

5-Day Certification Training Program

UF/MF Membrane Water Treatment Design & Optimization

9-13 June 2014, Seoul, South Korea

Instructor : Dr. Graeme Pearce

Organized by



5-DAY CERTIFICATION TRAINING PROGRAM

UF/MF MEMBRANE WATER TREATMENT

DESIGN AND OPTIMIZATION

9-13 June 2014, Seoul, South Korea

The Water Treatment Academy has joined with Membrane Consultancy Associates to provide a comprehensive assessed 5-day training program in membrane filtration technology for water and wastewater treatment. This program is divided into two modules: intermediate and advanced level. The content of this program is related to design and optimization of UF/MF membrane water treatment plant. The content of this program has a standard syllabus with detailed content updated on an annual basis to ensure that the content reflects the latest developments.

The course has been designed to cater for the participants with a range of experience in membranes and water and is suitable both for those who are relatively new to the field to experienced membrane technologists.

Tests are conducted at the half way stage after completion of the Intermediate module and again at the end of the course on completion of the Advanced module to provide an assessment of the student's understanding of the module material using the following format.

TEST 1	Multiple choice section and short answer section	30 minutes (40 marks)
TEST 2	Calculation of design parameters	60 minutes (30 marks)
TEST 3	Design example from a case study	60 minutes (30 marks)

Three tests will be conducted after completion of each of the two modules. In both cases, Test 1 will assess whether the student has adsorbed the facts and basic taught information in the main lectures. Tests 2 and 3 will be based on the group exercises used in the modules, and will test understanding and the ability to apply the knowledge gained. The following certificates will be available for students based on an aggregate performance from both sets of tests:

Certificate of Attendance	– student has attended the complete course
Certificate of Competence	– student has attended the course and passed the test (≥ 50 marks)
Certificate of Award	– student has passed the exam at a grade level as follows:
A	70 marks or above
B+	65 - 69 marks
B	60 – 64 marks
C+	55 – 59 marks
C	50 – 54 marks

PROGRAM CONTENT

1. UF/MF Basics: What is UF/MF, how does the technology work?

- Definitions and terms used
- Separation mechanisms and factors influencing performance
- Membrane materials and polymer choice
- Surface characteristics and hydrophilicity
- Fouling and how to control it

2. Module Format & System Configuration

- Module design options
- Pros and cons of different format and configuration choices
- Process sequence for filtration, backwash and cleaning cycles, and for different formats

3. Membrane Filtration Process Design

- Application categories
- Process design guidelines for inside and outside feed formats
- Temperature correction
- Exercise: Flux selection from guidelines and published data

4. Introduction to System Design

- Components, layout and arrangement, and flowsheet

5. Comparative Review of UF/MF Suppliers

- Commercial products; overview with tabulated summary for international suppliers
- Focused review of market leaders, ie GE-Zenon, Pall/Asahi, Pentair-Xflow, Siemens-Memcor
- Product Specification
- Mode of Operation

6. Applications

- Membrane filtration in drinking water, wastewater reuse, SWRO pre-treatment
- Current status, drivers, indicative markets and growth
- Energy comparison with conventional and operating cost breakdown for membranes
- Legislation, regulation and approval
- Indicative performance

7. Performance and Membrane Fouling

- Critical, threshold, and sustainable flux
- Permeability and fouling trends
- Exercise: Calculating sustainable flux from pilot data
- Examples of sustainable flux calculated from case studies

8. Operational issues

- Delivery, storage, commissioning, shutdown and mothballing
- Membrane integrity testing
- Calculating Log Removal Values (LRV) from pressure decay data
- Fibre repair

9. UF/MF Properties

- Polymeric membrane fabrication by phase inversion (NIPS and TIPS), and stretching
- Morphology and modification options
- Characteristics and surface charge comparison
- Pore size distribution and performance comparison
- Fibre dimensions and potting issues

10. Membrane Filtration System Design

- Rack size selection, pipework velocity, redundancy, and tank sizing
- Exercise: System design and sizing of racks and system components
- System scope; building blocks and package systems
- Design software

11. Comparative Review of UF/MF Suppliers

- Recent developments of international suppliers and brief review of Asian suppliers
- Product Specification
- Mode of Operation

12. Ceramic Membranes

- Advantages of ceramics compared to polymeric
- Materials and manufacturing
- Properties, pros and cons of different materials, and surface characteristics
- Modules and products
- Performance examples
- Brief review of suppliers

13. Monitoring and Permeability Trends in UF/MF

- Permeability trend analysis and monitoring
- Target permeability
- Performance optimization using permeability indices

14. Case Studies

- Case studies in drinking water, wastewater reuse, and SWRO pre-treatment; performance comparison, energy analysis and cost comparison

15. Foulants, Chemicals, and Applications

- Foulant categories; removals, fouling and cleaning issues
- Dosing and cleaning chemicals; options and procedures
- Membrane System Warranty
- Operating plant experience of fibre breakage frequency
- Advanced Application Issues; bio-fouling and disinfection in SWRO pre-treatment

16. Troubleshooting

- Problem investigation and monitoring
- Failure modes and mechanisms; particle and bacterial contamination
- Pressure spikes and potting problems
- Effect of format on problems experienced
- Remedy
- Fibre repair issues

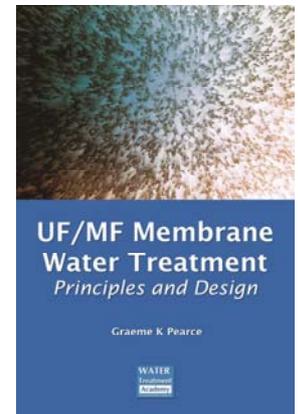
All the registered participants must bring “engineering calculator”

Book - UF/MF Membrane Treatment- Author: Dr. Graeme Pearce

This book provides a comprehensive description of the state of the art of ultrafiltration (UF) and microfiltration (MF) membrane technology in water and wastewater applications. The book will give practitioners a comprehensive understanding of all key facets of membranes and their application. The discussion of ‘Fundamentals’ will give a thorough grounding of the basis of the technology. Together with the review of ‘Commercial Membranes and Modules’, the reason for the relative diversity of this field will be explained. Readers will then be better equipped to select the most suitable option for a particular application. The book then goes on to describe issues involved in ‘System Design’, including flux selection, selecting and sizing of components, and developing the process control philosophy. The major applications of drinking water, wastewater reuse, and desalination pre-treatment will then be explored, highlighting key technical issues, energy use, and cost. Procedures for monitoring and troubleshooting will be discussed to assist operating personnel to get the best from their plant by identifying shortcomings or emerging problems, developing remedies, and improving performance. The final chapters will illustrate examples of plants through ‘Case Studies’ and describe the issues involved in ‘Project Execution’. The objective of the book is to provide a description and explanation of membrane technology in the water industry, and to improve the experience of trying to implement a scheme. The book will be essential reading for all project and process engineers, plant designers, planners, and operational personnel involved in municipal and industrial membrane projects. Also scientists and academics interested in the application of membranes in the water industry will find an insight into latest trends in commercial membrane technologies.

Author: Graeme Pearce *Year:* 2011 *Cover:* Hard Cover, ISBN: 978-616-90836-3-4 *Pages:* 387 *Book Price:* 200 US\$

This book will be given to all participants who register this certification program.



Instructor – Dr. Graeme Pearce, Membrane Consultancy Associates, UK



Dr Graeme K Pearce is a membrane technology specialist with 30 years experience in the membrane industry. A graduate of Oxford University in chemistry and chemical engineering, Dr Pearce's introduction to membrane technology started in BP in 1980. In 1991, he was Technical Director of the start up Kalsep, a buy-out from BP. The company was a key participant in the development of the UK membrane filtration market for drinking water. Dr Pearce joined Hydranautics in 2000, where he was responsible for the development and marketing of the ultrafiltration (UF) and microfiltration (MF) technology. In 2005, Dr.Pearce left Hydranautics to form an independent consultancy, Membrane Consultancy Associates (MCA), working with a broad spectrum of users and providers of membrane technology, to improve the knowledge base and application of membranes in water, wastewater, and process industries. Dr Pearce has authored numerous papers and articles on membranes. He has recently written "UF/MF Membrane Water Treatment" a companion guide to this Workshop, and has provided the membrane filtration contribution to two books, namely 'The Guidebook to Membrane Desalination Technology' and 'The Guidebook to Membrane Technology for Wastewater Reclamation'.

WATER TREATMENT ACADEMY



Water Treatment Academy is a division at TechnoBiz Communications Co., Ltd., based in Bangkok, Thailand. This academy is an educational and knowledge-based platform for water and wastewater treatment designers and operators. It organizes technical training programs and conferences on water and wastewater treatment. It publishes technical reference books on water and wastewater treatment. For more information on programs and activities of this academy, kindly visit website www.watertreatment-academy.org.

VENUE IN SEOUL

This program will be organized in the hotel. Registered delegates will be informed about hotel venue after registration confirmation.

Language: ENGLISH

Program Schedule: 9am to 5pm

**Registration Form – UF/MF Membrane Water Treatment
9-13 June 2014, Seoul, South Korea**

Company Name

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.....

Tel..... Fax.....

Email Cell No.....

Contact Person Position

PARTICIPANT NAMES

Participant Name 1 Position

Email..... Cell No

Participant Name 2 Position

Email..... Cell No

Participant Name 3 Position

Email..... Cell No

Participant Name 4 Position

Email..... Cell No

REGISTRATION FEE: 3,200 US\$/Person

- *This fee covers training documentation including reference book, lunch and refreshments.*
- Payment is required with registration fee.

EARLY BIRD REGISTRATION DISCOUNT:

- Register before 28 February 2014: 20% Discount
- Register before 30 March 2014: 15% Discount
- Register before 30 April 2014: 10% Discount
- Register before 15 May 2014: 5% Discount

GROUP REGISTRTION DISCOUNT

- If 3 or more than 3 participants join from the same organization, 10% discount on total registration fee
- If 5 or more than 5 participants join from the same organization, 15% discount on total registration fee

PAYMENT METHOD

Bank Transfer to *Bank Name : Bangkok Bank, A/C No: 177-0-70727-9, A/C Name : **TechnoBiz Communications Co., Ltd.**
Branch: Ratchada-Latprao Road branch, Bangkok (Swift Code: BKKBTHBK) (Kindly make payment for all bank charges)*

Credit Card Visa Master American Express *(5% bank fee applies for credit card processing)*

Card NumberCardholder Name

Card Expiry Date CVV Code.....Signature of Cardholder

PLEASE SEND COMPLETELY FILLED REGISTRATION FORM TO



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