INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)
Dundigal - 500 043, Hyderabad, Telangana

COURSE CONTENT

AUTOMATION IN MANUFACTURING							
I SEMSTER: CAD/CAM							
Course Code	**Category**	**Hours /Week**			**Credits**	**Maximum Marks**	

Course Code	**Category**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
BCCD05	**Elective**	**3**	**-**	**-**	**3**	**40**	**70**	100

Contact Classes:45	**Tutorial Classes: Nil**	**Practical Classes: Nil**	**Total Classes:45**

Pre requisites: Manufacturing Technology

I. COURSE OVERVIEW:
One of the best ways to communicate one's idea is through some form of picture or drawing. Computer graphics is the accurate technique that develops the ability to visualize any object with all physical and dimensional configurations. The computer aided drawing assists in preparation of 2D and 3D drawings to carry out sophisticated design and analysis.

II. COURSE OBJECTIVES:
The students will try to learn
I. The role and basics of Automation in manufacturing applications.
II. The geometric entities, projections development of curves and surfaces of Geometrical Modeling.
III. The geometric modeling techniques used in CAD such as wireframe, solid modeling.
IV. The product data standards and structures in computer graphics.

III. COURSE OUTCOMES:
After successful completion of the course, students should be able to:

CO1   Relate the role of graphic communication in the engineering design process.
CO2   Explain the concepts and underlying theory of modeling and the usage of models in different engineering applications
CO3   Develop geometric models in various industrial applications
CO4   Outline basic concept of image visualization on computer screen.
CO5   Identify the 2D and 3D transformations and various projections in CAD for synthesis various products
CO6   Develop parametric and non – parametric equations for curves and surfaces

V. COURSE CONTENT:
MODULE -I: AUTOMATION IN PRODUCTION SYSTEMS (09)
Automated Manufacturing Systems, Computerized Manufacturing Support Systems, and Reasons for Automation, Automation Principles and Strategies. Manufacturing operations, Production Concepts and Mathematical Models and Costs of Manufacturing Operations Basic Elements of an Automated Systems, Advanced Automation Functions and Levels of automation.

MODULE -II: MATERIAL HANDLING (09)
Introduction to Material Handling: Overview of Material Handling Equipment, Considerations in Material Handling System Design, the 10 Principles of Material Handling. Material Transport Systems, Automated Guided Vehicle Systems, Monorails and other Rail Guided Vehicles, Conveyor Systems, Analysis of Material Transport Systems. Storage Systems, Storage System Performance, Storage, Location Strategies.

Conventional Storage Methods and Equipment, Automated Storage Systems, Engineering Analysis of Storage Systems. Automatic data capture-overview of Automatic identification methods, bar code technology, other ADC technologies.

MODULE -III: ASSEMBLY LINES (09)
Manual Assembly Lines - Fundamentals of Manual Assembly Lines, Alternative Assembly Systems, Design for Assembly, Analysis of Single Model Assembly Lines, Line balancing problem, largest candidate rule, Kilbridge and Wester method, and Ranked Positional Weights Method, Mixed Model Assembly Lines, Considerations in assembly line design

MODULE -IV: TRANSFER LINES (09)
Transfer lines, Fundamentals of Automated Production Lines, Storage Buffers, and Applications of Automated Production Lines. Analysis of Transfer Lines with no Internal Storage, Analysis of Transfer lines with Storage Buffers.

MODULE -V: AUTOMATED ASSEMBLY SYSTEMS (09)
Automated Assembly Systems, Fundamentals of Automated Assembly Systems, Design for Automated Assembly, and Quantitative Analysis of Assembly Systems - Parts Delivery System at Work Stations, Multi- Station Assembly Machines, Single Station Assembly Machines, Partial Automation.

V. TEXT BOOKS:
1. Automation, Production systems and computer integrated manufacturing by Mikel P. Groover, Pearson Education.

VI. REFERENCE BOOKS:
1. CAD CAM: Principles, Practice and Manufacturing Management by Chris Mc Mohan, Jimmie Browne, Pearson Edu. (LPE)
2. Automation by Buckinghsm W, Haper & Row Publishers, New York, 1961
3. Automation for Productivity by Luke H.D, John Wiley & Sons, New York, 1972.

VII. WEB REFERENCES:
3. http://nptel.ac.in/courses/107103012/
4. http://me.gatech.edu/files/capstone/L071ME4182DFA

VIII. E-TEXT BOOKS:
3. https://books.google.co.in/books/about/Assembly_Automation_and_Product_Design.html ?id=XFtgaNFzMHQC
4. https://books.google.co.in/books/about/Product_Design_for_Manufacture_and_Assem.html?id=qYG gjwEACAAJ.

VIII. MATERIALS ONLINE
1. Course template
2. Tutorial question bank
3. Assignments
4. Model question paper – I
5. Model question paper – II
6. Lecture notes
7. PowerPoint presentation