



# Chemical Engineering for Non-Chemical Engineers

## TRAINING METHODOLOGY

This interactive training workshop includes the following training methodologies as a percentage of total tuition hours:-

- 50% Lectures
- 30% Workshops, Group Work & Practical Exercises
- 20% Videos & Software

## WHO SHOULD ATTEND

- Industrial Engineer
- Electrical Engineer
- Mechanical Engineer
- Civil Engineer
- Control & Instrumentation Engineer
- Plastics & Material Engineers
- Maintenance Engineers
- Food Scientists
- Environmental Engineers
- Environmental Technicians
- Chemists
- Chemical Plant Operator
- Maintenance Supervisor
- Laboratory Technician
- Shift Trades people
- Production Operations people (Supervisors, foremen, technicians, etc.)

## TO REGISTER CALL NOW!

+61 8 9535 8176

VISIT: [www.worldwidetank.com.au](http://www.worldwidetank.com.au)

EMAIL: [admin@worldwidetank.com.au](mailto:admin@worldwidetank.com.au)



## SEMINAR OBJECTIVES

Upon the successful completion of this seminar, participants will be able to:-

- Understand the fundamentals of Chemical Engineering
- Do simple specifications of pumps and heat exchangers
- Understand mass transfer phenomena including agitation scale-up
- Perform simple process calculations
- Troubleshoot process equipment and provide fixes
- Contribute to process design activities
- Understand process drawings and link them to plant operation
- Apply safety guidelines to a Process or Chemical Plant
- Understand basic chemical engineering jargon and terminology



# Chemical Engineering for Non-Chemical Engineers

## SEMINAR DESCRIPTION

### Chemical Engineering for Non-Chemical

Engineers aims to cover the fundamental concepts of chemical engineering and provide you with a solid working knowledge associated with it. If you are a non-chemical engineer this seminar will enable you to confidently talk to and work effectively with chemical engineers and process equipment. Many technical professionals today find themselves working with large-scale chemical processes even-though they do not have formal training in Chemical Engineering.

This seminar intends to fill this gap and provide you with this knowledge in the chemical engineering fundamentals and the ability to apply this knowledge to specify, design, operate, maintain and trouble-shoot chemical processes.



# Chemical Engineering for Non-Chemical Engineers

## DAY 1

0730 - 0745 Registration & Coffee

0745 - 0800 Welcome & Introduction

0800 - 0815 PRE-TEST

0815 - 0930

Introduction: The Chemical Process

0930 - 0945 Break

0945 - 1100

- Understanding a Process Flow Sheet
- Process Flow Diagrams (PFD's)
- Piping and Instrumentation Diagrams (P& ID's)
- Process Legends used in flow sheets

1100 - 1230 Stoichiometry

- Dimensions and Units
- Processes and Process Variable
- Process Data Representation and Analysis
- Basic Chemical Calculations

1230 - 1330 Break

1330 - 1630 Stoichiometry (cont'd)

- Material Balance without chemical reactions
- Material Balance with chemical reaction
- Energy Balance
- Combustion

1630 - 1700 Discussion/Questions  
End of Day One

## DAY 2

0730 – 0930 Fluid Mechanics

- Fluid statics and its applications
- Fluid-flow phenomena
- Basic equations and fluid flow
- Flow of incompressible fluids in conduits and thin layers

0930 - 0945 Break

0945 – 1230 Fluid Mechanics (cont'd)

- Flow of compressible fluids
- Flow past immersed bodies
- Transportation & Metering of fluids
- Agitation & Mixing

1230 - 1330 Lunch Break

1330- 1500 Heat transfer and its  
Applications

- Heat transfer by Conduction in solids
- Principles of heat flow in fluids
- Heat transfer to fluids without phase change

1500 - 1515 Break

1515 - 1630 Heat transfer and its Applica-  
tions (cont'd)

- Heat transfer to fluids with phase change
- Radiation heat transfer
- Heat-exchange applications
- Evaporation

1630 Discussion/Questions - End of Day Two



# Chemical Engineering for Non-Chemical Engineers

## DAY 3

### 0730 - 0930 Mass Transfer and its Applications

- Equilibrium-stage operation
- Distillation
- Leaching & Extraction
- Introduction to Multi component distillation

### 0930 - 0945 Break

### 0945 - 1230 Mass Transfer and its Applications (cont'd)

- Principles of diffusion and Mass transfer between phases
- Gas absorption
- Humidification operations
- Adsorption
- Drying of solids

### 1230 - 1330 Lunch Break

### 1330 - 1445 Chemical Engineering Thermodynamics

- Fundamental quantities
- First Law of Thermodynamics
- Volumetric properties of pure fluids
- Heat Effects
- Second law of Thermodynamics
- Thermodynamic properties of fluids

### 1445 - 1500 Break

### 1500 - 1630 Chemical Engineering Thermodynamics (cont'd)

- Thermodynamic properties of homogenous mixtures
- Phase Equilibria
- Chemical reaction equilibrium
- Thermodynamics of flow processes
- Conversion of heat into work by power cycles
- Refrigeration & Liquification
- Thermodynamic analysis of processes

1630 Discussion/Questions  
End of Day Three

## DAY 4

### 0730 - 0830 Chemical Kinetics

- Basic definitions
- Kinetics of homogenous reactions
- Interpretation of batch reactor data
- Introduction to reactor design

### 0830 - 0930 Chemical Kinetics (cont'd)

- Single ideal reactors
- Design for single reactions
- Design for multiple reactions
- Temperature and Pressure effects
- Non ideal flow
- Mixing of fluids

### 0930 - 0945 Break

### 0945 - 1100 Chemical Kinetics (cont'd)

- Introduction to design for heterogeneous reacting systems
- Fluid -Particle reactions
- Fluid -Fluid reactions
- Solid-catalyst reactions
- Reactivating catalysts

### 1100 - 1230 Process Equipment Design

- Design considerations
- Storage vessels
- Pressure vessels
- Reactors
- Heat Exchangers
- Evaporators and Crystallizers

### 1230 - 1330 Lunch Break

### 1330 - 1445 Process Equipment Design (cont'd)

- Distillation and Fractionation Equipments
- Agitators
- Filters
- Dryers
- Process Hazards and Safety measures
- Fundamentals of Computer aided design

### 1445 - 1500 Break

### 1500 - 1630 Process Equipment Design (cont'd)

1630 Discussion/Questions  
End of Day Four



# Chemical Engineering for Non-Chemical Engineers

## DAY 5

0730 - 0930

Process Control and Instrumentation

- Quantities of Measurement
- Process Instrumentation
- Temperature

0930-0945 Break

0930 - 1230

Process Control and Instrumentation (cont'd)

- Pressure
- Level
- Flow

1230 - 1330 Lunch Break

1330 - 1445 Process Economics

- Investment & Profitability
- Accounting & Cost Control

1445 - 1500 Break

1500 - 1600 Process Economics (cont'd)

- Manufacturing -Cost Estimation
- Fixed & Capital Cost Estimation

1600 – 1630 POST-TEST

1630 - 1645 Presentation of Certificates

### Dress Code:

Smart casual wear is suggested along with a sweater or jacket in case the conference room is cool.

### Payment Terms:

Payment must be made prior to the event or admittance will not be permitted. A tax invoice and confirmation letter will be emailed to the attendee upon completion of a valid registration. Payment may be made by EFT, cheque or credit card.