Course Type	Course Code	Name of Course	L	T	P	Credit
DE	NMED519	Design of Tools, Jigs and Fixtures	3	0	0	3

Course Objective
Students will learn about tooling and job holding requirements during different manufacturing operations. Another objective is to understand the design and selection criteria for jigs and fixtures for bulk and sheet metal processes.
Pre-requisite:
Students must had studied machining, forming, and welding during undergraduate.
Learning Outcomes
Upon successful completion of this course, students will: • Be able to acquire fundamental knowledge on tool design and clamping methods in different industrial environmental applications. • Formulate mathematical and scientific methods associated with design of a mechanical system. • Finally, it will be helpful in customizing design and development of a new system as per the requirement.

Module	Topics	Lecture Hours	Learning Outcome
1	Introduction: Tool design methods; tool making practices: hand finishing and polishing, screws and dowels, hole location and jig boring practices.	8	Understanding the different tool design methods and factors affecting the design criteria.
2	Tooling materials tool steel, cast iron, non-metallic tooling material, heat treatment and factor affecting the heat treatment.	7	Understanding of tool material and its processing
3	Design of cutting tools: Basic requirement of the cutting tools, metal cutting tools and classification. gauges and gauge design: fixed gauges, gauge tolerance, selection of materials for gauge.	9	Characterizing the cutting tools and its specification criteria in different applications
4	Locating and clamping methods, Classification of jigs, design of drill jigs and milling fixtures, other fixtures: turning, grinding, broaching, welding and modular fixtures	10	Application of jigs and fixtures in conventional manufacturing processes,
5	Design of sheet metal blanking and piercing dies, sheet metal bending, forming and drawing dies, tool design for numerical control machine tools.	8	Design and application of dies in sheet metal operations
	Total	**42**	

Text books:

1. Donaldson C, LeCain GH, Goold VC, Ghose J. Tool design. Tata McGraw-Hill Education; 2012
2. Jones, Ernest James Henry, and Harold Clifford Town. Production engineering: jig and tool design. Newnes, 2013.

References:

1. Venkataraman, K. Design of jigs, fixtures and press tools. John Wiley & Sons, 2015.
2. Reid, D. "Fundamentals of tool design, Society of manufacturing engineers." Publications development department (1991).