SEMESTER S6

COMPUTER INTEGRATED MANUFACTURING

Course Code	**OERUT613**	**CIE Marks**	40
Teaching Hours/Week (L: T:P: R)	3:0:0:0	**ESE Marks**	60
Credits	3	**Exam Hours**	2 Hrs. 30 Min.
Prerequisites (if any)	None	**Course Type**	Theory

Course Objectives:

SYLLABUS

Module No.	Syllabus Description	Contact Hours
1	**Introduction to CAD and CAM:** Overview of CAD/CAM, Importance in modern manufacturing, Manufacturing Planning and Control, Overview of Manufacturing Planning, Key aspects of Manufacturing Control **Introduction to CIM:** Concepts and significance of CIM, CIM system components: hardware and software, Production Types and Models, Types of production: batch, mass, and continuous, Manufacturing models and metrics, Automation and Lean Production, Basic elements of an automated system, Levels of automation, Lean Production and Just-In-Time (JIT) principles	9
2	**Production Planning, Control, and CAPP:** Process Planning and CAPP, Steps in Computer-Aided Process Planning, Benefits and implementation of CAPP, Production Planning Techniques, Aggregate Production Planning, Master Production Schedule **Material Requirement Planning (MRP) and Capacity Planning:** Introduction to MRP, Techniques for Capacity Planning **Control Systems and Shop Floor Control:** Overview of manufacturing control systems, Shop floor control techniques **Inventory Control and ERP:** Basic principles of inventory control, Introduction to Manufacturing Resource Planning-II (MRP-II): Overview of Enterprise Resource Planning (ERP)	9

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3	**Cellular Manufacturing and Group Technology**: Group Technology (GT) and Part Families, Concept of Group Technology **Classification and coding of part families:** Production Flow Analysis, Techniques for production flow analysis, Benefits of production flow analysis **Cellular Manufacturing Concepts:** Composite part concept, Designing and layout of machine cells **Quantitative Analysis in Cellular Manufacturing:** Rank Order Clustering Method, Arranging machines in a GT cell using Hollier Method **Machine Cell Design and Layout:** Principles of machine cell design, Layout strategies for cellular manufacturing	**9**
4	**Advanced Manufacturing Systems:** Flexible Manufacturing Systems (FMS), Types and components of FMS, Applications and benefits, Planning and control of FMS **Automated Guided Vehicle Systems (AGVS):** Overview of AGVS, Applications and benefits, Vehicle guidance technology **Vehicle Management and Safety in AGVS:** Techniques for vehicle management, Safety considerations in AGVS **Industrial Robotics:** Anatomy and classification of robots, Robot control systems and end effectors, Sensors in robotics **Robot Accuracy and Applications:** Robot accuracy and repeatability, Industrial applications of robots	**9**

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Course Assessment Method
(CIE: 40 marks, ESE: 60 marks)

Continuous Internal Evaluation Marks (CIE):

Attendance	Assignment/ Microproject	Internal Examination-1 (Written)	Internal Examination- 2 (Written)	Total
5	15	10	10	40

End Semester Examination Marks (ESE)

In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions

Part A	Part B	Total
• 2 Questions from each module. • Total of 8 Questions, each carrying 3 marks **(8x3 =24marks)**	• Each question carries 9 marks. • Two questions will be given from each module, out of which 1 question should be answered. • Each question can have a maximum of 3 sub divisions. **(4x9 = 36 marks)**	**60**

Course Outcomes (COs)

At the end of the course students should be able to:

	Course Outcome	Bloom's Knowledge Level (KL)
CO1	Comprehend the fundamentals and importance of CIM, including CAD/CAM, production types, and automation principles.	**K2**
CO2	Analyze and apply knowledge of production planning, control systems, and CAPP in manufacturing processes.	**K4**
CO3	Understand and evaluate cellular manufacturing concepts, including Group Technology and machine cell design.	**K5**
CO4	Demonstrate knowledge of advanced manufacturing systems, such as FMS, AGVS, and industrial robotics, and their applications in modern manufacturing.	**K3**

Note*: K1- Remember, K2- Understand, K3- Apply, K4- Analyse, K5- Evaluate, K6- Create*

CO-PO Mapping Table (Mapping of Course Outcomes to Program Outcomes)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	2	1	1	1	1	1	1	2
CO2	3	3	3	3	3	2	2	1	2	2	2	3
CO3	3	3	3	2	3	2	2	1	2	2	2	3
CO4	3	3	3	3	3	2	2	1	2	2	2	3

Note: *1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), -: No Correlation*

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Text Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Automation, Production Systems, and Computer-Integrated Manufacturing	Mikell P. Groover	Pearson Education India	5th edition, 2018
2	Computer Integrated Manufacturing	James A. Rehg and Henry W. Kraebber	Pearson Education India	3rd edition, 2004
3	Computer-Aided Manufacturing	Tien-Chien Chang, Richard A. Wysk, and Hsu-Pin Wang	Pearson Education India	4th edition, 2015

Reference Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Flexible Manufacturing Systems in Practice: Design, Analysis, and Simulation	Joseph Talavage and Roger G. Hannam	CRC Press	1st edition, 1988
2	CAD/CAM: Principles and Application	P.N. Rao	McGraw Hill Education (India)	3rd edition 2010

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