AMIRAJ

COLLEGE OF ENGINEERING & TECHNOLOGY

LABORATORY MANUAL

COMPUTER AIDED MANUFACTURING

SUBJECT CODE: 2171903

MECHANICAL ENGINEERING DEPARTMENT

B.E. 7th SEMESTER

NAME: _____

ENROLLMENT NO: _____

BATCH NO: _____

YEAR: _____

Amiraj College of Engineering and Technology,
Nr.Tata Nano Plant, Khoraj, Sanand, Ahmedabad.

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CERTIFICATE

This is to certify that Mr. / Ms. _____

Of class_____ Enrolment No _____has

Satisfactorily completed the course in _____as

by the Gujarat Technological University for ____ Year (B.E.) semester___ of

Mechanical Engineering in the Academic year_____.

Date of Submission:-

Faculty Name and Signature

(Subject Teacher)

Head of Department

(Mechanical)

MECHANICAL ENGINEERING DEPARTMENT

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List Of Experiments

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LAB-1

Title: Overview of Computer Integrated Manufacturing

Theory –

1) Definition of Automation.
2) Types of automation.
    a) Fixed automation.
    b) Programmable automation.
    c) Flexible automation.
3) Information processing cycle.
    a) Business functions.
    b) Product Design
    c) Manufacturing Planning
    d) Manufacturing control
    e) Shop floor control
    f) Inventory control
    g) Quality control
4) Difference between Automation & CIM.
5) Evolution of CIM.
6) Various elements of CIMS.
7) CIM Hardware & Software

Exercise

1. Discuss the conventional product life cycle. How CAD/CAM accelerates the product development?
2. Explain Role of computer in Design and manufacturing?
3. State the advantages and limitation of CAD/CAM?

LAB-2

Title: To learn about manual and Advance Part Programming of given components.

Introduction:

Theory1 –

1) Introduction to Numerical Control (NC).
2) Basic Components of NC.
3) Co-ordinate system in NC
4) Machine Control Unit (MCU) & its positioning.
5) NC Programming method.
6) NC words.
7) Tape format
8) Programs.
    a) Program for lathe.
    b) Program for drilling.
    c) Program for milling.

Theory2 –

1) G codes & M- codes for Lathe and Mill.
    a) Program for plain turning.
    b) Program for step turning.
    c) Program for linear & circular interpolation.

Exercise

1. Differentiate between NC and CNC .List there advantages and limitation?
2. Explain various type of tapes, with sketch used in NC machines?
3. Write a short not on recirculating ball screw with sketch? Why recirculating ball screw are used in NC and CNC machine tools?
4. Write short note on below title:
    - ❖ Open –close loop type control system.
    - ❖ Absolute and Incremental programming CNC machine system.
    - ❖ Rotary and Linear encoders.
    - ❖ Canned cycle.(Explain Drilling, Turning, Threading Canned cycle)
5. Explain geometrical and motion statements used in APT with illustration?

LAB-3

Title: To learn the concept of Group Technology

Introduction:

Theory -

1. Introduction.
2. Part families.
3. Coding technology.
4. Obstacles to GT.
5. Methods of classification.
    i) Visual inspection.
    ii) Classification and coding system.
    iii) Production flow analysis.
6. Types of classification and coding system.
7. .Benefits of well designed classification and coding system.
8. Machine cell design.
9. Types of cell design..
10. Benefits of Group Technology.

Exercise

1. What is GT? What are the advantages of GT? Explain Design and manufacturing attributes?
2. Why is part Classification and Coding required in GT? Explain OPTIZ system of coding.
3. Explain MICLASS system in detail?

LAB-4

Title: To understand the concept of Flexible Manufacturing System.

Introduction:

Theory -

1. Introduction.
2. Elements of FMS.
3. Types of FMS.
4. FMS layout.
5. FMS,FMC and FMM.
6. Automated Guided Vehicles(AGV)
7. Automated Storage and Retrieval System.(AS/RS)
8. Just in time

Exercise

1. What is FMS? Explain the Element used in FMS?
2. By using sketch explain FMM,FMC and FMS?
3. List the FMS layout and Explain each by using Sketch?
4. Write a short note on AGV associated with FMS.
5. Describe with sketch ASRS.

LAB-5

Title: To get acquainted with Robot Technology.

Introduction:

1) Introduction of Robot.
2) Robot anatomy. -- joints and links
    i) Linear joint
    ii) Orthogonal joint.
    iii) Rotational joint.
    iv) Twisting joint.
    v) Revolving joint.
3) Robot configurations.-
    i) Polar configuration.
    ii) Cylindrical configuration.
    iii) Cartesian coordinate robot.
    iv) Jointed arm robot.
    v) SCARA
4) Robot drive system.
5) Accuracy and repeatability.
6) Types of robot programming.
7) Safety monitoring.
8) End effectors and sensors in robots.
9) Application of robots.
10) Programming for some robotic application.

Exercise

1. Explain Types of basic Robot Configuration with neat sketch of work envelop?
2. What are the different types of drive used in robots also explain types of sensors used in robot technology?
3. Discuss various application of robot.
4. With neat sketch explain types of grippers.

LAB-6

Title: To understand the concept of Computer Integrated manufacturing

Introduction:

1) Introduction to computer integrated manufacturing (CIM).
2) Concept and scope of CIM.
3) Four island of Automation of CIM (CIM Wheel).
4) CIM product cycle.

Exercise

1. Elaborate the role of elements of CIM with the help of CIM wheel.
2. What are the objectives of CIM? Which major function areas of the manufacturing enterprise consider for achieving CIM objectives? What are the benefits of CIM?

LAB-7

Title: To get acquainted with Computer Aided Process Planning, Material Requirement Planning.

1) Introduction.

2) Types of Computer aided process planning.

   i) Retrieval process planning.

   ii) Generative process planning.

3) Advantages of computer aided process planning**.**

4) Material Requirement Planning.

Exercise

1. What is CAPP? Explain different types of CAPP in detail.
2. Write a short note on MRP I and MRP II?
3. What is the major function of process planning? What is the main problem Associated with manual process planning?

LAB-8

Title: To Study of Programmable Logical Controllers.

1) Introduction.
2) Relay device component.
3) PLC Architecture.
4) Tool for PLC logic design.

Exercise

1. What is PLC? Explain Relay device in detail.
2. Explain PLC architecture with block diagram.
3. Explain different type of PLC programming.