FACULTY OF ENGINEERING & TECHNOLOGY

First Year Master of Technology

Semester II

Course Code: 102320206

Course Title: Computer Integrated Manufacturing

Type of Course: Program Elective III

Course Objectives: To Provide insight into high end technologies used to automate manufacturing operations using computerized integration of product design, Process planning, production, distribution, and management**.**

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
				Internal		External		Total
Lecture	Tutorial	Practical		Theory	J/V/P*	Theory	J/V/P*	
3	0	2	4	30/15	20/10	70/35	30/15	150/75

* **J**: Jury; **V**: Viva; **P**: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	Introduction: Automated Manufacturing Systems, Computerized Manufacturing Support Systems, Reasons for Automation, Different Automation Strategies, The Scope of CAD/CAM and CIM	05
2	Automated Flow lines: System Configurations, Workpart Transfer Mechanisms, Storage Buffers, Control of Production Line, Analysis of Transfer Lines-Transfer Lines with No Internal Parts Storage, Transfer Lines with Internal Storage Buffers.	05
3	Manual Assembly Lines: Assembly Workstations, Work Transport Systems, Line Pacing, Coping With Product Variety, Analysis of Single Model Assembly Lines-Repositioning Losses, The Line Balancing Problem, Line Balancing Algorithms-Largest Candidate Rule, Kilbridge and Wester Method, Ranked Positional Weights Method.	06
4	Automated Assembly Systems: System Configurations, Parts Delivery at Workstations, Applications, Quantitative Analysis of Assembly Systems- Parts Delivery System at Workstations, Multi-station Assembly machines, Single Station Assembly Machines, Partial Automation.	04

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5	Automatic Material Handling and Storage systems: Design Considerations in Material Handling, Material Transport Equipment-Industrial Trucks, Automated Guided Vehicles, Monorails and Other Rail-Guided Vehicles, Conveyors, Cranes and Hoists, Analysis of Vehicle Based Systems, Conveyor Analysis. Engineering Analysis of AS/RS and Carousel Systems.	**04**
6	Automated Inspection systems: Overview of Automated Identification Methods, Bar Code Technology, Radio Frequency Identification, Other AIDC Technologies-Mangnetic Stripes, Optical Character Recognition, and Machine Vision.	**05**
7	Computer Aided Process Planning: Retrieval CAPP Systems, Generative CAPP Systems, Graph Based Approach, Attribute Adjacency Graph, Benefits of CAPP.	**04**
8	Flexible Manufacturing Systems: Types of flexibility, types of FMS, FMS components, FMS Components-Workstations, Material Handling and Storage Systems, Computer Control System, Human Recourses, FMS Applications and Benefits., Quantitative analysis of FMS, Sizing the FMS, System performance measure.	**06**

Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks						**R**: Remembering; **U**: Understanding; **A**: Application, **N**: Analyze; **E**: Evaluate; **C**: Create
R	**U**	**A**	**N**	**E**	**C**	
15	15	25	20	15	10	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1	Automation, production Systems and Computer Integrated Manufacturing, Mikell P Groover, Prentice Hall.
2	System Approach to Computer Integrated Manufacturing, Nanua Singh, Wiley & Sons Inc.
3	Intelligent Manufacturing System, Andrew Kusiak, Prentice Hall Inc.

Course Outcomes (CO):

Sr.	**Course Outcome Statements**	**%weightage**
CO-1	Gain an overall understanding of automated systems integration.	**25**
CO-2	Be able to use and program programmable controllers, robots and CNC machines in an integrated system.	**35**
CO-3	Be able to develop interfaces necessary to integrate machines with a conveyor system and a host control system for a flexible manufacturing system.	**20**
CO-4	Demonstrate their understanding by producing a product through an integrated flexible manufacturing system and documenting the results	**20**

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List of Practicals / Tutorials:

1	Problems on automated flow lines
2	Problems on line balancing, Ranked Positional Weights Method etc. for manual assembly lines
3	Problems on automated assembly systems
4	Problems on quantitative analysis of FMS
5	Sizing problems on FMS
6	STL file format reading and use of related algorithm for its manipulation
7	Problems on scheduling for CIM
8	Exercise on automated inspection system
9	Exercise on automated material handling system
10	Exercise on automated storage and retrieval system
11	Open ended problem of flexible manufacturing system

Supplementary learning Material:

Curriculum Revision:	
Version:	**1**
Drafted on (Month-Year):	Apr-20
Last Reviewed on (Month-Year):	Jul-20
Next Review on (Month-Year):	Apr-22

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