



One-Day Training Programme on Advanced Scanning Electron Microscopy (SEM): Based Microstructural Evaluation for Asset Integrity, Failure Investigation, and R&D Applications



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**10th
July, 2026**

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Evolve by TCR
215, Pancham Icon,
Vasna Road, near D-Mart,
Vadodara, Gujarat 390007

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Fees: INR 8,000/-
for single person +
GST 18% extra.

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10% Discount on total
amount of invoice for 03
or more nominations from
the same organization.

Course Content

1. Fundamentals of SEM & Microstructural Characterization

Key Learning: Understanding how SEM reveals critical microstructural features.

2. EDS Analysis & Elemental Characterization

Key Learning: Identifying chemical composition and linking it to failure mechanisms.

3. Application in Failure Investigation & Asset Integrity

Key Learning: Applying SEM/EDS insights to real-world engineering failures and decisions.

Overview: Gain practical understanding of SEM and EDS for analyzing microstructures, identifying elemental composition, and evaluating engineering failures.

4. Laboratory Visit & Demonstration

- Live SEM operation
- Sample preparation
- Real-time imaging & EDS analysis
- Result interpretation

Who Should Attend

- Mechanical, Metallurgy & Materials Engineers
- Inspection, Maintenance & Reliability Engineers
- QA/QC & Failure Analysis Professionals
- R&D and Design Engineers
- Professionals from Power, Refinery, Petrochemical, Fertilizer & Manufacturing

Objectives of the Training Programme:

- Gain in-depth understanding of SEM and EDS techniques for microstructural and elemental analysis.
- Learn methodologies for fracture analysis, elemental characterization, and interpretation of results.
- Develop the ability to identify material defects, corrosion products, and failure mechanisms.
- Build competency to apply SEM/EDS in Root Cause Failure Analysis (RCFA) and asset integrity decisions.
- Enhance skills to interpret reports and support evidence-based engineering decisions.

Meet The Faculty



Mr. M.N. Patel

- BE & ME in Metallurgical Engineering from Maharaja Sayajirao University of Baroda. Brings over 33 years of teaching experience at undergraduate and postgraduate levels in subjects such as Mechanical Metallurgy, Plastic Deformation of Metals, Welding Metallurgy, Physical Metallurgy, Non-Destructive Testing (NDT), and Failure Analysis.
- He has guided 20+ postgraduate dissertations and published 16 technical papers focusing on weldability of steels, corrosion, stainless steel sensitization, and failure investigations.
- At TCR Advanced, Prof. Patel is actively involved in material characterization and metallurgical failure investigations, including correlation of microstructure with material properties and service performance. His expertise in analysing welded structures, degradation mechanisms, and defects using SEM/EDS techniques makes him a valuable mentor in advanced microscopy-based investigations.

Mr Gopul Patel

- RBI Specialist and Advanced Materials Characterization Expert at TCR Advanced Engineering Pvt. Ltd., with over 15 years of experience in risk-based inspection, asset integrity management, and advanced analytical techniques. An API 580 certified professional, he contributes to digital solutions integrating FFS, API 581 risk analysis, IOW, and predictive maintenance.
- With a postgraduate background in Electronics, his expertise includes SEM/EDS, TEM, XRD, ICP-OES, and thermal analysis (DSC, TGA). Trained internationally in the Netherlands and Korea, he has played a key role in advanced microscopy applications, including Environmental SEM-based investigations.
- At TCR Advanced, he leads initiatives in advanced diagnostics, SEM/EDS-based failure analysis, and digital asset integrity solutions, bridging laboratory insights with real-world engineering applications



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