



INSTITUTE OF INFRASTRUCTURE, TECHNOLOGY, RESEARCH AND MANAGEMENT

(An Autonomous University established by Government of Gujarat)

Department of Mechanical and Aerospace Engineering

Target Audience:



**ITI Technicians
Diploma/UG Engineers**

Proposed Topics

Topics	Major-topics to be covered during training
Fundamentals of Industrial HVAC&R Systems	<ul style="list-style-type: none"> Fundamentals of Thermodynamics & Refrigeration Cycles HVAC System Components & Air Distribution Chilled Water Systems & VRF/VRV Technology Electrical Controls, BMS & Automation Maintenance & Safety
Industrial Foundry Solutions: Quality, Productivity, and Cost Optimisation	<ul style="list-style-type: none"> Foundry Basics and Quality Fundamentals Advanced Quality Assurance Techniques Boosting Productivity Through Process Optimization Cost Reduction Strategies Integrated Solutions and Case Studies
Practical Foundry Skills for Technicians and Young Engineers	<ul style="list-style-type: none"> Foundry Basics and Safety Pattern Making Sand Moulding Techniques Sand Molding Techniques Core Making and Advanced Molds Melting and Pouring Casting Finishing and Fettling Quality Control and Industry Applications
Skill Development in Modern Casting Processes and Inspection	<ul style="list-style-type: none"> Casting Fundamentals Advanced Casting Techniques Process Simulation and Optimization Defect Identification Inspection Methods Advanced Inspection and Correction Integration and Industry Applications
Basic Material Science	<ul style="list-style-type: none"> Material Classification and Structure Mechanical Properties and Testing Phase Diagrams and Heat Treatment Polymers and Composites Ceramics and Advanced Materials Processing and Manufacturing Techniques Characterization, Failure, and Industry Applications
Materials for Sustainable Urban Infrastructure and Smart Cities	<ul style="list-style-type: none"> Core Concepts Advanced Construction Materials Smart and Adaptive Materials Recycling and Circular Economy Industry Applications Challenges and Innovations Implementation Strategies

***We tailor-make training programs to match your requirements**

Proposed Topics

Topics	Major-topics to be covered during training
Applied Metallurgy and Materials Testing for ITI and Field Engineers	<ul style="list-style-type: none"> Fundamentals of Metallurgy Mechanical Testing Basics Impact and Toughness Testing Non-Destructive Testing (NDT) Heat Treatment and Microstructure Advanced Materials and Failure Analysis Field Applications and Standards
QUALITY-PR (Quality, Productivity & Problem Resolution)	<ul style="list-style-type: none"> Quality Fundamentals & MSME Challenges Problem Resolution & Continuous Improvement Basic Quality Tools – I Root Cause Analysis Techniques Process Understanding, Control & Quality Assessment Basic Quality Tools – II & Mistake Proofing Productivity Improvement Techniques Standardization, Sustenance & Leadership Implementation Planning & Assessment
Design Thinking, Innovation & IPR for Public Systems and Urban Governance	<ul style="list-style-type: none"> Design Thinking for Governance Planning & Team-Based Project Development Problem Scoping & Feasibility Understanding Citizen Needs & System Functions Learning from Existing Solutions & Setting Standards Generating, Selecting & Managing Innovation IPR, Patents & Protecting Public Innovations
Advanced Materials for Sustainable Urban Infrastructure	<ul style="list-style-type: none"> Fundamentals of Materials Science Materials Characterization Lightweight Metallic Materials Durability & Corrosion Engineering Advanced Composites & Nano-Materials Smart & Functional Materials Sustainability & Implementation
ITI/ Polytechnic Training Module	<ul style="list-style-type: none"> Superalloys and Composite Materials Particle Size Reduction Using Planetary Ball Mill Ultrasonic Assisted Turning (UAT) Advanced Grinding Operations Drilling on VMC (CNC) and Conventional Machine Tools Cryogenic Machining – Sustainable Manufacturing Technique Sustainable Lubrication Techniques Wire Electrical Discharge Machining (WEDM) Siemens NX Software Polymer Development and Characterization Sustainable Materials Development and Characterization HVAC Systems Welding Techniques Introduction to Drone technology
Non-Destructive Testing	<ul style="list-style-type: none"> Fundamentals of NDT & Visual Inspection Codes, Standards & Certification Liquid Penetrant & Magnetic Particle Testing Ultrasonic Testing (UT) Radiographic & Eddy Current Testing Advanced NDT & Industry Integration NDT in Industry 4.0
Welding Technology: Fundamentals to Advanced Applications	<ul style="list-style-type: none"> Fundamentals of Welding & Welding Processes Gas Welding & Resistance Welding Arc Welding, TIG and MIG Advanced Welding Processes Inspection, Testing & Standards in Welding Emerging Trends & Research in Welding

Achievements: Trained over 400 practicing engineers, technicians, and faculty members from various universities through STTPs and workshops.

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