

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