The Indian Institute of Metals Short Professional Educational Courses(Online) on

"Welding of Metallic Systems and Industry 4.0: Bridging Fundamentals with Smart Manufacturing"

(Course Number IIM-25-110)

Online Mode 6th & 7th November 2025, 09:30 – 14:00 each day

Background: The rise of Industry 4.0 is transforming manufacturing by integrating automation, digitalization, and real-time data intelligence. Welding of metallic systems, a cornerstone of industrial fabrication, must adapt to these advances to meet the demands of productivity, quality, and sustainability. This course, Industry 4.0 and Welding of Metallic Systems, emphasizes the application of smart technologies—robotics, sensors, artificial intelligence, and digital twins—in modern welding practices. Aimed at professionals and industry practitioners, it provides the knowledge and skills needed to optimize processes, ensure competitiveness, and position welding as a critical enabler in the connected, automated factories of the future.

Speakers Profile: The Faculty of this course is drawn from various eminent institutes across India.

1. Prof. Janaki Ram G. D., Professor, Department of Materials Science and Engineering, IIT, Hyderabad
2. Dr. Murugaiyan Amirthalingam, Associate Professor, Metallurgical and Materials Engineering, IIT Madras
3. Dr. Manojit Ghosh, Professor, Department of Metallurgy and Materials Engineering, IIEST Shibpur
4. Dr. Snehanshu Pal, Associate Professor, Department of Metallurgy and Materials Engineering, IIEST Shibpur
5. Dr. G. G. Roy, Professor, Department of Metallurgical and Materials Engineering, IIT Kharagpur
6. Dr. Swarup Bag, Professor, Department of Mechanical Engineering, IIT, Guwahati

The Course Content would be covered in Classroom Lectures accessible through Virtual on-line route from 6th to 7th November 2025.

Who should attend: This course will be immensely useful for Postgraduate and Doctoral Students in Materials/Metallurgical/Mechanical Engineering, Welding Engineers, Inspection Professionals, and Fabrication Specialists from Industries (Steel, Automotive, Aerospace, Energy, Shipbuilding), Researchers and industry professionals exploring Industry 4.0 integration in welding etc.

Course Objectives:

The course is designed to:

1. Introduce **fundamental and advanced welding processes** including both fusion and solid-state techniques.
2. Explain the **physics and metallurgy** underpinning welding processes for ferrous and non-ferrous alloys.
3. Provide insights into **welding defects and modern inspection methods** including NDT and digital inspection.
4. Present advanced welding technologies like **Electron Beam Welding**.
5. Explore the role of **Industry 4.0 tools** (sensors, AI/ML, digital twin) for **smart welding systems**.

Course Outcomes:

By the end of the two-day course, participants will :

1. Gain a **comprehensive understanding of major welding processes** (fusion and solid-state).
2. Understand the **physics of welding phenomena** for process optimization.
3. Develop knowledge of **metallurgical aspects** for ferrous and non-ferrous systems.
4. Learn to identify and mitigate **welding defects**, with exposure to **modern inspection techniques**.
5. Explore **cutting-edge welding technologies** like EBW and FSW.
6. Understand **Industry 4.0 integration** for smart, connected, and automated welding systems.
7. Build links between **academic knowledge and industrial practice** to improve manufacturing reliability and efficiency.

Course Content:

Day-1	Day-2
Inaugural Session	**Lecture 5:** Physical Metallurgy of Welding – Part II (Non-Ferrous Metals) by Dr. Manojit Ghosh
Lecture 1: Fusion State Welding Processes by Prof. Janaki Ram G. D.	**Lecture 6:** Electron Beam Welding Technology by Dr. G. G. Roy
Lecture 2: Solid-State Welding FSW by Dr. Murugaiyan Amirthalingam	**Lecture 7:** Welding Defects and Inspection by Dr. Swarup Bag
Lecture 3: Physics of Welding by Dr. Manojit Ghosh	**Lecture 8:** Industry 4.0 – Smart Manufacturing Integration in Welding by Dr. Snehanshu Pal
Lecture 4: Physical Metallurgy of Welding – Part I (Ferrous Metals) by Dr. Snehanshu Pal	

Registration Fees and Payment Methods

Participant type	Only Theory Course
IIM Members	3350 + 603* = 3953
IIM Non Member	5000 + 900* = 5900
Student Member	800 + 144* = 944
Student Non-member	1200 + 216* = 1416
* (18% GST)	

- Participants may join for the 2 days course module which shall be conducted virtually.
- Advance payment of Registration fees is mandatory.
- Participation fee is non-refundable; however, change in nomination is possible.
- Students may furnish suitable proof of they being students while filling in the online form.
- 10% discount shall be offered if more than 5 participants are nominated by any Organisation.

Participants are requested to register via
https://shorturl.at/jMTMZ [For Individuals],
https://shorturl.at/6SdNi [For Organizations]

and pay online as per the details given below.

The online transaction receipt, mentioning the course number IIM-25-110 may be uploaded by using the link provided in google form. Alternately, a demand draft in favour of "The Indian Institute of Metals" payable at Salt Lake, Kolkata can be sent to The Indian Institute of Metals, Metal House, Plot 13/4, Block AQ, Salt Lake, Sec V, Kolkata : 700 091.

Contact Person :

Ms Nabatara Mitra
The Indian Institute of Metals
Plot 13/4, Block AQ,
Salt Lake, Sec V,
Kolkata: 700 091
readingroom@iim-india.net /
iimshortonlinecourses@gmail.com

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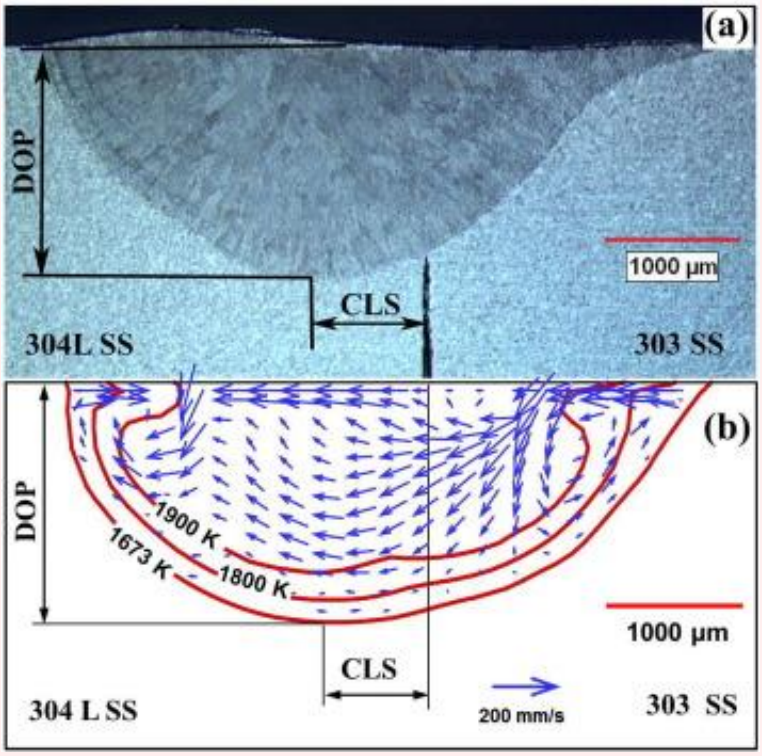

Metallurgy
Materials Engineering