



**NITTTR
BHOPAL**

MEE-6/2024-2025

Emerging Technologies in Mechanical Engineering

23-09-2024 to 27-09-2024

NITTTR Bhopal



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Rationale

Emerging technologies in mechanical engineering, such as Wire Arc Additive Manufacturing (WAAM) and Friction Stir Welding and Processing (FSW/FSP), are revolutionizing manufacturing by enabling the production of complex, high-strength components with reduced waste and enhanced material properties. WAAM utilizes an electric arc and wire feedstock for layer-by-layer construction, while FSW/FSP employs frictional heat and mechanical stirring for defect-free welds and material enhancement. However, challenges in Metal Additive Manufacturing (AM) persist, including maintaining consistent part quality, ensuring material integrity, and managing post-processing requirements. Optimizing techniques play an important role in harnessing full potential of these techniques in mechanical engineering applications like design of material systems, design of automotive systems etc. and integrate them seamlessly into industrial applications, driving forward the future of manufacturing.

Programme Outcomes

1. Enhanced problem-solving skills through modelling and optimization of complex systems.
2. Ability to select and design appropriate materials for specific engineering problems.
3. Design and fabricate components using wire arc additive manufacturing.
4. Skills in designing and selecting appropriate tools for FSW/P.
5. Ability to explore and develop new applications and methodologies using FSP.

Programme Content

The integration of emerging technologies in mechanical engineering, Digitalization of manufacturing processes, Design and fabrication of high-strength components with minimal waste and improved material properties. WAAM leverages an electric arc and wire feedstock for layer-by-layer metal fabrication, offering significant design flexibility and efficiency. Modelling and optimization techniques, and their applications, Addressing challenges in Metal Additive Manufacturing. Plant and Process simulations, Hands on session will be conducted on software tools.

Target Group

Faculty of Mechanical Engineering and allied disciplines

Coordinator & Co-Faculty

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