

## **CD5071 ADVANCED TOOL DESIGN**

### **DETAILED SYLLABUS**

#### **UNIT I INTRODUCTION TO TOOL DESIGN**

Introduction –Tool Engineering – Tool Classifications– Tool Design Objectives – Tool Design in manufacturing- Challenges and requirements- Standards in tool design-Tool drawings –Surface finish – Fits and Tolerances - Tooling Materials- Ferrous and Non ferrous Tooling Materials Carbides, Ceramics and Diamond -Non metallic tool materials-Designing with relation to heat treatment

#### **UNIT II DESIGN OF CUTTING TOOLS**

Mechanics of Metal cutting – Oblique and orthogonal cutting- Chip formation and shear angle- Single- point cutting tools – Milling cutters – Hole making cutting tools- Broaching Tools - Design of Form relieved and profile relieved cutters-Design of gear and thread milling cutters

#### **UNIT III DESIGN OF JIGS AND FIXTURES**

Introduction – Fixed Gages – Gage Tolerances –selection of material for Gages – Indicating Gages – Automatic gages – Principles of location – Locating methods and devices – Principles of clamping – Drill jigs – Chip formation in drilling – General considerations in the design of drill jigs – Drill bushings – Methods of construction – Thrust and Turning Moments in drilling - Drill jigs and modern manufacturing- Types of Fixtures – Vise Fixtures – Milling Fixtures – Boring Fixtures – Broaching Fixtures – Lathe Fixtures – Grinding Fixtures – Modular Fixtures – Cutting Force Calculations.

#### **UNIT IV DESIGN OF PRESS TOOL DIES**

Types of Dies –Method of Die operation–Clearance and cutting force calculations- Blanking and Piercing die design – Pilots – Strippers and pressure pads- Presswork materials – Strip layout – Short-run tooling for Piercing – Bending dies – Forming dies – Drawing dies-Design and drafting.

For Syllabus, Question Papers, Notes & many More

## **UNIT V TOOL DESIGN FOR CNC MACHINE TOOLS**

Introduction –Tooling requirements for Numerical control systems – Fixture design for CNC machine tools- Sub plate and tombstone fixtures-Universal fixtures– Cutting tools– Tool holding methods– Automatic tool changers and tool positioners – Tool presetting– General explanation of the Brown and Sharp machine.

### **REFERENCES**

1. Cyrll Donaldson, George H.LeCain, V.C. Goold, “Tool Design”, Tata McGraw Hill Publishing Company Ltd., 2000.
2. E.G. Hoffman,” Jig and Fixture Design”, Thomson Asia Pvt Ltd, Singapore, 2004
3. Haslehurst M., “Manufacturing Technology”, The ELBS, 1978
4. Prakash Hiralal Joshi, “Tooling data”, Wheeler Publishing, 2000
5. Venkataraman K., “Design of Jigs, Fixtures and Press tools”, TMH, 2005

### **OBJECTIVES**

The purpose of this course is to make the students to get familiarized with the design of various tools that can be implemented for different mechanical operations.