

**Subject Name: Computer Aided Process Management**
**B.Tech.. IV Year-(Sem-VII) Mechanical Engineering**

**Type of course:** Programme Core

**Prerequisite:** Zeal to learn the subject

**Rationale:** This course aims to provide an overview of production management, focusing on the computer aided tools applicable in managing automated production. It comprehends about the production systems, facility location and layout, production planning and control, Materials resource planning, scheduling, shop floor control, Simulation of Machine shop and modern approaches.

**Teaching and Examination Scheme:**

Teaching Scheme ( Hours)			Credits	Evaluation Scheme					Total Marks
				Theory Marks			Practical Marks		
Theory	Tutorial	Practical		ESE (E)	IA	CSE	Viva (V)	Term Work (TW)	
4	---	2	5	50	30	20	25	25	150

**Content:**

Sr. No.	Content	Total Hrs
1	<b>Fundamentals:</b> System concept, Hierarchical structure, System design, Decision making procedure, Manufacturing Systems, Factors affecting selection of Manufacturing Process, Modes of Production- Jobbing / Intermittent / Continuous/ Mass Production.	02
2	<b>Product / Process Planning and Design :</b> Facilities (Plant) Location - Facility location and layout – Factors to be considered in Plant location, Comparative Study of rural and urban locations Methods of selecting plant layout , Requirements of good layout Principles for better plant lay out, Different Types of layout. Computerized technique for relative allocation of facility , automated layout design program and computerized relationship layout planning for facility location and layout.	12
3	<b>MRP :</b> Material Requirement – Terminology – types of demands – inputs to MRP- techniques of Material Requirement Planning, methods for Lot sizing, benefits and limitations of MRP – Manufacturing Resources Planning (MRP –II).	05

<b>4</b>	<b>Job scheduling :</b> Scheduling – Policies – Types of scheduling – Forward and Backward Scheduling, Gantt Charts, Flow shop Scheduling of n jobs and 2 machines, n jobs and 3 machines, job shop Scheduling ,2 jobs and n machines,Line of Balance.	<b>06</b>
<b>5</b>	<b>Computer Aided Process Planning:</b> feature based and CAD based CAPP, Types of Generative and variant , backward and forward approach,	<b>05</b>
<b>6</b>	<b>Shop Floor Control:</b> Database structures, hierarchical, network, Relational concepts, keys, relational operations, query languages; Shop Floor Data Collection Systems-Types of data, on-line and off-line data collection, Automatic data collection systems.	<b>06</b>
<b>7</b>	<b>Modern approaches in Manufacturing:</b> Cellular Manufacturing, Detailed Group Technology, Composite part, ROC technique (Rank Order Clustering Technique), Hollier method for Group Technology, cell layouts; Flexible Manufacturing- Concept, principles, Lean manufacturing concept, principles.	<b>06</b>
<b>8</b>	<b>Simulation in Manufacturing system :</b> Major activities, purpose, simulation process, methodology, simulation packages, process quality simulator, computer requirements trends, applications simulation of machine shop.	<b>05</b>

**Suggested Specification table with Marks (Theory):**

<b>Distribution of Theory Marks</b>					
Remembrance	Understanding	Application	Analyze	Evaluate	Create
<b>10</b>	<b>10</b>	<b>30</b>	<b>20</b>	<b>20</b>	<b>10</b>

**Reference Books:**

1. Production & operations management: Concepts, Models and Behaviour, Adam E.(Jr.), Ebert R J., PHI.
2. Production & operations management, Chary S N, McGraw-Hill.
3. Computer Aided Production Management, Mahapatra P B, PHI.
4. Manufacturing Processes, Kalpakjian, Pearson

5. Facility Layout & location – An analytical approach – Richard L. Francis, John A. white
6. Production & operations management, Nair G N, McGraw-Hill.
7. An Introduction to Computer Aided Production Management, Childe, S., Springer.

**Course Outcomes:**

Sr. No.	CO statement	Marks % weightage
CO-1	Understand relevance and importance of the Different Production and operations management techniques and their applications.	25
CO-2	Capable to design, analyse and assess production planning and control systems, including those operating within distributed manufacturing environment.	25
CO-3	Be able to develop simulation of machine shop.	30
CO-4	Gain an overall understanding of computer aided production management.	20

**List of Experiments:**

1. Salient features and facilities of ideal software.
2. Algorithm and program for sequencing / scheduling
3. Forecasting methods and program of any one.
4. Group technology
5. Computerized plant layout design
6. Computer aided process planning
7. Material requirement planning
8. Shop floor control

**Equipment / Computational facility:**

1. Computational Facility and programming software

**List of Open Source Software/learning website:** <https://nptel.ac.in/>