## **TOOL DESIGN**

V Semester: ME								
Course Code	Category	Но	Hours / Week		Credits	Maximum Marks		
AME509	<b>Professional Elective</b>	L	Т	Р	С	CIA	SEE	Total
		3	-	-	3	30	70	100
Contact Classes: 50	<b>Tutorial Classes: Nil</b>	P	ractica	l Class	es: Nil	Tota	l Classe	s: 50
<ul> <li>The course should enable the students to:</li> <li>I. Compare the characteristics of various tool materials for cutting operation</li> <li>II. Demonstrate the design of cutting tools and its importance in manufacturing industry.</li> <li>III. Understand the design of jigs and fixtures for holding the different components.</li> <li>IV. Illustrate the design for sheet metal forming-I in the field of design aspects.</li> <li>V. Compare the design for sheet metal forming-II in the manufacturing industry.</li> </ul>								
<ul> <li>COURSE LEARNING OUTCOMES (CLOs):</li> <li>1. Understand various tool materials used in various industries</li> <li>2. Explain the characteristics of different tool materials</li> <li>3. Evaluate the properties of Non Metallic and Non Ferrous materials</li> <li>4. Use design principles to incorporate in cutting tools</li> <li>5. Explain design of Point cutting tools: Milling, Drilling</li> <li>6. Demonstrate the selection of carbide tool steels for cutting operations</li> <li>7. Solve problems and find methods to determine the shank size</li> <li>8. Explain principles of Jigs and Fixtures</li> <li>9. Demonstrate the general considerations in the design of drill jigs and drill bushing</li> <li>10. Explain design of sheet metal blanking and piercing dies</li> <li>11. Demonstrate the methods of construction of fixtures, vice, milling and boring</li> <li>12. Explain the fundamentals of die cutting operation, power press types</li> <li>13. Explain about material handling equipment</li> <li>14. Solve problems on punches and dies</li> <li>15. Understand the importance of sheet metal forming, bending, and deep drawing</li> <li>16. Compare extrusion and forging processes to identify advantages and limitations</li> <li>17. Enable students to understand various sheet metals forming for industrial applications.</li> </ul>								
competitive exams	TFRIAT						Classes	. 10
Tool materials: Properties of materials: Tools steels, Cast Iron, Mild or low carbon steels, Non metallic and nonferrous materials. Heat treating.								
UNIT II DESIGN (	OF CUTTING TOOLS						Classes	: 10
Design of cutting tools: Point cutting tools: Milling cutters, drills, selection of carbide steels, determination of shank size for single point carbide tools, determining the insert thickness for carbide tools.								
UNIT III DESIGN (	<b>OF JIGS AND FIXTURES</b>						Classes	: 10
Design of jigs and fixtures: Basic principles of location and clamping; Locating methods and devices, jigs, definition types. General considerations in the design of drill jigs, drill bushing, methods of construction; Fixtures, vice fixtures, milling, boring lathe grinding fixtures.								
UNIT IV DESIGN I	FOR SHEET METAL FOR	<b>MING</b>	-1				Classes	: 10
Design of sneet metal blanking and piercing dies: Fundamentals of die cutting operation, power press types, general press information, materials handling equipment, cutting action in punch and die operations, die clearance, types of die construction, die design fundamentals, banking and piercing die construction, pilots, stripper and pressure pads presswork material, strip layout, short run tooling for piercing.								
UNIT V DESIGN I	FOR SHEET METAL FOR	RMING	– II				Classes	: 10
Design of sheet metal bending, forming and drawing dies: Bending dies, drawing dies, forming dies, drawing operations, variables that effect metal flow during drawing, determination of blank size, drawing force, single and double action draw dies								

## **Text Books:**

- 1. Donaldson, "Tool Design", Tata McGraw-Hill, 1stEdition, 2013.
- 2. HMT, "Production Technology", Tata McGraw-Hill, 1st Edition, 2012.
- 3. R.K. Jain, S. C. Gupta, "Production Technology", Tata McGraw-Hill, 1stEdition, 2013.

## **Reference Books:**

- 1. George F Dieter, "Mechanical Metallurgy", Tata McGraw-Hill, 1stEdition, 2015.
- 2. C. Elanchezhian, M.Vijayan, "Machine Tools", Anuradha Publications, 1stEdition, 2010

## Web References:

- 1. http://www.uobabylon.edu.iq/uobColeges/ad\_downloads/4\_1293\_515.pdf
- 2. http://ebooks.library.cornell.edu/k/kmoddl/toc\_heywood1.html

**E-Text Books:** 

- 1. https://drive.google.com/file/d/0B7raaoEF40D7eEJIR1VoODJodFE/edit.
- 2. http://royalmechanicalbuzz.blogspot.in/2015/04/tooldesign-by-vganesan-ebook-pdf.html.
- 3. https://docs.google.com/file/d/0B5dLUIZfysmqMXBhakRyODhublU/edit.
- 4. https://archive.org/details/tooldesign00mckarich.