



# INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal - 500 043, Hyderabad, Telangana

## COURSE CONTENT

| COMPUTER AIDED PROCESS PLANNING                 |                       |                       |   |   |                   |               |     |       |
|-------------------------------------------------|-----------------------|-----------------------|---|---|-------------------|---------------|-----|-------|
| II Semester: CAD / CAM                          |                       |                       |   |   |                   |               |     |       |
| Course Code                                     | Category              | Hours / Week          |   |   | Credits           | Maximum Marks |     |       |
| BCCD15                                          | Elective              | L                     | T | P | C                 | CIA           | SEE | Total |
|                                                 |                       | 3                     | - | - | 3                 | 40            | 60  | 100   |
| Contact Classes: 48                             | Tutorial Classes: Nil | Practical Classes: Ni |   |   | Total Classes: 48 |               |     |       |
| Pre requisites: Production Planning and Control |                       |                       |   |   |                   |               |     |       |

### I. COURSE OVERVIEW:

Computer-aided process planning (CAPP) is the use of computer technology to aid in the process planning of a part or product, in manufacturing. CAPP is the link between CAD and CAM in that it provides for the planning of the process to be used in producing a designed part.

### II. COURSE OBJECTIVES:

The students will try to learn:

- I. The fundamentals of computer aided process planning, group technology and applications.
- II. The importance of design, tolerances and geometric transformation for modern manufacturing.
- III. The implementation of process engineering and computer aided process planning.
- IV. The integration of process planning activities into a complete system.

### III. COURSE OUTCOMES:

After successful completion of the course, students should be able to:

- CO1 Recall fundamentals of Computer Aided Process Planning, group technology and applications
- CO2 Illustrate the importance of design and manufacturing geometric tolerances for selection of machining parameters
- CO3 Summarize the variant and generative process planning approaches in decision making
- CO4 Explain the different process planning techniques in multi-product manufacturing systems
- CO5 Identify the requirements of integrated process planning systems, process planning and report generation
- CO6 Apply the integrated manufacturing for expert process planning in automated industry.

### IV. COURSE CONTENT:

#### MODULE -I: Introduction to CAPP (09)

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

#### MODULE -II: Part Design Representation (09)

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.

#### MODULE -III: Process Engineering and Process Planning (10)

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.

#### **MODULE -IV: Computer Aided Process Planning Systems (10)**

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.

#### **MODULE -V: An Integrated Process Planning Systems (10)**

Totally integrated process planning systems-An Overview-Modulus Structure-Data Structure-Operation-Report Generation, Expert process planning.

#### **V. TEXT BOOKS:**

1. Gideon Halevi, Roland D. Weill, "Principle of process planning- A Logical Approach", Chapman & Hall, 1<sup>st</sup> edition, 2019.
2. T. C. Chang, Richard A. Wysk, "An Introduction to automated process planning systems", Prentice Hall, 1<sup>st</sup> edition, 2018.

#### **VI. REFERENCE BOOKS:**

1. T. C. Chang, "An Expert Process Planning System", Prentice Hall, 1<sup>st</sup> edition, 2018.
2. Nanua Singh, "Systems Approach to Computer Integrated Design and Manufacturing", John Wiley & Sons, 1<sup>st</sup> edition, 2016.
3. P. N. Rao, "Computer Aided Manufacturing", Tata McGraw Hill, 1<sup>st</sup> edition, 2017.

#### **VII. ELECTRONICS RESOURCES:**

1. [http:// onlinecourses.nptel.ac.in/noc22\\_me10/preview](http://onlinecourses.nptel.ac.in/noc22_me10/preview)

#### **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