

GUJARAT TECHNOLOGICAL UNIVERSITY

MECHANICAL (CAD/CAM) (08) COMPUTER AIDED PRODUCTION MANAGEMENT SUBJECT CODE: 2720814 SEMESTER: II

Type of course: Post Graduate Level

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			Credits	Examination Marks						Total Marks
L	T	P		Theory Marks		Practical Marks				
			ESE (E)	PA (M)	ESE (V)		PA (I)			
					ESE	OEP	PA	RP		
4	0	2 [#]	5	70	30	20	10	10	10	150

Contents:

Sr. No.	Contents	Lectures	Weightage %
1	Fundamentals: 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.	04	05
2	Product / Process Planning and Design : Facilities (Plant) Location - Facility location and layout – Factors considerations in Plant location- Comparative Study of rural and urban sites – Methods of selection plant layout – objective of good layout – Principles – Types of layout. Computerized relative allocation of facility technique, automated layout design program and computerized relationship layout planning for facility location and layout.	14	20
3	MRP : Material Requirement – Terminology – types of demands – inputs to MRP- techniques of MRP – Lot sizing methods – benefits and drawbacks of MRP – Manufacturing Resources Planning (MRP –II).	05	10
4	Job scheduling : 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 jobs and n machines – Line of Balance.	06	10
5	Computer Aided Process Planning:	04	05

	Generative and variant types, backward and forward approach, feature based and CAD based CAPP.		
6	Shop Floor Control: 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.	07	15
7	Modern approaches in Manufacturing: Cellular Manufacturing- Group Technology, Composite part, Rank Order Clustering Technique, Hollier method for GT cell layouts; Flexible Manufacturing- Concept, principles, Lean manufacturing concept, principles.	09	20
8	Simulation in Manufacturing system : Major activities, purpose, simulation process, types methodology, simulation packages, process quality simulator, computer requirements trends, applications simulation of machine shop.	07	15

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:

After learning the course the students should be able to:

1. Understand relevance and importance of the Different Production and operations management techniques and their applications.
2. Capable to design, analyse and assess production planning and control systems, including those operating within distributed manufacturing environment.

List of Experiments:

Following Laboratory work should be planned based on following themes.

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

Design based Problems (DP)/Open Ended Problem:

1. Students may carryout case study and suggest improvements for material resource planning in an existing unit.

Major Equipment:

1. Computational Facility and programming software.

Review Presentation (RP): The concerned faculty member shall provide the list of peer reviewed Journals and Tier-I and Tier-II Conferences relating to the subject (or relating to the area of thesis for seminar) to the students in the beginning of the semester. The same list will be uploaded on GTU website during the first two weeks of the start of the semester. Every student or a group of students shall critically study 2 papers, integrate the details and make presentation in the last two weeks of the semester. The GTU marks entry portal will allow entry of marks only after uploading of the best 3 presentations. A unique id number will be generated only after uploading the presentations. Thereafter the entry of marks will be allowed. The best 3 presentations of each college will be uploaded on GTU website