# GUJARAT TECHNOLOGICAL UNIVERSITY

**Program Name: Master of Engineering**

**Level: PG**

**Subject Code : ME02000451**

**Subject Name : Computer Aided Production Management**

| | |
|---|---|
| w. e. f. Academic Year: | 2024-25 |
| Semester: | 2 |
| Category of the Course: | Professional Elective Course |

| | |
|---|---|
| **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. |

**Course Outcome:**

After Completion of the Course, Student will able to:

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

**Teaching and Examination Scheme:**

| Teaching Scheme (in Hours) | | | Total Credits L+T+ (PR/2) | Assessment Pattern and Marks | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|
| | | | | Theory | | Tutorial / Practical | | |
| L | T | PR | C | ESE (E) | PA / CA (M) | PA/CA (I) | ESE (V) | |
| 3 | 0 | 2 | 4 | 70 | 30 | 20 | 30 | 150 |

**Course Content:**

| Unit No. | Content | No. of Hours | % of Weightage |
|---|---|---|---|
| 1. | **Fundamentals:** System concept, Hierarchical structure, System design, Decision makingprocedure, Manufacturing Systems, Factors affecting selection of Manufacturing Process, Modesof Production- Jobbing / Intermittent | 03 | 6 |

| | | | |
|---|---|---|---|
| | /Continuous/ Mass Production. | | |
| 2. | **Product / Process Planning and Design** :<br>Facilities (Plant) Location - Facility location and layout – Factors considerations in Plant location- Comparative Study ofrural and urban sites – Methods of selection plant layout – objective of good layout – Principles – Types of layout.<br>Computerized relative allocation of facility technique, automated layoutdesign program and computerized relationship layout planning for facilitylocation and layout. | 12 | 25 |
| 3. | **MRP :**<br>Material Requirement – Terminology – typesofdemands – inputs to MRP- techniques of MRP – Lot sizing methods – benefits and drawbacks of MRP –Manufacturing Resources Planning (MRP –II). | 04 | 8 |
| 4. | **Job scheduling :**<br>Scheduling – Policies – Types of scheduling – Forward and Backward Scheduling – Gantt Charts –Flow shop Scheduling – n jobs and 2 machines, n jobs and 3 machines – job shop Scheduling – 2 jobsand n machines – Line of Balance | 06 | 15 |
| 5. | **Computer Aided Process Planning:**<br>Generative and variant types, backwardand forward approach, feature based and CAD based CAPP. | 04 | 8 |
| 6. | **Shop Floor Control:**<br>Database structures, hierarchical, network, Relationalconcepts,keys, relational operations, query languages; Shop Floor Data Collection Systems-Types of data, on-line and off-line data collection, Automatic data collection systems. | 06 | 15 |
| 7. | **Modern approaches in Manufacturing:**<br>Cellular Manufacturing- Group Technology, Compositepart, Rank Order Clustering Technique, Hollier method for GT cell layouts; FlexibleManufacturing- Concept, principles, Lean manufacturing concept, principles. | 06 | 15 |
| 8 | **Simulation in Manufacturing system :**<br>Major activities, purpose, simulation process, typesmethodology, simulation packages, process quality simulator, computer requirements trends, applications simulation of machine shop. | **04** | **8** |
| | **Total** | **45** | **100** |

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

| Distribution of Theory Marks | | | | | |
|---|---|---|---|---|---|
| **R Level** | **U Level** | **A Level** | **N Level** | **E Level** | **C Level** |
| **10** | **20** | **30** | **20** | **20** | **-** |

*Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)*

**References/Suggested Learning Resources:**

**(a) 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.

**(b) Open-source software and website:**

https://nptel.ac.in/

**Suggested Course Practical List:**

**List of Laboratory/Learning Resources Required:**

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

**Suggested Project List:**

**Suggested Activities for Students: If any**

**Equipment / Computational facility**: 1.Computational Facility and programming software

* * * * * * *