

**GOVERNMENT POLYTECHNIC, MALKANGIRI**  
**DEPARTMENT OF MECHANICAL ENGINEERING**

LESSON PLAN

Discipline: <b>Mechanical Engineering</b>	Semester: 4th	Name of the Teaching Faculty: <b>SHARMILA SABAR</b>	
Subject: <b>TOOL ENGINEERING</b>	No. of days/week class allotted 3	Semester From date:24.12.2025 No. of Week: 15	To date:18.04.2026
<b>PRE-REQUISITE</b>			
<b>Course Outcomes</b>	<ul style="list-style-type: none"> <li>• Illustrate concepts, principles and procedures of tool engineering</li> <li>• Classify and explain various tools and tool operations</li> <li>• Select proper tool and a die for a given manufacturing operation to achieve highest productivity</li> <li>• Estimate tool wear and tool life</li> </ul>		
<b>Week</b>	<b>Class Day</b>	<b>Theory/Practical Topics</b>	
1st	1st	Metal Cutting: Mechanics of Metal cutting; requirements of tools	
	2nd	cutting forces;	
	3rd	types of chips; chip thickness ratio	
2nd	1st	shear angle ; simple numerical	
	2nd	types of metal cutting process; or- thogonal; oblique and form cutting	
	3rd	types of metal cutting process; or- thogonal; oblique and form cutting	
3rd	1st	types of metal cutting process; or- thogonal; oblique and form cutting	
	2nd	Cutting fluids: types; characteristics and applications.	
	3rd	. Tool wear: Types of wear;	
4th	1st	Tool life; Tool life equations.	
	2nd	Machinability: definition; factors affecting machinability	
	3rd	machinability index	
5th	1st	Tool materials: Types; characteristics	
	2nd	applications; Heat treatment of tool steels;	
	3rd	Specification of carbide tips	
6th	1st	Types of ceramic coatings	
	2nd	Cutting Tool Geometry: Single point cutting tool; drills	
	3rd	Cutting Tool Geometry: Single point cutting tool; reamers;	
7th	1st	Cutting Tool Geometry: Single point cutting tool; milling	
	2nd	Cutting Tool Geometry: Single point cutting tool; cutters.	
	3rd	Types of dies and construction: Simple Die;	
8th	1st	Compound Die	
	2nd	Progressive Die	
	3rd	Combination Die	
9th	1st	Punch & Die mountings: pilots; strippers	
	2nd	misfeed detectors; Pressure Pads	
	3rd	Knock outs; stock guide	
10th	1st	Feed-Stop; guide bush; guide pins	
	2nd	Die Design Fundamentals: Die Operations	
	3rd	blanking; piercing; shearing	
11th	1st	cropping; notching; lancing	
	2nd	coining; embossing; stamping	
	3rd	curling; drawing; bending; forming	
12th	1st	Die set; Die shoe; Die area	
	2nd	Calculation of clearances on die and punch for blanking and piercing dies;	
	3rd	Calculation of clearances on die and punch for blanking and piercing dies;	

13th	1st	Strip layout,
	2nd	Calculation of material utilization factor.
	3rd	Forming Dies: Bending methods; Bending Dies; bend allowance;
14th	1st	spring back; springing; bending pressure; pressure pads; development of blank length
	2nd	Drawing: operations; Metal flow during drawing;
	3rd	Calculation of Drawing blank size; variables affecting metal flow during drawing
15th	1st	single action and double action dies; combination die
	2nd	Fundamentals of other Tools: Constructional features of - Pressure Die casting dies;
	3rd	metal extrusion dies; injection molding dies; forging dies; plastic extrusion dies

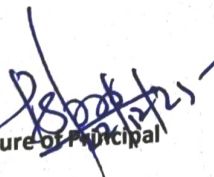
**Learning Resources:**

1. Tool Design - Donaldson Anglin, Tata McGraw Hill.
2. Production Technology- H.M.T.Jain, Tata McGraw Hill.
3. A Text Book of Production engineering – P.C. Sharma, S.Chand & Co.
4. Production Technology, R.K.Jain, Khanna Publishers.

  
Signature of  
Faculty

  
Signature of HOD/

  
Signature of Academic  
Coordinator

  
Signature of Principal