

Process Chemistry Training Programs

Industry-Oriented Learning for Pharmaceutical R&D Chemists and Manufacturing Professionals

Dr. Bhaskar's Process Solutions offers industry-oriented Process Chemistry Training Programs designed for scientists, process chemists, scale-up teams, production professionals, and technical managers. The programs combine scientific principles with practical industrial experience and real process development case studies, providing practical insights into the development and manufacture of active pharmaceutical ingredients (APIs), intermediates, and specialty chemicals. They are designed to strengthen technical capability in process research and development, providing a strong foundation for early-career chemists and advanced technical insights for experienced R&D professionals.

Why Choose Us?

Our training programs are built on over 21 years of industrial experience in pharmaceutical process development and Manufacturing. They emphasize practical implementation, industrial case studies, and organization-specific capability development aligned with each organization's technical challenges, development priorities, and business objectives.

Training Delivery Formats

Programs can be delivered as half-day technical sessions, one-day intensive workshops, two-day advanced workshops, customized in-house programs, or case-study-based technical discussions. Each program is designed in consultation with the organization to address specific technical challenges, development priorities, participant experience levels, and capability-building objectives.

Learning Outcomes

Upon completion of the program, participants will be able to:

- Develop robust, scalable, and cost-effective chemical processes through systematic route selection, process optimization, and scale-up strategies.
- Improve technical problem-solving capabilities in process development, impurity control, crystallization, and technology transfer.
- Apply process safety, risk management, and regulatory principles to support reliable process development and manufacturing excellence.

Who should attend?

- Process R&D scientists
- Medicinal and synthetic chemists
- Scale-up and technology transfer teams
- Production and manufacturing chemists
- Quality and regulatory professionals

Representative programs

• Route selection and process optimization • Downstream operations • Scale-up and technology transfer • Practical impurity management • Crystallization and polymorphism • Process safety and risk management • Potent API Process Development and Manufacturing • Structure Elucidation and Characterization • Green Chemistry • Process intensification • Quality Systems and Regulatory Compliance

About the Trainer

Dr. P. Muni Bhaskar, Ph.D.

Founder & Scientific and Technical Strategist

Dr. Bhaskar's Process Solutions



Dr. P. Muni Bhaskar is an organic chemist and process development professional with over 21 years of experience in the chemical and pharmaceutical industry. He founded Dr. Bhaskar's Process Solutions to help pharmaceutical and chemical organizations strengthen process development capability through scientific expertise, practical industrial solutions, and capability-building programs. His expertise spans process research and development, route selection, process optimization, scale-up, technology transfer, quality systems and regulatory compliance, impurity management, crystallization, polymorphism, and process intensification.

He holds a Ph.D. in Chemistry from the Indian Institute of Technology (IIT) Madras and completed postdoctoral research at RWTH Aachen University, Germany. He earned a M.Sc. in Chemistry from Sri Venkateswara University, Tirupati. He has authored research publications in international scientific journals, filed patent applications, and published technical thought-leadership articles on LinkedIn, demonstrating his continued engagement in innovation, scientific research, and knowledge dissemination in process chemistry. He has also completed Lean Six Sigma professional training through the American Society for Quality (ASQ).

His academic foundation, combined with over 21 years of industrial experience, enables him to deliver training programs that integrate scientific rigor with practical application, technical problem-solving, and capability development for pharmaceutical R&D and manufacturing professionals.

Core Training Modules

The training programs cover the key technical areas essential for successful process development, scale-up, technology transfer, and manufacturing excellence.

1. Route Selection and Process Optimization

- Route scouting and feasibility assessment
- Reagent and solvent selection
- IP landscape and route differentiation
- DoE-based process optimization
- In-process control strategy
- Raw material cost optimization

2. Downstream Operations and Product Isolation

- Design practical and scalable downstream processes
- Work-up and impurity removal strategies

- Product isolation and recovery optimization
- Solvent management and process efficiency
- Safety and robustness in downstream operations

3. Scale-up and Technology Transfer

- Scale-up principles and challenges
- Documentation and knowledge transfer for successful scale-up and technology transfer
- Process validation and robustness assessment
- Process troubleshooting during manufacturing

4. Process Safety and Risk Management

- Reaction hazard assessment
- Thermal safety considerations
- Safe scale-up practices
- Quality Risk Management (QRM)

5. Contained Chemistry for Potent APIs

- Categorization and occupational exposure bands (OEBs) for potent compounds
- Process development considerations for potent and highly potent APIs
- Facility design and containment controls for safe handling of materials and manufacturing operations
- Cleaning validation, decontamination procedures, and cross-contamination control
- Risk assessment, PPE strategy, and safe operational practices
- Industrial case studies and regulatory expectations

6. Crystallization and Polymorphism

- Crystallization process development
- Preparation and control of API solid forms, including salts, co-crystals, solvates, hydrates and amorphous forms
- Polymorph screening of APIs
- Particle properties and process performance
- Solid-state characterization

7. Practical Impurity Management

- Assessment of potential impurities in a manufacturing process and storage
- Impurity source identification and control strategies for all impurities
- Genotoxic and nitrosamine impurity management
- Establishing impurity threshold limits and specification criteria in accordance with ICH guidelines
- Synthesis and qualification of impurity standards

8. Structure Elucidation and Characterization

- Spectroscopic techniques for structure elucidation (NMR, MS, IR, and related methods)
- Structural confirmation of intermediates, products, and impurities
- Interpretation of spectroscopic and analytical data
- Characterization of process-related impurities
- Characterization of polymorphs, solvates, hydrates and amorphous forms
- Practical case studies in structure elucidation and characterization

9. Quality Systems and Regulatory Compliance

- ICH and FDA guidelines and regulatory expectations
- Data integrity and documentation practices
- Quality by Design (QbD) principles
- GMP considerations in process development and manufacturing
- Chemistry, Manufacturing, and controls (CMC) sections for regulatory submission

10. Green Chemistry for Sustainable Process Development and Manufacturing

- Principles of green chemistry
- Route selection for sustainable and resource-efficient processes
- Reduction of waste, emissions, and process mass intensity (PMI)
- Energy-efficient process design and manufacturing practices
- Greener reagents, catalysts, and process alternatives
- Green chemistry metrics (E-factor, atom economy, PMI)
- Industrial case studies in sustainable process development

11. Advanced Process Technologies

- Flow chemistry fundamentals
- Process intensification concepts
- Continuous processing opportunities
- Process Analytical Technology (PAT) for process monitoring and control
- Industrial case studies

Our Commitment

We are committed to helping organizations build stronger process chemistry capability, reduce development risk, improve scale-up success, strengthen technical decision-making, and accelerate process development through practical, industry-focused training programs.

Contact:

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