203	70	22	20	-	10	-	-	-	30	9	20	-	-	-			4	2	150
MCAD-204	70	22	20	-	10	-	-	-	30	9	20	-	-	-			4	2	150
MCAD-205	70	22	20	-	10	-	-	-	–	–	–	-	-	-			4	-	100
MCAD-206	70	22	20	-	10	-	-	-	–	–	–	-	-	-			4	-	100
MCAD-207	-	-	-	-	-	-	-	-	–	–	-	-	50	-			-	2	50
MCAD-208	-	-	-	-	-	-	-	-	–	–	-	-	50	-			-	2	50

TH- THEORY MS- MID SEM
TQ- THEORY QUIZ
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GP- GRADE POINT

F$-ABSENT
#-GRACE

SWAMI VIVEKANAND UNIVERSITY, SAGAR

Semester: 1

Mechanical Engineering (CAD/CAM)

MCAD-101 Advanced Machine Design

UNIT - I

General design procedure for design problems, design concept product design and development, Product design specifications, Product life cycle, Protection of intellectual property, Bench marking, Brainstorming, Ethics in Engineering design, Whistle blowing , Design for strength & rigidity. Design for strength & rigidity.

UNIT -II

Design based on - Fatigue, Fracture, Creep criteria, safe life v/s fail safe Design ,Dynamic design of Mechanical equipments, Modeling of machine tools, Aircraft and Automobiles etc. for determining dynamic characteristics and extraction of Modal parameters for dynamic design.

UNIT -III

Design for manufacturing including assembly aspects & other aspects, reliability based design of mechanical components, Recent development pressure vessel design, testing of pressure vessels as per standards Computer aided design of pressure vessels Rotating disc and rotating cylinder:- Disc with uniform thickness – disc for uniform strength – stresses in rotating cylinders with and without internal Thermal stress, creep and stress rupture; Dynamic and fatigue behavior

UNIT -IV

Friction theories, wear & types of wear, Lubrication, different modes of lubrication - hydrodynamic, hydrostatic & Easton-Hydrodynamic, porous bearings, determination of static load capacity of bearing (Stribek's equation).

UNIT- V

Recent trends in materials handling equipment design, basic principles of design, main girder design, structure analysis , loading patterns, service factors & environmental conditions, testing as per BIS, etc. Advances in gear design, gear materials, corrective gear design, gear rating calculation as per BIS, Quality Function Deployment Concurrent engine

MCAD-102 Computer Aided Machine Design

UNIT-I

Introduction: Need and Scope of Computer Aided Machine Design Computer graphics: Principles of interactive computer graphics and overview of hardware available for use in CAD; Scan conversion; Bresenham's Algorithm for line, circle, Geometric transformations- 2D and3D translation, scaling rotation, shear and reflection, homogeneous transformations

UNIT -II

Geometric modeling: Types of mathematical representation of curves, wire frame models wire frame entities parametric representation of synthetic curves Hermit cubic splines Bezier curves, Representations :,.Surface modeling :Mathematical representation surfaces, Surface model, Surface entities surface representation, Parametric representation of surfaces, rule surface, surface of revolution.

UNIT-III

B-rep and C-rep Feature based modeling Geometric modelling-3D: Solid modeling, Solid Representation, Boundary Representation (B-rep), Constructive Solid Geometry (CSG).Solid modeling using software: Solid modeling of components and Assembly using CAD software such as ProEngineer /Inventor Professional / Mechanical Desktop

UNIT-IV

Computer aided design of machine components: To develop computer programs using 'C'/ 'C++' / MATLAB Programming language for the machine components such as shafts, springs, couplings, clutches, brakes, levers, gears, belts

UNIT -V

Engineering optimization: Optimum design of Machine Elements, Johnson's method, single variable and multi variable optimization techniques. Single objective and Multi-objective functions related to machine component design

MCAD-103 Computer Aided Production Management

UNIT-I

Computer Aided Forecasting : Nature and use of forecast, sources of data, demand patterns, forecasting methods – Delphy's method, Time series method, exponential smoothing, linear regression, Box Jerkin's method, selection of forecasting technique, measurement of forecast Accuracy- MAD, Adoptive methods Computerized relative allocation of facility technique.

UNIT-II

design program and computerized relationship layout planning for facility location and layout ,Group Technology: - Introduction, objectives part families, algorithms and models for G.T. - Rank order clustering, Bond energy, mathematical model for machine component cell formation. Design and manufacturing attributes. Parts classification and coding, concept of composite job

UNIT-III

machine group, cell group tooling, design rationalization, CAD/CAM and GT benefits. Computer Aided Process Planning: Generative and variant types, backward and forward approach, feature based and CAD based CAPP, Operation Management. MRP: Introduction, Objective, Input, Computational procedure, information provided by the system. Detailed capacity planning.

UNIT-IV

ERP: Introduction, main features, generic model of ERP system, selection of ERP, proof of concept approach, analytic hierarchy approach, ERP implementation Job Sequencings, scheduling Data collection, computer generated time standard

UNIT-V

COMPUTER AIDED INSPECTION: Computer Aided Testing, Contact type, non-contact type.SIMULATION: Major activities, purpose, simulation process, types methodology, simulation packages, process quality simulator, computer requirements trends, applications simulation .

MCAD-104 Advanced Materials And Processes

UNIT-I

ADVANCED MATERIALS:Super alloys, Ferro electric and piezoelectric materials, Advanced magnetic materials, Advanced engineering polymer materials, Advanced ceramic and composite materials, photo conducting and photovoltaic materials, electro-optic materials, Lasers, smart materials PROCESSING OF MATERIALS:Conventional processing techniques for advanced materials, special processing techniques, use of computers in metal processing.

UNIT-II

CHARACTERIZATION AND EVALUATION TECHNIQUES: Destructive and Non-destructive evaluation techniques, Electron and X-ray techniques, Distortion and Residual stress measurement, corrosion and its control, Delayed fracture, Performance of materials at High & low temperatures, Radiation damage and recovery. DESIGN:Introduction :Design philosophy – steps in Design process –General Design rules for manufacturability – basic principles of designing for economical production – creativity in design.

UNIT-III

MATERIALS: Selection of Materials for design – Developments in Material technology –criteria for material selection – Material selection interrelationship with process selection – process selection charts MACHINING PROCESS: Overview of various machining processes – general design rules for machining - Dimensional tolerance and surface roughness – Design for machining – Ease – Redesigning of components for machining ease with suitable examples. General design recommendations for machined parts.

UNIT-IV

METAL CASTING: Appraisal of various casting processes, selection of casting process, - general design considerations for casting – casting tolerances – use of solidification simulation in casting design – product design rules for sand casting Appraisal of various welding processes, Factors in design of elements – general design guidelines – pre and post treatment of welds

UNIT-V

FORGING: Design factors for Forging – Closed die forging design – parting lines of dies drop forging die design – general design recommendations .EXTRUSION & SHEET METAL WORK: Design guidelines for extruded sections - design principles for Punching, Blanking, Bending, Deep Drawing – Keeler Goodman Forming Line Diagram – Component Design for Blanking

MCAD- 105 Material Science and Materials

UNIT-I

STRUCTURE – Atomic structure & Chemical bonding, Crystalline & Network structure, Grain structure, Grain deformation & Anisotropic properties, Properties of material, Physical, Chemical, Electrical, Thermal & Mechanical. THERMAL PROPERTIES OF MATERIALS : Specific Heat: Classical, Einstein, Debye theory, An harmonic crystal imperfections, Electronic specific heat, Thermal Expansion, Hypothetical & Actual Energy Curves. Thermal

UNIT-II

PERFORMANCE OF MATERIALS IN SERVICE :Performance based on - static properties, dynamic properties and temperature effect. methods of testing & interpretation of test results. THEORY OF ELASTICITY AND PLASTICITY: Fundamentals- Methods - Yield surface.

UNIT-III

ADVANCED MATERIALS:Super alloys, Ferro electric and piezoelectric materials, Advanced magnetic materials, Advanced engineering polymer materials, Advanced ceramic and composite materials, photo conducting and photovoltaic materials, electro-optic materials, Lasers, smart materials. Biomaterials Determining mechanical properties and their applications. Recent trends in Bio-Material Characterization.

UNIT-IV

PROCESSING OF MATERIALS: Conventional processing techniques for advanced materials, special processing techniques, use of computers in metal processing.
CHARACTERIZATION AND EVALUATION TECHNIQUES: Destructive and Non-destructive evaluation techniques, Electron and X-ray techniques, Distortion and Residual stress measurement.

UNIT-V

PERFORMANCE OF MATERIALS IN SERVICE: Service performance, corrosion and its control, Delayed fracture, Performance of materials at High & low temperatures, Radiation damage and recovery

MCAD-106 Mechanical Engineering For Mechatronics

UNIT-I

Introduction to Mechatronics:Origin and evaluation, definition, multidisciplinary scenario, need in industry, objectives, design of Mechatronics systems, modules in the system, Mechatronics technology, Mechatronics and engineering skills, overview, system and Mechatronics, measurement system, microprocessor based controllers, engine management system, automatic camera, automatic washing machine and automatic bathroom scale.

UNIT-II

Overview of Sensors and Transducers: Definitions, classification, performance parameters, pressure sensors and flow sensors, Hall effect sensors, light sensors, proximity sensors, optical sensor and desirable features of sensors and transducers. Hydraulic System: Actuators, Hydraulic Cylinders and their types, Hydraulic

UNIT-III

Motors and their types, Valves and their types, symbols for Hydraulic System Components, general hydraulic circuit, different types of hydraulic circuits and hydrostatic transmission. Pneumatic Systems: Introduction to pneumatics, gas laws, generation and contamination control, pneumatic actuators, valves and control circuits, multiple-actuators circuits, pneumatic applications,maintenance, trouble shooting and safety.

UNIT-IV

System Models: Elements of mechanical systems, spring mass damper system, an unconventional Approach, arrangement and application of mechanical elements, elements of Electrical Engineering, unconventional solution to RLC circuit, application of DC Servomotor, Hydraulic System

UNIT-V

Elements of Machine Tools: Structure, design considerations for structures, guide ways, their requirements and classification, slide ways, stick-slip phenomena, antifriction ways, shapes and types slide ways, re-circulation ball screw and nut, planetary roller screw, spindle and spindle bearings, types of loads on spindles, types of bearings, bearing material selection, antifriction bearings, preloading and its methods for re-circulating ball

SEMESTER II

MCAD- 201- Finite Element Method

UNIT-I

Introduction to FEM: basic concepts, historical back ground, application of FEM, general description, comparison of FEM with other methods, Variational approach, Galerkin's Methods. Co-ordinates, basic element shapes, interpolation function. Virtual energyprinciple, Rayleigh- Ritz method, properties of stiffness matrix,

UNIT-II

boundary conditions, solution of system of equations, shape functions and characteristics, Basic equations of elasticity, strain displacement relations 1-D structural problems – axial bar element – stiffness matrix, load vector, temperature effects, Quadratic shape function. Analysis of Trusses – Plane Truss and Space Truss elements

UNIT-III

Analysis of beams – Hermite shape functions – stiffness matrix – Load vector – Problems 2-D problems –CST, LST, force terms, Stiffness matrix and load vector, boundary conditions. Isoparametric element – quadrilateral element, Shape functions –

UNIT-III

Numerical Integration – sub parametric and super parametric elements. 3-D problems – Tetrahedral element – Jacobian matrix – Stiffness matrix. 6 Dynamic considerations, Dynamic equations – consistent mass matrix – Eigen Values, Eigen Vector, natural frequencies – mode shapes – modal analysis

UNIT-IV

Applications of numerical procedures to determine natural frequencies and mode shapes. Finite Element Method for dynamic analysis Scalar field problems - 1-D Heat conduction – 1-D fin element – 2-D heat conduction problems – Introduction to Torsional problems

UNIT-V

Introduction to Non linearity, Non linear problems; Geometric Non-linearity.

MCAD 202- Computer Aided Manufacturing

UNIT-I

NC / CNC MACHINES: Numerical Controls, types, evolution of controllers, Programmable Logic Controllers, components of NC/CNC system, specification of CNC system. Classification of NC /CNC machines, transducers used, salient features, Tape, Tape codes and tape readers used in NC machines constructional details of CNC machines, axis designation, NC/CNC tooling -Fundamentals of manual part programming , types of format, word address format manual part programming for drilling, lathe and milling machine operations, subroutines, do loops, canned cycles.

UNIT-II

Computer assisted part programming: - Need, list of computer assisted programming languages, Automated Programmed Tools language- its types of statement, command and programming-CAD based CNC programming using CAM software. FLEXIBLE MANUFACTURING SYSTEM: -FMS definition and description need of FMS -General FMS Considerations, objective, management commitment and planning, types of FMS, main elements of FMS, flexibilities, their measurements , various mathematical techniques for flexibility measurements.

UNIT-III

Manufacturing cells , cellular v/s flexible manufacturing -Systems planning, physical planning –human resources, Concepts of Quality, JIT and GT as applied to FMS - Processing and Quality assurance equipments- Turning centre, Machining centre, Cleaning and debarring equipment, co ordinate measuring machines- their types-working , System support equipment-Automated material movement and Automated Storage and Retrieval Systems (ASRS), scheduling of AGVs, cutting tools and tool management, work holding considerations FMS computer hardware & software-general structure and requirements. FMS installation

UNIT-IV

COMPUTER INTEGRATED MANUFACTURING SYSTEMS: Introduction to CIMS, nature, types of manufacturing system, evaluation, CIMS hardware and software, benefits, scope and needs, CIMS wheel, elements of CIMS and their role, computer technology and manufacturing, database requirement, fundamentals of communication,

UNIT-V

CIM specification, application, development of experiments and facilities needed, economics, justification, case studies. -Expert systems and AI based scheduling in CIM environment. -CAD/CAM Integration: - Activities involved, case studies, software requirements, hardware requirements, factory automation, implementation issues economic justification

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MCAD 203- Robotic Engineering

UNIT-I

Automation and Robotics, Robot anatomy, robot configuration, motions joint notation work volume, robot drive system, control system and dynamic performance, precision of movement. CONTROL SYSTEM AND COMPONENTS: basic concept and modals controllers control system analysis, robot activation and feedback components. Positions sensors, velocity sensors, actuators sensors, power transmission system.

UNIT-II

MOTION ANALYSIS AND CONTROL: Manipulator kinematics, position representation forward transformation, homogeneous transformation, manipulator path control, robot dynamics, configuration of robot controller. END EFFECTORS: Grippers-types, operation, mechanism, force analysis, tools as end effectors consideration in gripper selection and design..SENSORS: Desirable features, tactile, proximity and range sensors, usessensors in robotics

UNIT-III

MACHINE VISION: Functions, Sensing and Digitizing-imaging, Devices, Lighting techniques, Analog to digital single conversion, Image storage, Image processing and Analysis-image data reduction, Segmentation feature extraction. Object recognition, training the vision system, Robotics application. ROBOT PROGRAMMING:Lead through programming, Robot programming as a path in space, Motion interpolation, WAIT, SINGNAL AND DELAY commands, Branching capabilities and Limitations\

UNIT-IV

ROBOT LANGUAGES: Textual robot languages, Generation, Robot language structures, Elements in function ROBOT CELL DESGIN AND CONTROL: Robot cell layouts-Robot centered cell, In-line robot cell, Considerations in work design, Work and control, Inter locks, Error detection,Work cell controller.

UNIT-V

ROBOT APPLICATION: Material transfer, Machine loading/unloading. Processing operation, Assembly and Inspection, Feature Application. RECENT TRENDS IN ROBOTICS: Multi-axis robots, intelligent robots.

MCAD 204- Automation in Production and Hydraulic Control

UNIT-I

Basics of automated work piece handling, preparation for automated handling, working principles and techniques, solution for feeding arrangements, vibratory feeder, transfer mechanisms, automated feed out of components. Construction elements for automation, concepts of transfer lines, unit builtmachines, Special Purpose Machines, Machining centers.

UNIT-II

Assembly automation, automated packaging, automated inspection, use of pneumatic, hydraulic systems for automation.

UNIT-III

HYDRAULIC CONTROL IN MACHINE TOOLS.Hydraulic Principles- Elements of hydraulic system (Pumps, Filters, Seals, Valves, accumulators etc) Study of their functional and design characteristics.

UNIT-IV

Analysis and study of typical hydraulic circuits in M/C tools. Design of systems for specific requirements, introduction to servo systems.

UNIT-V

Maintenance of Hydraulic systems, Pneumatic & Hydro pneumatic circuits

MCAD205- Modern Machining Methods

UNIT-I

Unconventional Machining Process, Need – clarification – Brief overview of all techniques. nMECHANICAL ENERGY BASED PROCESSES: Abrasive Water Jet Machining, Water Jet Machining, Ultrasonic Machiningn (AJM / WJM/ USM). Working principles – equipments used – process parameters – MRR – Variation in techniques used – Applications.

UNIT-II

ELECTRICAL ENERGY BASED PROCESSES:Electro Discharge Machining, Working principles – Equipments – Processparameters – MRR – electrodes/ tools / power circuits – tool wear –Dielectric- flushing-Wire cut EDM – Applications.

UNIT-III

CHEMICAL AND ELECTRO-CHEMICAL ENERGY BASED PROCESSES: Chemical Machining, Electro- Chemical Machining – Etchants- maskant- Techniques of applying maskants – Process parameters – MRR – Applications. Principles of ECM-MRR-Electrical circuit – process parameters – ECG and ECH applications.

UNIT-IV

THERMAL ENERGY BASED PROCESSES: Laser Beam Machining, Plasma Arc Machining and Electron Beam Machining. Principles – equipments – types – beam control techniquesapplications.

SWAMI VIVEKANAND UNIVERSITY, SIRONJA, SAGAR (M.P.)

SYLLABUS

For

M.TECH MECHANICAL(CAD/CAM)
3RD AND 4TH SEM

Swami Vivekanand University, Sironja Sagar
2013-2014

Swami Vivekanand University, Sagar (M.P.)

Scheme of Examination

Third Semester- Master of Technology(MECHANICAL(CAD/CAM))

S.No.	Subject Code	Subject Name	Periods per week			Credits	Maximum Marks (Theory Slot)			Maximum Marks (Practical Slot)		Total Marks
			L	T	P		End. Sem. Exam.	Tests (Two)	Assign ments /Quiz	End. Sem. Practical /Viva	Practical Record/ Assignm ent/Quiz /Present ation	
1.	MCAD-301	Major Elective - IV	3	1	-	4	70	20	10	-	-	100
2.	MCAD-302	Engineering Optimization	3	1	-	4	70	20	10	-	-	100
3.	MCAD-303	Seminar	-	-	4	4	-	-	-	-	100	100
4.	MCAD-304	Preliminary Dissertation cum Synopsis	-	-	8	8	-	-	-	120	80	200
		Total	6	2	12	20	140	40	20	120	180	500

L: Lecture - T: Tutorial - P: Practical

Major Elective - IV

Sr. No.	Major Elective - IV
1	Artificial Intelligence
2	Soft Computing Methods
3	Design of Material Handling Equipments

Swami Vivekanand University, Sagar (M.P.)

Scheme of Examination

Fourth Semester- Master of Technology

(*MECHANICAL(CAD/CAM)*)

S.No.	Subject Code	Subject Name	Periods per week			Credits	Maximum Marks (Theory Slot)			Maximum Marks (Practical Slot)		Total Marks
			L	T	P		End Sem. Exam.	Tests (Two)	Assignments /Quiz	End Sem. Practical/Viva	Practical Record/ Assignment/Quiz /Presentation	
1.	MCAD 401	Dissertation Part- II	-	-	20	20	-	-	-	300	200	500
		Total	-	-	20	20	-	-	-	300	200	500

L: Lecture - T: Tutorial - P: Practical

(MCAD-303) **Artificial Intelligence**

UNIT-I

AI is an exciting and rewarding discipline. Students can use AI to solve complex problems in CAD/CAM and Engineering. **ITS ROOTS AND SCOPE:** Definitions, overview of AI application areas, AI as Representation and search: the predicate calculus, application. **STRUCTURES AND STRATEGIES FOR STATE SPACE SEARCH:** Introduction, Graph theory, Strategies for state space search using the state space to represent, Reasoning with the Predicate Calculus.

UNIT-II

HEURISTIC SEARCH: algorithm, admissibility, informedness, using heuristic in Games and complexity issues. **CONTROL AND IMPLEMENTATION OF STATE SPACE SEARCH:** Recursion based Search, Pattern-Directed search and production systems.

UNIT-III

MACHINE LEARNING: Symbol based, connectionist, social and emigrant. **ADVANCED TOPICS:** AI Problem Solving: Automated reasoning and Understanding natural language.

UNIT-IV

RECENT DEVELOPMENT: Knowledge based systems, Expert Systems and AI in manufacturing as case studies published in research papers

MCAD-302

Soft Computing Methods

UNIT-I

SOFT COMPUTING: Neural Networks, Genetic Algorithm, Fuzz Logic, Neuro-Fuzzy system, Neural - Fuzzy system, Fuzzy Neural Networks, Fuzzy Genetic Algorithms, Neuro-Genetic Systems. Negotiations € Methods, Game theory, Plan based negotiations, Human based negotiations, privacy and security, deception. Software agents and their application in negotiation € Electronic Commerce, Kasbah. Look at CommunicationTheme

UNIT-II

MATLAB BASICS: MATLAB getting started, Working with matrices, plotting graphs, 2D plotter, 3D plots,3D mesh plots, MATLAB programming, Control flow, example for Gauss Eliminationmethod, Function Workspace

UNIT-III

GENETIC ALGORITHM: History, Natural Selection, Simulated Evolution, G.A. Vocabulary, Canonical GA €Concepts, Basic Principle, working principle, coding, fitness function, GA operators,Crossover, Mutation, Illustration, GAS and Traditional methods, exploitation andexploration, population based search, Applications o0f GA

UNIT-IV

FUZZY SYSTEMS: Motivation, Types of uncertainties, fussy sets, and fuzzy variables, fuzzy set basicconcepts, fuzzy operations, fuzzy numbers

UNIT-V

NEURAL NETWORKS: Functioning of human brains, classification of learning rules, basic learning laws,transfer functions, topology € hope field- ,neural network € its mathematicalmodeling, storage capacity € its application - pattern recognition, traveling salesperson problem, formulation into optimization problem, multilayer neural network,radial basis function network, comparison between RBF networks and multilayerperceptions, interpolation problems.Supervised learning as an ill posed hypersurface reconstruction problem. Regularization theory and networks, Generalizedradial basis function network, weighted norm, approximation properties ofRBFnetworks, learning strategies € Fixed centers selected at random, Self organized selection of centers, image processing and its applications

MCAD-303

Subject Name: **Design of Material Handling Equipments**

UNIT-I

Materials Handling Equipments: Types, Selection and applications.

UNIT-II

Design of Hoists: Design of hoisting elements: Welded and roller chains - Hemp and wire ropes - Design of ropes, pulleys, Pulley systems, Sprockets and drums, Load handling attachments. Design of forged hooks and eye hooks, Crane grabs, Lifting magnets, Grabbing attachments, Design of arresting gear, Brakes: shoe, Band and cone types.

UNIT-III

Drives of Hoisting Gear: Hand and power drives, Travelling gear, Rail travelling mechanism, Cantilever andmonorail cranes, Slewing, Jib and lifting gear, Cogwheel drive, selecting the motor ratings.

UNIT-IV

Conveyors: Types, Description, Design and applications of Belt Conveyors, Apron Conveyors and Escalators Pneumatic Conveyors, Screw conveyors and vibratory conveyors.

UNIT-V

Elevators: Bucket elevators: design, Loading and bucket arrangements, Cage elevators, Shaftway, Guides, counter weights, Hoisting machine, Safety devices, Design of form lifttrucks.

MCAD- 304

Engineering Optimization

UNIT-I

General Characteristics of mechanical elements, adequate and optimum design,principles of optimization, formulation of objective function, design constraints,classification of optimization problems. Single and multivariable optimization techniques.

UNIT-II

Technique of unconstrained minimization. Golden section, Random, Pattern andGradient search methods, interpolation methods, equality and inequality constraints.

UNIT-III

Direct methods and indirect methods using penalty function, Lagrange multipliers.Geometric programming and stochastic programming, Genetic algorithms.

UNIT-IV

Engineering applications, structural-design application axial and transverseloaded members for minimum cost, minimum weight. Design of shafts, bars,columns and torsion members, design optimization of springs, gears.

UNIT-V

Use of MATLAB optimization toolbox for the solution of problem on hand.