# 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

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Topic</th>
<th>Hours</th>
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<tbody>
<tr>
<td>1.</td>
<td>Advanced Machining Processes</td>
<td>24</td>
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<td>- Introduction</td>
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<td>- Process principle</td>
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<td>- Material removal mechanism</td>
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<td>- Parametric analysis and</td>
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applications of processes such as ultrasonic machining (USM)
- 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. **Advanced Casting Processes**
- Metal mould casting
- Continuous casting
- Squeeze casting
- Vacuum mould casting
- Evaporative pattern casting
- Ceramic shell casting

3. **Advanced Welding Processes**
- Details of electron beam welding (EBW)
- Laser beam welding (LBW)
- Ultrasonic welding (USW)

4. **Advanced Metal Forming Processes**
- Details of high energy rate forming (HERF) process
- Electro-magnetic forming, explosive forming
- Electro-hydraulic forming
- Stretch forming
References:

