

# Advanced Manufacturing Processes - Video course

## COURSE OUTLINE

The course covers the details of the advanced machining theory and practices, advanced machining processes, advanced metal forming processes, advanced welding processes and advanced foundry processes.

**Contents:** Advanced machining theory & practices - mechanisms of chip formation, shear angle relations, and theoretical determination of cutting forces in orthogonal cutting; analysis of turning, drilling, and milling operations; mechanics of grinding; dynamometry; thermal aspects of machining; tool wear; economics of machining; processing of polymers, ceramics, and composites;

Advanced machining processes - introduction of USM, AJM, ECM, EDM, LBM, and EBM;

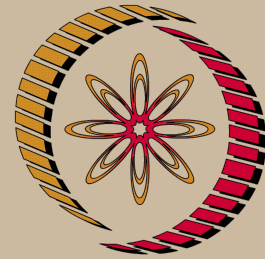
Advanced forming processes - electro-magnetic forming, explosive forming, electro-hydraulic forming, stretch forming, contour roll forming;

Advanced welding processes - EBW, LBW, USW;

Advanced foundry processes - metal mould, continuous, squeeze, vacuum mould, evaporative pattern, and ceramic shell casting.

## COURSE DETAIL

Sl. No	Topic	Hours
1.	<b>Advanced Machining Processes</b> <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Process principle</li> <li>• Material removal mechanism</li> <li>• Parametric analysis and</li> </ul>	24



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## Mechanical Engineering

### Pre-requisites:

Understanding of basic concept of Manufacturing Processes: UG level manufacturing technique course.

### Coordinators:

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	<p>applications of processes such as ultrasonic machining (USM)</p> <ul style="list-style-type: none"> <li>• Abrasive jet machining (AJM)</li> <li>• Water jet machining (WJM)</li> <li>• Abrasive water jet machining (AWJM)</li> <li>• Electrochemical machining (ECM)</li> <li>• Electro discharge machining (EDM)</li> <li>• Electron beam machining (EBM)</li> <li>• Laser beam machining (LBM) processes</li> </ul>		
2.	<p><b>Advanced Casting Processes</b></p> <ul style="list-style-type: none"> <li>• Metal mould casting</li> <li>• Continuous casting</li> <li>• Squeeze casting</li> <li>• Vacuum mould casting</li> <li>• Evaporative pattern casting</li> <li>• Ceramic shell casting</li> </ul>	6	
3.	<p><b>Advanced Welding Processes</b></p> <ul style="list-style-type: none"> <li>• Details of electron beam welding (EBW)</li> <li>• laser beam welding (LBW)</li> <li>• ultrasonic welding (USW)</li> </ul>	6	
4.	<p><b>Advanced Metal Forming Processes</b></p> <ul style="list-style-type: none"> <li>• Details of high energy rate forming (HERF) process</li> <li>• Electro-magnetic forming, explosive forming</li> <li>• Electro-hydraulic forming</li> <li>• Stretch forming</li> </ul>	4	

- Contour roll forming

**References:**

1. "Materials and Processes in Manufacturing" (8th Edition), E. P. DeGarmo, J. T Black, R. A. Kohser, Prentice Hall of India, New Delhi (ISBN 0-02-978760).
2. "Manufacturing Science" A. Ghosh, and A. K. Mallik, Affiliated East-West Press Pvt. Ltd. New Delhi.
3. "Nontraditional Manufacturing Processes", G.F. Benedict, Marcel Dekker, Inc. New York (ISBN 0-8247-7352-7).