4 Day Intensive and Interactive Master Course

REVERSE OSMOSIS & ULTRAFILTRATION
Pre-treatment, Membrane Fouling and Scaling

Prof. Jan C. Schippers, PhD, MSc
August 20 – 23, 2018, Rome, Italy

Jan Schippers, Professor Em. in Water Supply Technology at IHE Institute for Water Education, UNESCO in Delft and consultant will give this interactive course. He has extensive professional experience in drinking and industrial water supply projects in Morocco, Qatar, United Emirates, Gabon, Cab Verde, Namibia, Uzbekistan, France and The Netherlands.

His specializations are: Consultancy, research, training and education in the field of integral drinking and industrial water treatment and desalination/membrane related technologies.

Gave courses on Membrane Technology, Fouling, scaling and pre-treatment in membrane technology, Aquatic Chemistry, Conventional filtration Techniques and Membrane Bio Reactors in Cyprus, Morocco, China, Jordan, Yemen, Bahrain, Iran, Oman, Saudi Arabia, Chile, Italy and The Netherlands.
Rome is the capital of the Italian Republic. It is the most populous and largest municipality in Italy and is among Europe’s major capitals in terms of the amount of terrain it covers. It is the city with the highest concentration of historical and architectural riches in the world. Its historical centre, outlined by the enclosing Aurelian Walls, layering nearly three thousand years of antiquity, is an invaluable testimony to the European western world’s cultural, artistic and historical legacy and in 1980 it was, together with the Holy See’s property beyond the confines of the Vatican State as well as the Basilica of St. Paul outside the Walls, were added to UNESCO’s World Heritage List.

Over 16% of the world’s cultural treasures are located in Rome (70% in all of Italy)

Advance program

Monday, 20 August 2018

08.30 – 09.00  Registration and Workbook
09.00 – 10.45  1. Introduction membrane technology
               2. Advanced pre-treatment for Reverse osmosis
                  Basic principles micro- and ultrafiltration
10.45 – 11.00  Coffee break
11.00 – 12.30  3. Overview MF/UF elements and systems
12.30 – 13.30  Lunch
13.30 – 15.00  4. Fouling MF/UF fouling control in Ultra – microfiltration and pre-treatment
               5. Basic principles reverse osmosis and nanofiltration
15.00 – 15.15  Coffee Break
15.15 – 17.00  5. Basic principles reverse osmosis and nanofiltration
               6. Overview RO and NF membranes and elements
Tuesday, 21 August, 2018

09.00 – 11.00  7.  Basic principles of process design RO systems with spiral wound elements

11.00 – 11.15  Coffee break

11.15 – 12.30  8.  Normalizing data in RO/NF systems to monitoring fouling reverse osmosis membranes, temperature, pressure, osmotic pressure Trouble shooting

12.30 – 13.30  Lunch

13.30 – 15.00  9.  Fouling in RO/NF systems. Contaminants:
10. Conventional pre-treatment techniques for RO/NF
   Intakes; wells, screens, strainers, chlorination, sand filtration, coagulation, sedimentation and dissolved air flotation (DAF).

15.00 – 15.15  Coffee break

15.15 – 17.00  10. Conventional pre-treatment techniques for RO/NF (continued)
11. Fouling due to particulate matter; monitoring, SDI and MFI

Wednesday, 22 August, 2018

9.00 – 11.00  11. Fouling due to particulate matter. SDI and MFI
12. MFI-UF; prediction fouling rate in Reverse Osmosis

11.00 – 11.15  Coffee break

11.15 – 12.30  13. Fouling in Ultrafiltration and Reverse Osmosis due to algae and Transparent Exo-Polymers (TEP)
14. Fouling of RO membranes due to coagulants

12.30 – 13.30  Lunch

13.30 – 15.00  15. Removal particulate colloidal and suspended matter in practice Comparing Advanced (Ultrafiltration), Conventional (Sand filtration) and combinations of pre-treatment processes for surface water treatment e.g. DAF & UF.
16. Removal of iron and manganese from ground water

15.00 – 15.15  Coffee break

15.15 – 17.00  16. Removal of iron and manganese from ground water (continued)
17. Biofouling in Reverse Osmosis systems; Principles and contaminations causing biofouling, prediction rate of fouling and pre-treatment in full scale. plants.
Thursday, 23 August, 2018

9.00 – 11.00  17. Biofouling; in Reverse Osmosis systems (continued); Comparing Advanced (ultrafiltration) and Conventional (sand filtration) Pre-treatment and combinations for surface water and waste water treatment.

18. Organic fouling: Transparent Exo Polymers, oil compounds, coagulant aids

11.00 – 11.15  Coffee break


20. Principles of scaling in RO systems; Homogeneous and heterogeneous nucleation, calcium carbonate, sulfate, silica

12.30 – 13.30  Lunch


22. Calcium carbonate: Langelier and Stiff & Davis Index

23. Demonstration; scaling predictions with Computer Program

15.00 – 15.15  Coffee break

15.15 – 16.45  24. Scaling in seawater reverse osmosis

25. Scaling Control, monitoring and anti-scalants

26. Trouble shooting in Reverse Osmosis systems and cleaning RO membranes

16.45 – 17.00  Closing and Certificates
REGISTRATION FORM

Surname ___________________________________________ Name _______________________________________

Affiliation _________________________________________________________________________________

Address ____________________________________________________________________________________

___________________________________________________________________________________________

Country __________________________________________ Telephone _________________________________________________________________________________

Fax ________________________________________________________________________________________ Email ______________________________________________

Registration fee:

☐ EDS members €2,500

☐ Non-members €2,700

The fee includes 4 nights accommodation, lunches, coffee, dinners and course workbook.

Payment can be made by:

Credit card ☐ Visa ☐ Mastercard

Bank Transfer to be sent to the address below and a copy emailed to us. Card No. ________________________________

Please take care of your own bank charges Exp. date ______ Security code _______

Account name: European Desalination Society

Account No. 11863.19

Banca Monte dei Paschi di Siena

67100 L’Aquila, Italy

ABI: 01030 CAB: 03600

Swift code: PASCITMAQU

IBAN code: IT 92 I 01030 03600 000001186319

Please fill in the form and send as an attachment to:

balabannmiriam@gmail.com or fax to: +1 928 543 3066