

# Advanced Welding Processes for Titanium and Aluminum Alloys

## Overview

The course on 'Advanced Welding Processes for Titanium and Alluminium Alloys' is in line with the present demands of the manufacturing sector, it also supports the 'Make in India' initiative of The government of India. Various manufacturing sectors including defense, power, space, atomic energy, automobile, heavy fabrication and ship building are in need of advanced manufacturing processes. Amongst various manufacturing processes- welding is a very important manufacturing operation.

The course on advanced welding processes, covers various advanced welding processes, which include advances in arc welding e.g. A-TIG welding, Metal cored arc welding, Narrow Gap Welding, etc. Under the solid state welding processes it includes, Friction stir welding assisted by additional heating (Hybrid welding), Bobbin Friction stir welding, Friction stir welding of dissimilar metals, Friction stir processing for surface composites and super plasticity and friction surfacing.

Nowadays, the light alloys, such as titanium and aluminum alloys, are finding a widespread use in the construction of mechanical components. These alloys, in particular, are used in aerospace and transportation applications where the combination of high mechanical properties and light weight is highly appreciated and requested. These alloys are difficult to weld with conventional techniques for a number of reasons related to their metallurgy and their physical properties.

In the last decade, some innovative joining techniques have been suggested to obtain high performance joints with the above mentioned materials. The aim of this course is to learn about the advanced welding processes and new developments and opportunities in this area. The course will cover fundamentals of the conventional welding processes followed by characteristics of aluminum and titanium alloys, their properties and their metallurgy. The advances and alternative techniques of conventional welding techniques will be discussed. The in depth study will be done on advanced welding processes, and various advanced welding inspection and destructive as well as non-destructive testing techniques. The latest state of the art knowledge in the area of advancements in the welding techniques and their applications will also be dealt with.

L. D. College of Engineering, Ahmedabad, was established in 1948. It is one of the highest ranked state government academic institution affiliated with Gujarat Technological University (a state government University) and approved by AICTE. The institute already hosts a center of excellence in CAD/CAM and CIM. A most sophisticated, Gujarat technological university and center for entrepreneurship development, Govt. of Gujarat approved "Center of Excellence-Welding Technology" has been established at institute.

Course participants will learn these topics through lectures and Tutorials.

<b>Modules</b>	<b>A: GPR Technology: Oct 7 – Oct 11 , 2019</b> <b>Number of participants for the course will be limited to fifty.</b>
<b>You Should Attend If...</b>	<ul style="list-style-type: none"><li>▪ You are a mechanical Engineer, production Engineers, automobile Engineers, or research scientist interested in learning advances in solid state welding process and current issues in aluminum and titanium welding.</li><li>▪ You are welding engineers or quality control inspectors, or production supervisor or non-destructive test engineer interested to learn about welding defects.</li><li>▪ You are a student or faculty from academic institution interested in learning about advances in titanium and aluminum welding.</li></ul>
<b>Fees</b>	The participation fees for taking the course is as follows: <b>Participants from abroad : US \$500</b> <b>Industry/ Research Organizations: 3000 INR</b> <b>Academic Institutions: 2000 INR</b> The above fee include all instructional materials, computer use for tutorials and assignments, laboratory equipment usage charges, 24 hr free internet facility. The participants will be provided with accommodation on payment basis.

## The Faculty



**DR. Antonello Astarita** is in the faculty of University of Naples “Federico II”. He is expert in Advances in Surface Engineering and Welding Technology, Friction Stir Welding, Laser Beam welding, Cold Spray Technology,



**Dr. J. Krishnan** : Ph.D, (M.Tech.,B.E.) Served in BARC for 3 decades;after retirement served on different roles of L&T,Heavy engineering-the last one CHAIR PROFESSOR at MS University, Baroda (2013-16) Experience: Knowledge of Welding Processes(being used in Indian Industries) Knowledge of Advances in these Processes Knowledge of Consumables. Knowledge of Solid State welding Processes./Electron Beam welding Process Current Interests:Delivering Subject lectures/Motivational Lectures Corporate Training Assess, guide, monitor Research/Maintenance welding Projects.



**Dr. Vishvesh Badheka**, studied Metallurgy at The M.S. University of Baroda, received Bachelor, Master and PhD in Metallurgical Engineering. Presently he working as Professor & Head, Mechanical Engineering Dept., school of Technology, PDPU Gandhinagar, his research interest area is Advanced Welding Processes, Friction Stir Welding, Friction Stir Processing- surface composite, super-plasticity, Friction Surfacing, BT-FSW, Hybrid FSW, FSW of dissimilar metals, Narrow Gap-GMAW/FCAW/MCAW. A-TIG welding of P91, RAFM steels, Hybrid Welding and Wear of surface composites. He qualified Diploma International Welding Engineer awarded by International Institute of Welding, Dec 2011. He received funding from various funding agencies like DST, ISRO, DAE, and DRDO. So far he guided 6 PhDs and 25 M.Tech students in the area of Advance welding processes. He is member of various professional bodies like American Welding Society (AWS), MRSI, IIM, IIW, ISNT and IE.

## Course Co-ordinator

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