MMCM - 301 (A)CNC Machines

1. INTRODUCTION TO CNC MACHINE TOOLS: Development of CNC Technology, principles, features, advantages, economic benefits, applications, CNC, DNC concept, classification of CNC Machine, types of control, CNC controllers, characteristics, interpolators.

2. STRUCTURE OF CNC MACHINE TOOL: CNC Machine building, structural details, configuration and design, guide ways - friction and anti friction and other types of guide ways, elements used to convert the rotary motion to a linear motion - Screw and nut, recalculating roller screw, planetary roller screw, recalculating roller screw, rack and pinion, torque transmission elements - gears, timing belts, flexible couplings, Bearings.

3. DRIVES AND CONTROLS: Spindle drives - DC shunt motor, 3 phase AC induction motor, feed drives - stepper motor, servo principle, DC & AC servomotors. Open loop and closed loop control, Axis measuring system - synchro, synchro-resolver, gratings, moire fringe gratings, encoders, inductosyn, laser interferometer.

4. CNC PROGRAMMING: Coordinate system, structure of a part program, G & M Codes, Manual part programming for Fanuc, Heidenhain, Sinumeric control system, CAPP, APT part programming using CAD/CAM, Parametric Programming.

5. TOOLING AND MAINTENANCE OF CNC: Cutting tool materials, carbide insets classification, qualified, semi qualified and preset tooling, tooling system for Machining centre and Turning centre, work holding devices, maintenance of CNC Machines.

Reference Book:

1. HMT. Mechatronics. Tata McGraw-Hill Publishing Company Limited, New Delhi
2. James Madison. "CNC Machining Hand Book ". Industrial Press Inc.. 1996.
3. Steve Krar, Arthur Gill. "CNC Technology and Programming ", McGraw-Hill
4. Berry Leathan, Jones, Introduction to Computer Numerical Control, Pitman. London
4, Hans B.Kiej, 7:Fredericx Waters, "Computer Numerical Control ", MacMillan McGraw
5, Bernard Hodgers, "CNC Part Programming Work Book ". cizv and Guid, Macmillan
6. David Gribbs, "An Introduction to CNC Machining ", Ca,\".\'ell, /9R7,
7, Sadasivan. 7:A, and .S'arathy, D.,"Cutting Tools for Productive Machining, Widia P
8. Radhakrishnan. P. "Computer Numerical Control Machines ". New Central Book Ag
9. Peter Smid, "CNC Programming Hand Book ", Industrial Press Inc., 2000.Web

MMCM - 301 (B) MIS and ERP

UNIT 1

Management Information System (MIS) definition, Objectives and benefits, MIS as strategic tool, obstacles and challenges for MIS, functional and cross functional systems, hierarchical view of CBIS, structured and unstructured decision, Operation and mgt support, Decision process and MIS, info system components and activities, Value chain and MIS support.

UNIT 2

System concepts: types, definition, characteristics, feedback (Pull) and feed-forward (Push) control, system stress and entropy, computer as closed system, law of requisite variety, open and flexible (Adaptive) systems, work system model and comparison with input-process-output model, five views of work system: structure, performance, infrastructure, context and risk and their effect on product performance.

UNIT 3

Info concepts: define data, info, knowledge, intelligence and wisdom. Information characteristics and attributes, info measurement and probability, characteristics of human as info processor.

UNIT 4

Planning and control Concepts: terminologies, difficulties in planning, system analysis and development plan-purpose and participants, info planning, (SDLC) system development life cycle for in-house and licensed sw, system investigation, analysis of needs, design and implementation phases, training of Operational personnel, evaluation, Control and Maintenance of Information Systems.

UNIT 5

E-business components and interrelationship, Evolution of Enterprise Resource Planning (ERP) from MRP, Supply chain management (SCM) and Customer relationship management (CRM), Integrated data model, strategic and operational issues in ERP, Business Process Re-Engineering (BPR), significance and functions, BPR, information technology and computer NW support to MIS.

UNIT 6

ERP Implementation, role of consultants, vendors and users, customization, methodology of ERP implementation and guidelines for ERP implementation, ERP modules.

Reference books:

1. Davis and Olson, MIS, TMH
2. James O' Brian, MIS, TMH
3. Business Process Re-Engineering, Jayaraman, TMH.
4. ERP by V.K. Garg, PHI
5. ERP by Alex Leon, and manuals of SAPP, MFG-pro.

MMCM - 302 (A) Flexible Competitive Mfg. System

1. MANUFACTURING IN A COMPETITIVE ENVIRONMENT: Automation of manufacturing process - Numerical control - Adaptive control - material handling and movement - Industrial robots - Sensor technology - flexible, fixturing - Design for assembly, disassembly and service.

2. GROUP TECHNOLOGY: Part families - classification and coding - Production flow analysis - Machine cell design - Benefits.

3. FLEXIBLE MANUFACTURING SYSTEMS: introduction - Components of FMS - Application work stations - Computer control and functions - Planning, scheduling and control of FMS - Scheduling - Knowledge based scheduling - Hierarchy of computer control – Supervisory computer.

4. COMPUTER SOFTWARE, SIMULATION AND DATABASE oF FMS: System issues- Types of software - specification and selection - Trends – Application simulation - software - Manufacturing data systems - data flow - CAD/CAM considerations - Planning FMS database.

5. JUST IN TIME: Characteristics of JIT - Pull method - quality -small lot sizes - work station loads - close supplier ties - flexible work force - line flow strat."b'Y' - preventive maintenance - Karban system - strategic implications -implementation issues - ~ARD liT - Lean manufacture.

Reference Books:

1. Groover MP., II Automation, Production System", un" Computer Integrated Manufacturing ", Prentice-Hall of India Pvt. Ltd., New Delhi, 1996
2. .fha, N.K. " Handbook of Flexible Manufacturinj!; Systems ", Academic Press Inc., 1991
3. Kalpakjian, " Manufacturing Engineering and Iechnology ", Addison-Wesley Publishing Co. 1995.
4. Taiichi Ohno, Toyota, "Production System Beyond Large-Scale production ", Productivity Press (India) Pvt. Ltd. , 1992.

MMCM - 302 (B) Total Quality Management

1. INTRODUCTION: Principles of Quality Management - Pioneers of TQM - Quality costs - Quality system Customer Orientation - Benchmarking - Re-engineering – Concurrent Engineering.

2. PRACTICES OF TQM: Leadership - Organisational Structure - Team Building – Information Systems and Documentation - Quality Auditing - ISO 9000 - QS 9000.

3. TECHNIQUES OF TQM: Single Vendor Concept - J.I.T. - Quality Function deployment - Quality Circles - KAIZEN - SGA - POKA - YOKE - Taguchi Methods.

4. STATISTICAL QUALITY CONTROL: Methods and Philosophy of Statistical Process Control - Control Charts for Variables and Attributes - Cumulative sum and Exponentially weighted moving average control charts - Others SPC Techniques - Process Capability Analysis - Six sigma accuracy.

5. ACCEPTANCE SAMPLING: Acceptance Sampling Problem - Single Sampling Plans for attributes - double, multiple and sequential sampling, Military standards - The Dodge – Roming sampling plans.

Reference Books:

1. Mohamed Zairi, ff Total Quality Management for Engineers ff. Woodhead Publishing Limited 1991.
2. Harvid Noori and Russel, ff Production Lind operation management - Total Quality and Responsiveness ff, McGraw-Hill Inc, 1995.
3. Suresh Dalela and Saurabh, ISO 9000 ff A Manual for Total Quality Management S. .Chand and Company Ltd., 1997.
4. John Bank, ff The Essence of Total Quality Management ", Prentice Hall of 1f,Jia Pvt. Ltd.1995.
5. Douglus C. Montgomery. ff Introduction to Statistical Quality C'ontrol ff, 2nd Edition, John Wiley and Sons. 1991.
6. Grant E.L and Leavensworth, ff Statistical Quality C'ontrol ff, McGraw-Hill, 1984.

MMCM - 302 (C) CI Process Inventory System

1, DEMAND FORECASTING: Characteristics and Principles, Methods, Qualitative Methods - Delphi technique, Market Research, Intrinsic method-time-series analysis, moving averages, exponential smoothing - The Bon Jenkins method, Extrinsic methods - Regression models, measurement of forecast errors. Characteristics and Principles, Methods, Qualitative Methods - Delphi technique, Market Research, Intrinsic methods - time-series analysis, moving averages, exponential smoothing - The Bon Jenkins method, Extrinsic methods - Regression models, measurement of forecast errors.

2. INVENTORY MANAGEMENT: Functions of inventory - Objectives - Inventory systems - Inventory models - Basic and advanced inventory models. Functions of inventory - Objectives - Inventory systems - Inventory models - Basic and advanced inventory models.

3. PRODUCTION PLANNING: Purpose, Characteristics - Aggregate Planning - methods - Master Production Scheduling - functions - Time buckets - time fences - Orders - Reports. Purpose, Characteristics - Aggregate Planning - Methods - Master Production scheduling - functions - Time buckets -time fences - Orders - Reports.

4, MATERIALS, REQUIREMENT PLANNING AND CAPACITY PLANNING: purpose of MRP - Inputs to MRP - MRP LOGIC - Planning Factors - Outputs from MRP – Resource Planning -Capacity Planning. Purpose of MRP - Inputs to MRP - MRP LOGIC - Planning factors - Outputs from MRP - resource Planning - Capacity Planning

5. CURRENT TRENDS
JIT Supply chain Management concurrent engineering MRP II ERP

Reference Books:
1. LJ. Krajewski, LP. Ritzman, Operations Mgt Strategy and Analysis, Addison Wesley
2. ,S'pencer B.Smith, " Computer Based Production and 1nventory Control", PHI
3. Joseph S.Martinkh, "Production and Operations Management ", John wiley & sons
4. Joseph Monks, Operation Management, Theory and Practice, TMH
5. Nanu Singh, ",Systems approach to computer-integrated design and Manufacturing ", John Wiley & ,Sons, 1996.