COURSE CONTENT

Computer Aided Process Planning

I Semester: M.Tech (CAD/CAM)

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
2214015	Advanced	3	0	0	3	40	60	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes: 45		

Prerequisites: Production Technology, Machine Tools, Operations Research

Course Overview:

This course focuses on process planning within the manufacturing cycle, highlighting its integration with production planning and concurrent engineering. It covers part design representation, tolerancing, geometric modeling, and group technology coding systems. Students learn process planning approaches, including variant and generative methods, supported by decision tools and AI techniques. The course also explores computer-aided process planning systems and their implementation. Finally, it introduces integrated process planning systems, emphasizing data structures, system operations, and expert-based planning for efficient manufacturing.

Course Objectives:

1. Provide knowledge on process planning.
2. Expose the students with various part design representation.
3. Impart knowledge on process engineering and process planning.
4. To design a computer aided process planning systems.
5. Implement integrated process planning systems.

Course Outcomes: After Completion of the Course, Students should be able to

1. Explain the importance of process planning.
2. Identify the link between OPTIZ and MICLASS system
3. Understand process engineering and process planning.
4. Know different computer aided process planning systems.
5. Exhibit competence on the usage integrated process planning systems.

UNIT- I:

Introduction: The Place of Process Planning in the Manufacturing Cycle-Process planning and production Planning-Process planning and Concurrent Engineering, CAPP, Group Technology.

UNIT- II:

Part Design Representation: Design Drafting-Dimensioning-Conventional Tolerance-Geometric Tolerance-CAD-input/output devices -Topology - Geometric Transformation - Perspective Transformation-Data Structure-Geometric modelling for process planning--GT Coding-The OPITZ system-The MICLASS System.

UNIT- III:

Process Engineering and Process Planning: Experience based planning-Decision table and Decision Trees-Process capability analysis-Process Planning-Variant process planning-Generative Approach-Forward and backward planning, Input format, AI.

UNIT- IV:

Computer Aided Process Planning Systems: Logical Design of process planning-

Implementation Considerations-Manufacturing system components, Production Volume, No. of production families - CAM-I, CAPP, MIPLAN, APPAS, AUTOPLAN and PRO, CPPP.

UNIT-V:

An Integrated Process Planning Systems: Totally integrated process planning systems-An Overview-Modulus Structure-Data Structure-Operation-Report Generation, Expert process planning

TEXT BOOKS:

1. Gideon Halevi and Roland D. Weill, "Principle of process planning- A Logical Approach", Chapman & Hall, 1995
2. Chang T. C. & Richard A. Wysk, "An Introduction to automated process planning systems", Prentice Hall 1985.

REFERENCE BOOKS:

1. Chang, T.C., "An Expert Process Planning System", Prentice Hall,1985
2. Nanua Singh, "Systems Approach to Computer Integrated Design and Manufacturing", John Wiley &Sons,1996
3. Rao P.N., "Computer Aided Manufacturing", Tata McGraw Hill Publishing Co., 2000.

ELECTRONIC RESOURCES:

1. https://www.youtube.com/watch?v=wfj0J3iCxu4

MATERIALS ONLINE:

1. Course template
2. Definitions and terminology
3. Lecture notes
4. E-Learning Readiness Videos (ELRV)