

**Unit I****Chapter 1 : Basics of Tool Engineering****1-1 to 1-21****Syllabus :**

- 1.1 Principles in tool engineering.
- 1.2 Mechanics of Metal cutting : Requirements of tools
- 1.3 Cutting forces - Merchant circle, types of chips, chip thickness ratio, shear angle.
Shear angle - concept, need and method to give shear angle on punch and die.
- 1.4 Types of metal cutting process - orthogonal, cutting.
- 1.5 Cutting tool geometry - Single point cutting tool

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- 2.1 Cutting tool materials-types, composition, properties and applications
- 2.2 Carbide inserts-types, ISO-designation and applications, other inserts like CBN and PCBN
- 2.3 Tool holders for turning, milling machines and CNC machines
- 2.4 ISO designations of Tool holders
- 2.5 Tool sharpening method for single point cutting tool.



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Unit III

Chapter 3 : Locating and Clamping Devices

3-1 to 3-25

Syllabus :

- 3.1** Concept, Definition Locating and Clamping
- 3.2** Use of Locating and Clamping Principles on Shop Floor
- 3.3** **Degrees of Freedom** : Concept and Importance
- 3.4** **Locators** : Types, construction, working and applications.
- 3.5** **Clamping Devices** : Types of construction, Working and application.
- 3.6** Fool proofing and ejecting techniques.

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- 4.1** Concept, definition of jigs and fixtures, Difference between jigs and fixtures.
4.2 Jigs - Types, construction, working and applications.
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4.4 Design considerations and procedure for Jigs and Fixtures.

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- 5.1 Press working processes**-types, sketches and Applications.
5.2 Press tools : types, working, components and their Functions.
5.3 Concept, meaning, definitions and calculations of press tonnage and shut height of press tool. Shear action in die cutting operation.
5.4 Centre of pressure : Concept, meaning, definition, Methods of finding and importance.
5.5 Die clearance : Concept, meaning, definition, Reasons, effects and methods of application.
5.6 Cutting force : Methods to calculate and methods of reducing.
5.7 Scrap strip layout : Concept, importance, method to prepare and determining percentage stock utilization.
5.8 Types, working and applications of stock stop, pilots, strippers and knockouts.
5.9 Cutting dies-types and applications.
5.10 Design of progressive cutting die : a) Sketch the component, b) Prepare scrap strip layout
c) Calculate tonnage d) Determine centre of pressure e) Determine dimensions of punches, die block and die shoe f) Prepare sketch of stripper plate g) General assembly sketch of punches arrangement, die block, die shoe and stripper plate.

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Unit VI

Chapter 6 : Bending, Drawing and Forging Dies

6-1 to 6-26

Syllabus :

6.1 Bending dies :

- a) Types, parts and functions of bending die.
- b) Definition, calculations and factors affecting bend radii, bend allowance and spring back
- c) Method to compute bending pressure : Types, sketch, working and applications of bending dies.

6.2 Drawing dies : Types and method to determine blank size for drawing operation, Types, sketch, working and applications of drawing dies (embossing, curling, bulging, coining, swaging and hole flanging) .

6.3 Forging dies : Terminology, types, sketch, working and application.

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