

32062 COMPUTER AIDED DESIGN AND MANUFACTURING

Unit I COMPUTER AIDED DESIGN

Computer Aided Design: Introduction – definition – Shigley’s design process – Ohnsuga Model - CAD activities – benefits of CAD - CAD software packages.

Transformations: 2D & 3D transformations – translation, scaling, rotation and concatenation.

Geometric modelling: Techniques - Wire frame modelling – applications – advantages and disadvantages. Surface modelling – types of surfaces – applications – advantages and disadvantages – Solid modelling – entities – advantages and disadvantages – Boolean operations - Boundary representation – Constructive Solid Geometry – Comparison.

Graphics standard: Definition – Need - GKS – OpenGL - IGES – DXF.

Finite Element Analysis: Introduction – Development - Basic steps – Advantage.

Unit II COMPUTER AIDED MANUFACTURING

Computer Aided Manufacturing: Introduction - Definition – functions of CAM – benefits of CAM. Group technology: Part families - Parts classification and coding - coding structure – Optiz system, MICLASS system and CODE System. Process

Planning: Introduction – Computer Assisted Process Planning (CAPP) – Types of CAPP - Variant type, Generative type – advantages of CAPP.

Production Planning and Control (PPC): Definition – objectives - Computer Integrated Production management system – Master Production Schedule (MPS) – Capacity Planning – Materials Requirement Planning (MRP) – Manufacturing Resources Planning (MRP-II) – Shop Floor Control system (SFC) - Just In Time manufacturing philosophy (JIT) - Introduction to Enterprise Resources Planning (ERP).

Unit III CNC PROGRAMMING, RAPID PROTOTYPING

CNC PART PROGRAMMING: Manual part programming - coordinate system – Datum points: machine zero, work zero, tool zero - reference points - NC dimensioning – G codes and M codes – linear interpolation and circular interpolation - CNC program procedure - sub-program – canned cycles - stock removal – thread cutting – mirroring – drilling cycle – pocketing.

For Notes, Syllabus, Question Papers and Many more

Rapid prototyping: Classification – subtractive – additive – advantages and applications - materials. Types - Stereo lithography (STL) – Fused deposition model (FDM) – Selective laser sintering (SLS) - three dimensional printing (3D) – Rapid tooling.

Unit IV COMPUTER INTEGRATED MANUFACTURING, FLEXIBLE MANUFACTURING SYSTEMS, AUTOMATIC GUIDED VEHICLE, ROBOT

CIM: Introduction of CIM – concept of CIM - evolution of CIM – CIM wheel – Benefits – integrated CAD/CAM.

FMS: Introduction – FMS components – FMS layouts – Types of FMS: Flexible Manufacturing Cell (FMC) – Flexible Turning Cell (FTC) – Flexible Transfer Line (FTL) – Flexible Machining System (FMS) – benefits of FMS - introduction to intelligent manufacturing system.

AGV: Introduction – AGV - working principle – types – benefits.

ROBOT: Definition – robot configurations – basic robot motion – robot programming method – robotic sensors – end effectors – mechanical grippers – vacuum grippers - Industrial applications of Robot: Characteristics - material transfer and loading – welding - spray coating - assembly and inspection.

Unit V CONCURRENT ENGINEERING, QUALITY FUNCTION DEPLOYMENT, PRODUCT DEVELOPMENT CYCLE, AUGMENTED REALITY

Concurrent Engineering: Definition – Sequential Vs Concurrent engineering – need of CE – benefits of CE.

Quality Function Deployment (QFD): Definition – House of Quality (HOQ) – advantages – disadvantages. Steps in Failure Modes and Effects Analysis (FMEA) – Value Engineering (VE) – types of values – identification of poor value areas – techniques – benefits. Guide lines of Design for Manufacture and Assembly (DFMA).

Product Development Cycle: Product Life Cycle - New product development processes.

Augmented Reality (AR) – Introduction - concept – Applications.

Text Books:

- 1) CAD/CAM/CIM , R.Radhakrishnan, S.Subramanian, New Age International Pvt. Ltd.
- 2) CAD/CAM , Mikell P.Groover, Emory Zimmers, Jr.Prentice Hall of India Pvt., Ltd.