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

<table>
<tr><td>Course Title</td><td>Advanced Machining Processes</td><td>Course Code</td><td colspan="4"></td></tr>
<tr><td>Dept./ Specialization</td><td>Mechanical Engineering</td><td>Structure (LTPC)</td><td>3</td><td>1</td><td>0</td><td>4</td></tr>
<tr><td>To be offered for</td><td>UG/PG</td><td>Status</td><td colspan="2">Core</td><td colspan="2">Elective ■</td></tr>
<tr><td>Faculty Proposing the course</td><td>Dr. K. Senthilkumar and
Dr. P. Pandithevan</td><td>Type</td><td colspan="2">New</td><td colspan="2">Modification ■</td></tr>
<tr><td colspan="2">Recommendation from the DAC: Yes</td><td>Date of DAC</td><td colspan="4">01-06-2021</td></tr>
<tr><td>External Expert(s)</td><td colspan="6">Prof. U.S Dixit, Department of Mechanical Engineering, IIT Guwahati.</td></tr>
<tr><td>Pre-requisite</td><td>Manufacturing Basics</td><td colspan="2">Submitted for approval</td><td colspan="3">46th Senate</td></tr>
<tr><td>Learning Objectives</td><td colspan="6">To impart knowledge on the principles of material removal mechanism of advanced machining processes such as mechanical, electro-chemical and thermal. To provide in depth knowledge in selection of advanced machining processes to fabricate intricate and complex shapes in difficult to machine material. To provide awareness of advanced finishing processes to achieve submicron/nano surface finish.</td></tr>
<tr><td>Learning Outcomes</td><td colspan="6">Students will be able to evaluate and select suitable manufacturing processes for machining advanced materials for a wide variety of applications. They will be able to differentiate between conventional processes and non- conventional processes and develop niche applications based on these processes.</td></tr>
<tr><td>Contents of the course (With approximate break-up of hours for L/T/P)</td><td colspan="6">Introduction: Types of advanced manufacturing processes; Evolution, need, and classification of advanced machining processes. (3L+1T)
Mechanical Processes: USM, Rotary Ultra Sonic Machining (RUM), AJM, WJM, AWJM processes - Process principle and mechanism of material removal; Process Parameters; Process Capabilities; Applications; Operational characteristics; Limitations. (8L+3T)
Advanced Fine Finishing Process: Abrasive Flow Machining (AFM), Magnetic Abrasive Finishing (MAF), Magneto Rheological Abrasive Finishing (MRAF) - Process principle; Process equipment; Process Parameters; Process Capabilities; Applications; Limitations. (6L+3T)
Chemical Processes: Process principle and details of Chemical Machining (CHM), Photo-Chemical Machining (PCM), and Bio-Chemical Machining (BCM) processes. (4L+1T)
Electro Chemical Processes: ECM - Process principle; Mechanism of material removal; Process Parameters; Process Capabilities; Applications, Tool Design, Electro Chemical Deburring (ECDE). (7L+4T)
Thermal Processes: EDM, Wire Electro Discharge Machining (WEDM), LBM, EBM, IBM, PAM processes – Process principle and mechanism of material removal; Process parameters and characteristics; Surface finish and accuracy, Process Capabilities; Applications; Limitations. (8L+2T)
Derived and Hybrid: Electro Stream Drilling (ESD), Shaped Tube Electro Machining (STEM), Electro Chemical Honing (ECH), Electro Chemical Discharge Machining (ECDM) - Process Parameters; Process Capabilities; Applications; Limitations, Introduction to form machining. (8L+2T)</td></tr>
<tr><td>Text Book</td><td colspan="6">1. V. K. Jain, Advanced Machining Processes, 1st edition, Allied Publishers Pvt. Ltd, 2007. ISBN: 978-8177642940.</td></tr>
<tr><td>Reference Books</td><td colspan="6">1. H. Abdel and G. El-Hofy, Advanced Machining Processes: Nontraditional and Hybrid Machining Processes, 1st edition, McGraw-Hill Professional, 2005. ISBN: 978-0071453349.
G.F. Benedict, Nontraditional Machining Processes, 1st edition, Marcel Dekker Inc., 2002.</td></tr>
</table>