

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY
DESIGN AND MANUFACTURING (IIITDM)
KANCHEEPURAM

INTRODUCTION OF NEW COURSE

Course Title	Abrasive Machining and Finishing Processes	Course Code	ME xxxx			
Dept./ Specialization	Mechanical	Structure (LTPC)	3	1	0	4
To be offered for	UG/PG	Status	Core		Elective <input type="checkbox"/>	
Faculty Proposing the course	Dr. Kishor Kumar Gajrani	Type	New <input type="checkbox"/>		Modification	
Recommendation from the DAC: Yes		Date of DAC	01-06-2021			
External Expert(s)	Prof. V. K. Jain (Retired, IIT Kanpur)					
Pre-requisite	Manufacturing Processes-II	Submitted for approval			46 th Senate	
Learning Objectives	<ul style="list-style-type: none"> To gain a basic understanding of abrasive machining and finishing processes including classifications, types, principles and working mechanism. To develop an understanding of the advanced and hybrid abrasive based machining and finishing processes to select and apply processes for achieving micro/nano level of finishing. To understand the merits and demerits of various processes for finishing complex components. 					
Learning Outcomes	<ul style="list-style-type: none"> At the end of the course, students will be able to distinguish between various abrasive machining and finishing processes. Also, they will be able to select the best process to finish complex components depending on their applications. 					
Contents of the course (With approximate break-up of hours for L/T/P)	<p>Introduction to Abrasives and Grinding Processes (L6 + T2) Need of finishing, Abrasives Particles, Classification of Abrasive Processes. Grinding Processes: Classifications, Processes, Applications, Tribology, Grinding fluids, Minimum Quantity Lubrication in grinding.</p> <p>Conventional Abrasive Finishing Processes (L6 + T2) Surface Integrity issues in abrasive finishing processes; Honing, Wire Brushing, Lapping, Buffing, Superfinishing, Sand Blasting, Micro Blasting, Vibratory Finishing, and Drag Finishing.</p> <p>Advanced Abrasive Machining / Finishing Processes (L4 + T1) Abrasive Jet Machining, Abrasive Water Jet Machining, Ultrasonic Machining</p> <p>Hybrid Advanced Abrasive Finishing Processes (L4 + T2) Electrical Discharge Grinding, Electrical Discharge Diamond Grinding, Electrochemical Grinding, Chemo-mechanical Polishing</p> <p>Polymer Assisted Abrasive Finishing Processes (L6 + T2) Abrasive Flow Finishing (AFF) Process, Advances in Abrasive Flow Finishing, Applications of AFF and its Allied Processes</p> <p>Magnetic Field Assisted Abrasive Finishing Processes (L5 + T2) Magnetic Abrasive Finishing (MAF), Vibration Assisted MAF, Chemo-mechanical MAF, Magnetic Abrasive Deburring, Magnetic Jet Polishing</p> <p>Magnetorheological Abrasive Flow Finishing Processes (L5 + T1) Magnetorheological Abrasive Flow Finishing (MRAFF) Process, Magnetorheological Finishing (MRF)</p> <p>Hybrid Abrasive Finishing and Metrology of the Surface Finish (L6 + T2) Chemo-mechanical MRF, Finishing of Advanced Materials, Modified Advanced Abrasive Finishing Processes, Metrology and optimization techniques for finishing Processes</p>					
Text Book	<ol style="list-style-type: none"> M. C. Shaw, Principle of Abrasive Processing, Oxford University Press, 1996. V. K. Jain, Nanofinishing Science and Technology: Basic and Advanced Finishing and Polishing Processes, CRC Press, 2016. 					
Reference Books	<ol style="list-style-type: none"> J. A, Mc Geough, Advanced Methods of Machining, Springer Science and Business Media, 1988. G. K. Lal, Introduction to Machining Science, New Age International Publishers, 2007. V. P. Astakhov and S. Joksch, Metalworking fluids (MWFs) for Cutting and Grinding, Woodhead Publishing, 2012. V.K.Jain, Advanced Machining Processes, (2nd edition), Allied Publishers, Delhi. 					