<u>SUBJECT NO-IM21002, SUBJECT NAME- Production Design and Process Planning</u>
<u>LTP- 3-1-0,CRD- 4</u>

<u>SYLLABUS :-</u>
Prerequisites: IM21003 Operations Research-1

Introduction: Four plane concept of manufacturing – planning, control, material flow, and manufacturing process. Control loop of a manufacturing system. Basic functions of a manufacturing facility for small- and medium-size production runs. Functions of a computer an a manufacturing organization.

Concurrent Engineering: Sequential versus concurrent engineering, mathematical model for interactions between design and manufacturing, benefits of CE, characterization of CE environment, framework for integration of life-cycle phases in CE, CE techniques, difficulties associated with CE, examples.

Automated Material Handling and Storage Systems: Principles of MH, MH equipment, types and components of AGVS, automated storage and retrieval systems, distributed computer control architecture for AGVS and AS/RS, conveyors.

Robotic Systems: Fundamentals of robotics and its technology, robot classification, robot motion analysis, robot selection and its application, economic justification of robots.

Numerical Control: Conventional numerical control (NC) – basic components of an NC system, applications of NC, economics of NC, and problems with conventional NC. Computer Numerical Control (CNC), Direct Numerical Control (DNC), and combined CNC/DNC systems. NC programming.

Process Planning: Manufacturing environment for process planning. Generative process planning, variant process planning, and CAPP system. Computer-aided generation of process plans.

Group Technology, CMS, and MRP: Classification methods – OPITZ , CODE, and MICLASS systems. Master production schedule. Material Requirements Planning (MRP). Manufacturing Resources Planning (MRP-II)–capacity requirement planning, order release planning, and operations sequencing. Group scheduling in MRP-II environment. Introduction to JIT-based techniques.

Flexible Manufacturing Systems: Types of flexibility, key characteristics, basic features of physical components of FMS, control components of FMS, operational problems and layout considerations, simulation modeling and FMS benefits.

JIT Manufacturing Systems: Overview of TPS, pull versus push system, types of kanban, kanban planning and control models – deterministic and probabilistic models, signal kanban, other types of kanbans, alternative JIT systems, JIT purchasing, barriers to and benefits of JIT implementation, examples.

Textbook
• Groover, M.P. and Zimmers, E.W. Jr., CAD/CAM: Computer-aided Design and Manufacturing, Prentice-Hall of India Private Ltd, New Delhi, ISBN 0-87692-402-10, 1986.

References

- Halevi, G., The Role of Computers in Manufacturing Processes, John Wiley.
- Orlicky, J., Material Requirements Planning, McGraw-Hill.
- Koren, Y., Computer Control of Manufacturing Systems, McGraw-Hill.
- Vail, P.S., Computer Integrated Manufacturing, PWS-KENT Publishing Co.
- Rembold,U., Blume, C. and Dillmann, R., Computer Integrated Manufacturing Technologyand Systems, Marcel Dekker.
- Hyde, W.F., Improving Productivity by Classification, Coding, and Database Standardization, Marcel Dekker.
- Noori, H., Managing the Dynamics of New Technology: Issues in Manufacturing Management, Prentice-Hall.