Terms and Conditions

Payment: Tuition payable in U.S. funds net of all charges. Payment is due at time of registration or on receipt of invoice. If payment has not been received two weeks prior to the course, a credit card will be required to guarantee registration.

Discount/Rates: To receive the Early Bird tuition rate, payment is required at time of registration and/or BEFORE early registration tuition expires or the regular tuition rate will apply. If choosing invoice/ wire transfer, payment must be received prior to expiration of early registration tuition or the regular tuition rate will apply. All tuition prices are a per person rate. To qualify for the Group Rate discount, registration must be for two or more enrollments registering at the same time, from the same company, for the same course. Please note: Group Rate Discount cannot be combined with any other discount. Multiple discounts not applicable.

Cancellations/Substitutions/FEES: All cancellations must be in writing and emailed to info@cfpa.com. All cancellations are subject to a $300.00 cancellation fee. Applicants may cancel up to four (4) weeks prior to the course start date for a refund less cancellation fee. Applicants that cancel less than four (4) weeks prior to the course will be issued a credit less cancellation fee that can be used for a future course up to one year from the date of issuance. If you do not cancel and do not attend you are still responsible for the full payment. If for any reason, CfPA decides to cancel this course, we will not be responsible for airfare, hotel or other costs incurred by the registrant. Program content, schedule and instructors are subject to change without notice. Substitutions are permitted at any time, must be in writing and emailed to Customer Service at info@cfpa.com.

Confirmation Letters: Before each course begins, all registrants will receive written final confirmation including detailed information regarding course location – VIA EMAIL. We recommend that travel/ hotel arrangements not be made until final confirmation package is received. If confirmation is not received two weeks prior to the course please contact Customer Service at info@cfpa.com.

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Who We Are

The Center for Professional Advancement (CFPA) is the largest accredited technical training organization in the world with a curriculum of approximately 450 short courses in 15 industries including Pharmaceutical, Biotechnology, Medical Device, Chemical, Cosmetics, Food and more.

Since our founding in 1967, we have successfully trained nearly a half million people worldwide in topics ranging from basic and introductory courses to new advances and cutting-edge technology, and current U.S. and European regulations. CfPA courses are offered in a variety of formats – Public offering, Client Site and Online – to fit you or your company’s training needs.

Accreditations/Recertifications

The American Society for Quality (ASQ) Recertification Opportunities

The following information was provided courtesy of ASQ, and is not meant as an endorsement of CfPA products. It serves only as an informational guide about the certifications offered by ASQ. Many CfPA courses offer training that may be helpful in obtaining required ASQ’s recertification education units. To view a list of recommended courses that may be appropriate please visit www.asq.org. For more information about ASQ, contact them at: help@asq.org

Courses of Interest

- Atomization and Spray Drying: Applied and Practical Approach course id 2035
- Critical Process Cleaning and Cleaning Validation course id 1687
- Elements of Applied Process Engineering course id 1512
- IQ, OQ, PQ course id 1698
- Pharmaceutical Quality Assurance and Control course id 224
- Powder Mixing Technology course id 771
- Unit Operations for the Process Industries course id 2035

3 Ways To Register

- Internet: www.cfpa.com
- Fax registration form to: 732.238.9113
- Mail registration form to: The Center for Professional Advancement (CFPA) 190 State Highway 18, Suite 203, East Brunswick, NJ 08816 USA

Registration Form

Course Offering # 1601-504

Pilot Plant and Scale-Up Studies

January 27–29, 2016 • San Mateo, CA

Dr. M. M. First Name
Job Title
Company/Institution
Company Address
City State Zip
Tel ____________________________ Fax _________________________
E-mail Address _______________________________________________

Job Title ____________________________________________________
Dr. Mr. Ms __________________________________________________
Note: Please complete separate form for each registrant.

I accept CFPA’s Terms and Conditions

Tuition and Payment Methods

Early Bird (Slab $209) (Must register and pay by December 16, 2015)
Regular Tuition

Group Discount: Register 2 or more from the same company, at the same time, for this course. You will receive a 10% discount off each registration.

Tuition payable in U.S. funds net of all charges includes continental breakfast, luncheon, breaks and course notes.

Note: Payment is due 2 weeks prior to course or at time of registration.

Send Invoice/Bill Me Purchase Order # (If Required)

Check (Payable in U.S. funds to: The Center for Professional Advancement)

Credit Card 

Card 

Card #

Exp. Date

Signature

Cardholder Name

Credit Card billing address (if different than above address) (3 or 4 digit code)

Mail registration form to: The Center for Professional Advancement (CFPA) 190 State Highway 18, Suite 203, East Brunswick, NJ 08816 USA

SAVE $200-Register & Pay by December 16

Pilot Plant and Scale-Up Studies

Process Development and Scale-Up Methods

How to Perform Pilot Plant Studies and Process Translation

January 27–29, 2016 San Mateo, CA

Course Topics Include:

- Systematic Method for Scale-Up
- Scale-Up Traps and Overcoming Traps
- Multiphase Systems
- Pitfalls and Analogies

The Center for Professional Advancement (CFPA) has been approved as an Authorized Provider by the International Association for Continuing Education and Training (IACET), 701 East Broadway Dr., Suite 300, McLean VA 22102. In obtaining this approval, CFPA has demonstrated that it complies with the ANSI/IACET Standards which are widely recognized as standards of good practice internationally. CFPA is therefore authorized to offer IACET CEUs for its programs that qualify under the ANSI/IACET Standards. CEUs will be awarded for participation in CFPA’s courses at the rate of 1 CEU per contact hour upon successful completion of the entire course and 70% accuracy in the required Learners’ Assessment.

CfPA is an ISO/AS9001:2008 certified company.

For more information about ASQ, contact them at: help@asq.org
Who Should Attend

Engineers and scientists who are involved with process development, process translation, scale-up and pilot plant studies will benefit from this course. This includes those in:

- Pilot plant operations
- Food processing
- Waste processing
- Process and project design
- Biotechnology and fermentation

Learning Objectives

Upon completion of this course, you will be able to:

- Identify management considerations in scale-up
- Use different approaches for process scale-up
- Perform process scale-up using a systematic general approach for different processes
- Avoid the classical mistakes and traps made in process scale-up
- Carry out successful process translations from the laboratory to the plant
- Explain different concepts of scale-up in mixing and contacting

Course Description

This course will provide concepts, methods and advice on how to scale-up or translate a process or model to larger sizes. Emphasis throughout the course will be on proper designs, modeling and processing. The importance of the process geometry will be emphasized.

The course will cover the different scale-up methods and how to establish viable process objectives. A general scale-up method is presented and a number of examples are worked as illustrations. Scale-up traps and pitfalls are reviewed as well as ways to avoid these. The importance of process objectives will be emphasized. Basic concepts of importance are reviewed using different areas as examples. Power analysis will be presented as a useful tool in scale-up. Examples will show how to use the power analysis in applications and to establish the controlling mechanisms. Detailed suggestions for pilot studies will be given. Scale-up in the mixing and contacting area is reviewed. Equipment, operating conditions, optimum designs and processing conditions will be discussed. Methods to perform process translation in mixing will be developed and examined as to their practicality. Correlations and data use will be reviewed for process accuracy and use in pilot studies. Pitfalls and the use of analogues in solving process problems will be discussed.

Pilot Plant and Scale-Up Studies

Course Outline

First Day

8:00 a.m.: Registration/Continental Breakfast
8:30–12:00 noon:
Session 1: Why? Management Considerations/Review of Learning Objectives
- Time Lines
- Facilities and Personnel
- Safety and the Environment
- Equipment and Process Reliability
- Development
Session 2: Methods for Scale-Up
- Repeating Designs
- Regular Design Methods
- Rules of Thumb
Session 3: A Systematic Method for Scale-Up
- Needs Matching
- Process and Geometric Similarity
- A Simple Process
- Energy, Power and Their Importance
- Geometry and its Importance
- Working Volume
1:00–5:00 p.m.: The General Scale-Up Method
- Examples for Each of the Following:
  - Burning Problem
  - Flow Regime Change
  - Agglomerator Scale-Up; Atomization, Metal Processing
- Spray Dryer Dual Approach: Vendor and Pilot Plant Studies
- The KPS Index
- Scale-down
- Process Understanding
Session 4: Scale-Up Traps and Overcoming Traps
- Traps of Geometric Similarity
- Examples of Traps for Flostation
- Precipitation Reactions, Boiling
- Fermentation and Gas Liquid Reactions
- Mixed Opportunities
- Trap Reversal
- Overcoming Traps
Session 5: Process Objectives
- Process Failure: Troublesome Areas; Processing Tricks
- Scale and Process Type

Second Day

8:00–12:00 noon:
Session 6: Basic Concepts as Applied to Mixing and Engineering
- The Economic Situation; Range of Problems
- A Good Mixing Design; Process Specific Design
- Laminar and Turbulent Mixing Geometries; Revolutions to Mix Principle; Optimum Points
- Proper Perspective; Problem Identification; Mixing Tests
- Technical Literature
Session 7: Power
- Power Analysis; Theoretical Based Applications; Chemical Reactions; Fold Down of a Slimy: Emulsion Production
- Power Number for Impellers
- Laminar Power
- Turbulent Power
Session 8: Fluid Motion
- Flow Regimes Number of Flow Regimes
- Mixing Geometries; Pumping Numbers
- Common Impellers
- Good Power Distribution
- The D/T Ratio; D/T Ratio Effects
1:00–5:00 p.m.: Session 9: Mixing
- Mixleak; Scale of Scrutiny; Mixing Time
- Correlations
- Turbulent Mixing, Laminar Mixing, Jet Mixing, Continuous and Fed Batch
- Ineffective Mixing
Session 10: Multiphase Systems, Heat Transfer & Chemical Reactions
- Simple Suspension
- Simple Solids: Complex Solids
- Complexity Submergence
- Gas Liquid Contacting
- Interfacial Area
- Liquid Liquid Contacting
- Drop Breakage; Drop Coalescence
- Dispersion Effectiveness; Production of Uniform Drops
- Heat Transfer
- Chemical Reactors
- Pumps: Design; Selectivity; Side Reactions
- Retrofits

Third Day

8:00–12:00 noon:
Session 11: Scale-Up in Mixing
- Process Similarity; Scale Matching; Exact Identity
- Geometric Similarity; Scaling Objectives; Mixing Mechanisms
- Scale-Up in Turbulent Regime; Scale-Up in Laminar Regime
- Practicality
Session 12: Scaling Research
- General Scaling Objectives
- Process Definition; Impossible Expectations; Optimum Operation; Process Mishaps & Mistakes
- Economic Questions and Cost
- Negatives & Positives, Basic Economic Balance
- Types of Scaling Studies
- Testing Suggestions and Concerns
1:00–3:30 p.m.: Session 13: Pitfalls and Analogies
- Megas Pitfalls; Lesser Pitfalls
- Dimensionless Numbers; Correlations
- Boundary Layer Analysis
- Scale of Scrutiny for Correlations; Useful Misapplications
- Food Analogies; Heat Transfer Analogy
- Failure of Boundary Layer Analysis

Session 14: Course Summary

Assessment Opportunity

Course Location

This course will be held at the San Mateo Marriott San Francisco Airport. Participants must, however, make their own reservations; the cost of hotel accommodation is not included in the course fee. Hotel information will be included with your reservations. For reservations please call 650.653.6000.

- Easy access to downtown San Francisco Bay Area Attractions

Recommended Reading

The Course Director recommends the texts, Scale-up and Design of Industrial Mixing Processes and Process Scale-Up and Design by Gary Tatterson, as optional reading.

Course Director

Dr. Gary B. Tatterson is a recognized leader in the areas of process scale-up, mixing and process design for industry. He brings to this program fourteen years of teaching a highly successful scale-up course in the US and Europe as well as thirty-two years of research and industrial experience in fluid mechanics, mixing, multiphase processing, pilot plant and design-scale up. As a consultant, he has worked on design problems for numerous companies, including Mead Paper Co., Wilton Great Batch, Akzo Coatings America, B.J. Services, Raytheon, Teseo, E.I. du Pont. Rohm & Haas and Colgate.

Dr. Tatterson has written extensively in the area of scale-up, mixing and contacting. With over thirty-eight publications in mixing and contacting, Dr. Tatterson emphasizes a fundamental and practical approach to scale-up issues. He has written three texts:

1) FLUID MIXING AND GAS DISPERSION IN AGITATED TANKS

2) SCALE-UP AND DESIGN OF INDUSTRIAL MIXING PROCESSES

3) PROCESS SCALE-UP AND DESIGN

Currently, Dr. Tatterson is doing research and in the general area of unit operations in chemical engineering, which will cover areas such as wheel, fluid and nozzle atomization, spray-drying, agglomeration, size reduction and filtration.

Dr. Tatterson is a Professor of Chemical Engineering at the North Carolina A&T State University, where he teaches thermal sciences, plant design, solids handling, food processing, mixing and process scale-up courses. His courses follow the philosophy of fundamental and practical understanding that is basic to good processing and engineering practice.

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