COURSE CODE	TOOL DESIGN ENGINEERING	L	T	P	C
1152ME118		3	0	0	3

1. Preamble

This course provides an introduction to the basic components and techniques of Tool engineering & its classification, materials heat treatment etc., Understanding of press tools & basic plastic moulding, analysis of mold flow and tool maintenance.

2. Prerequisite

Machining And Machine Tools Technology 1151ME107

3. Links to other courses

Project Work

4. Course Educational Objectives

Students undergoing this course are expected to

- Describe the manufacturing of cutting tools, plastic tools & press tools

5. Course Outcomes

The students would be benefitted with the following outcomes:

CO Nos.	Course Outcomes	Level of learning domain (Based on revised Bloom's)
CO1	Describe the classification, properties and applications of various cutting tools	K2
CO2	Use multi point cutting tools in real applications.	K2
CO3	Demonstrate knowledge on process of heat treatments in making cutting tools.	K2
CO4	Design press tools and sheet metal forming processes	K2
CO5	Design injection moulding and die casting tools	K2

6. Correlation of COs with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	H	L										L	M	L
CO2	H	L										L	M	L
CO3	H	L			L							L	M	L
CO4	H	L	L		L							L	M	L
CO5	H	L	L		L							L	M	L

H- High; M-Medium; L-Low

7.Course Content

UNIT-I CUTTING TOOLS **L-9**

Materials-properties, classification, selection, insert and coated tools, tool wear, and tool life. Recent developments and applications. Single Point Tools: Nomenclature, types and styles, Introduction of HSS and carbide insert type tools for turning, boring, shaping, planning and slotting operations. Design of form tools. Tools and holders for CNC applications, tools for dry machining.

UNIT-II MULTIPOINT CUTTERS **L-9**

Nomenclature, classification and selection, construction methods, cutter setting, design and manufacture of drills, reamers, taps, dies, thread chasers, milling cutters, broaches, hobs and gear shaper cutters. Grinding- wheel specification and selection.

UNIT-III TOOL MATERIALS & HEAT TREATMENT **L-9**

Standards and specifications of materials – Tool materials, metals and non-metals - Selection of metal tool materials, Hardening, annealing of tool steels and its types. Aus tempering, Mar tempering and Isothermal annealing for tool steels,. Tool failures due to improper heat treatment like overheating, improper quenching and loading. ION Nitrating, Vacuum carburizing, Chemical Vapour deposition. Heat treatment of non-ferrous materials-Aluminum Alloys.

UNIT-IV ROLE OF DESIGN **L-9**

Construction & design: single point tools, drills, reamers, ground thread taps, periphery cutting tools, broach, hobs –Selection & application role of design in the performance of cutting tools on ferrous and nonferrous work materials.

UNIT-V PRESS TOOLS **L-9**

Design and manufacture of die sets for sheet metal components-simple, compound and progressive dies for punching and blanking operations. Dies for drawing and bending operations. Selection of presses and tools

TOTAL: 45 Periods

8. Text Books

1. Donaldson C and LeCain C H, "Tool Design", Tata McGraw Hill Publishing Company Ltd., New Delhi, 2004.
2. Bhattacharyya A, "Metal Cutting Theory and Practice", New Central Books Agency (P) Ltd, Calcutta, 2000.
3. Cracknell P C and Dyson R W, "Handbook of Thermoplastics Injection Mould Design", Chapman and Hall, 1993.
4. Mikell P Groover, "Fundamentals of Modern Manufacturing", John Wiley and Sons, Singapore, 2004.

9. References

1. SME, "Manufacturing Engineers Hand Book", 1998. 2. Rodin P, "Design and Production of Metal cutting Tools", MIR Publishers, Moscow, 1968