COURSE TITLE	**COMPUTER AIDED PROCESS MANAGEMENT**
COURSE CODE	**01ME1721**
COURSE CREDITS	**4**

Objective:

1 The course is prepared to provide the basic understating of Immersive Technology in mechanical engineering

Course Outcomes: After completion of this course, student will be able to:

1 Apply the fundamentals of process management and computer-aided production systems to select suitable production modes and process planning approaches for a given manufacturing situation.

2 Apply techniques of facility location, plant layout design, and computerized methods (CRAFT, ALDEP, CORELAP) to improve manufacturing efficiency

3 Analyze and implement inventory management, forecasting, material requirement planning (MRP/MRP-II), and enterprise resource planning (ERP) systems for production control.

4 Evaluate and compare scheduling methods, shop floor data collection systems, and modern manufacturing approaches such as lean, group technology, and flexible manufacturing.

5 Develop and simulate manufacturing systems using process simulation software to model, assess, and optimize production performance.

Pre-requisite of course: Zeal to learn the subject

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	2	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	**Fundamentals:** Introduction of Process Management, Computer Aided 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. Types of Generative and variant, backward and forward approach,, Process Planning Systems: Variant Systems: CAPP, MIPLAN, MITURN, MIAPP, UNIVATION, CINTURN, COMCAPPV, etc. Generative system: METCAPP, CPPP, AUTAP, and APPAS.	5

Contents : Unit	Topics	Contact Hours
2	**Product / Process Planning and Design :** 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 (CRAFT), automated layout design program (ALDEP) and computerized relationship layout planning (CORELAP) for facility location and layout.	7
3	**Inventory management and Material Requirement Planning:** Introduction, Types of Inventory, Inventory planning & control: Determining economic lot sizes, Determining safety stock levels, Determining ordering policies and reorder points, ABC inventory analysis, Analysis of usage rates for lot size calculations and other purposes, M, 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)., Enterprise Resources Planning (ERP):	6
4	**Forecasting:** Introduction, Methods of forecasting, time-Series Forecasting, , Forecasting Performance Measurement	4
5	**Job scheduling :** 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.	5
6	**Shop Floor Control:** Shop Floor Data Collection, Types of data collection system,, on-line and off-line data collection, Automatic data collection systems.	4
7	**Modern approaches in Manufacturing:** 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.	7
8	**Simulation in Manufacturing system :** Introduction, Types of simulation, Techniques of simulation, Simulation process for manufacturing, , , Simulation software packages, Application of simulation, Procedure for simulation using software.	4
Total Hours		**42**

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Exercise based on Algorithm and program for sequencing / scheduling** Exercise based on Algorithm and program for sequencing / scheduling	2
2	**Exercise based on Forecasting methods and program of any one** Exercise based on Forecasting methods and program of any one	2
3	**Study Group technology methods** Study Group technology methods	2
4	**Exercise based on Computerized plant layout design** Exercise based on Computerized plant layout design	2
5	**Case study on Computer aided Process Planning** Case study on Computer aided Process Planning	2
6	**Exercise based on Material requirement planning** Exercise based on Material requirement planning	2
7	**Case study on Inventory Management.** Case study on Inventory Management.	2
8	**Case study on Just in Time** Case study on Just in Tim	2
9	**Manufacturing data collection system.** Manufacturing data collection system.	2
10	**Case study on Lean Manufacturing** Case study on Lean Manufacturing	2
11	**Demonstrate features and facilities of ideal software** Demonstrate features and facilities of ideal software	2
12	**Execute simulation using software** Execute simulation using software	2
Total Hours		**24**

Textbook :

1 CAD/CAM: computer-aided design and manufacturing, Groover, Mikell P, Prentice-Hall, Inc, 2000

2 CAD/CAM/CIM, P. Radhakrishnan, S. Subrmanyan and V. Raju, New Age International (P) ltd., 2018

References:

1 Production & operations management: Concepts, Models and Behaviour, Production & operations management: Concepts, Models and Behaviour, Adam E. (Jr.), Ebert R J, PHI, 2000

2 Production & operations management,, Production & operations management,, Chary S N,, McGraw-Hill., 2005

3 An Introduction to Computer Aided Production Management, An Introduction to Computer Aided Production Management, Childe, S., Springer, 1996

References:

4 Production & operations management, Production & operations management, Nair G N, McGraw-Hill, 2002

5 Manufacturing Processes, Manufacturing Processes, Kalpakjian, Pearson, 2022

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking / Creative**
10.00	10.00	30.00	20.00	20.00	10.00

Instructional Method:

1 PPT

Supplementary Resources:

1 https://youtube.com/playlist?list=PLLy_2iUCG87A-kHGx4YUY97ShTTqBfA6-&si=UM4_KftFJtZhm4_S