



SINGAPORE WATER MANAGEMENT SERIES ON WATER QUALITY

About the Singapore Water Story

As a small island that does not have natural aquifers and lakes and with little land to collect rainwater, Singapore needs to maximise whatever it can harvest.

Driven by a vision of adequacy, reliability and sustainability in water, Singapore has been investing in research and technology. Today, the nation has built a robust, diversified and sustainable water supply from four different sources known as the Four National Taps (water from local catchment areas, imported water, reclaimed water known as NEWater and desalinated water).

By integrating the system and maximising the efficiency of each of the four taps, Singapore has ensured a stable and sustainable water supply capable of supporting the country's continued growth.

About the Singapore Water Academy

The Singapore Water Academy is a practitioner-focused learning institute in urban water management. Established by PUB, Singapore's National Water Agency, the Academy enhances capability development for water professionals both locally and internationally.



Singapore Water Management Series On Water Quality

14 – 18 January 2019

The five-day Water Quality Course, part of the Singapore Water Academy's flagship programme- The Singapore Water Management Series, aims to offer practitioner based technical training to arm participants with the depth and breadth of knowledge in the topic of Water Quality Management. It features trainers who are world leaders in the field of water quality, as well as senior PUB officers with in-depth planning and operational experience.

Highlights of the course:

Singapore's Approach to Sustainable Water Supply

- Singapore's Water Masterplan
- Closing the water loop with four national taps
- Developing reservoir sources
- Land use policies and planning: the Marina Reservoir Story
- Going beyond conventional source

Integrated Water Quality Management in Singapore

- A holistic approach to land use planning and regulations
- Multi-barrier concept
- Water Safety Plans from source to tap
- Sampling and Monitoring
- Water Response Plan
- Surveillance and Audit

Advances in Water Treatment Technologies and Drinking Water Quality Control

- State of the Technology in water treatment – conventional and nonconventional processes
- Treatment of raw water with high natural organic content and strategies for control of disinfection by-products
- Applications of membranes in water treatment with case studies
- Advanced oxidation processes - applications and cost comparison
- Planning, operation and monitoring strategies in managing water quality in the distribution system

Nexus of Water-related Microbiology, Water Quality and Public Health

- Overview of microbial hazards
- Occurrence and removal of pathogens in drinking water supply
- Enumeration techniques for various pathogens - protozoa, bacteria and viruses
- Managing algal blooms in water bodies for drinking water applications
- Occurrence and treatment of cyanotoxins and other algal metabolites of aesthetic concern in raw water

The course provides participants with an overview of PUB's integrated management of water supply in Singapore. International experts will share on the existing and emerging microbial and chemical contaminants in water, as well as ways of how these contaminants can be removed via treatment technologies and managed in supply networks. The course also covers on the drinking water quality guidelines from World Health Organisation (WHO), and how various countries have adopted policies and technical solutions to meet these standards.

Managing Micro-pollutants, Disinfection by-products and Emerging Contaminants of Health Concern

- Overview of micro-pollutants and disinfection by-products – occurrence and health significance
- Emerging contaminants of health concern in drinking water
- Analytical methods for detection of micro-pollutants and emerging contaminants
- Recent developments in controlling disinfection by-products and removal of micro-pollutants and emerging contaminants

Drinking Water Quality Guidelines

- Water Quality parameters for drinking water
- Key considerations and principles
- Water quality regulatory frameworks and health-based targets

Application and Management of Drinking Water Standards

- Development of Drinking Water Standards
- Comparisons and applications of various drinking water standards and frameworks
- Policy Formulation and Regulatory Frameworks



Renowned speakers in the Water Quality course



Prof Joan Rose

Homer Nowlin Chair in Water Research, Michigan State University, USA; Stockholm Water Prize Winner 2016

Prof Joan Rose is a leading world authority on water microbiology and holds the Homer Nowlin Chair in Water Research at Michigan State University. She was awarded the 2016 Stockholm Water Prize for her contributions to global public health in assessing risks to human health in water and creating guidelines and tools for decision-makers and communities.



Mr Chan Yoon Kum

Senior Consultant and former Deputy Chief Executive, PUB, Singapore's National Water Agency

Mr Chan Yoon Kum former Deputy Chief Executive, was appointed the Senior Consultant of PUB after his retirement. He assists the Chief Executive on Board policies, management and operations in his advisory capacity. Mr Chan has extensive experience from his 40 years in PUB covering water supply management from policies, engineering to operations and maintenance of the entire water supply chain.



Dr David Cunliffe

Principal Water Quality Advisor, Department of Health, South Australia

Dr David Cunliffe is the principal water quality specialist with the South Australian Department of Health. He has over 30 years of experience in dealing with public health aspects of water supply including regulation of drinking water and recycled water systems, management of recreational waters and investigation of water quality incidents and water-borne disease. Dr Cunliffe led the development of the South Australian Safe Drinking Water Act. He has contributed to Australian and WHO guidelines for drinking water quality, wastewater reuse and recreational water quality.



Dr Lim Mong Hoo

Director (Water Quality), PUB, Singapore's National Water Agency

Dr Lim Mong Hoo is the Director for the Water Quality Department (WQD) in PUB, Singapore's national water agency, which plays an important role in setting and monitoring internal operating standards for water quality in PUB. Dr Lim is a certified Professional Engineer with more than 30 years of experience in water supply engineering which includes water treatment, water distribution, water conservation, water quality evaluation, water distribution and plumbing design, regulatory framework and enforcement. His expertise also extends to the planning, development and commissioning of water treatment plants, with applied research in water treatment processes, water quality assessment and water quality monitoring systems.



Prof Ong Choon Nam

Director, NUS Environmental Research Institute, National University of Singapore

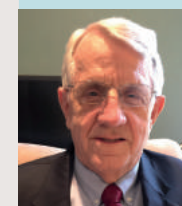
Prof Ong Choon Nam, throughout the course of his career, has made significant contributions to Environmental Health Sciences and Toxicology. He has published more than 300 peer-reviewed academic articles with over 18,000 citations. He has been a consultant to the World Health Organisation (WHO) since 1998 and contributed to 12 of its health criteria publications. He has also been a member of WHO's expert panel for guidelines on drinking water quality since 2003.



Prof Shane Snyder

Executive Director, Nanyang Environment & Water Research Institute (NEWRI), Nanyang Technological University (NTU)

Prof Shane Snyder is a Professor of Chemical & Environmental Engineering and is the Executive Director of the Nanyang Environment & Water Research Institute (NEWRI) at Nanyang Technological University (NTU) in Singapore. He joined NTU after serving as a Professor of Chemical & Environmental Engineering and the co-Director of the Water & Energy Sustainable Technology (WEST) Center at the University of Arizona, USA. He is a Fellow of the International Water Association and a member of the World Health Organization's Drinking Water Advisory Panel.



Prof Vernon Snoeyink

Professor Emeritus of Environmental Engineering, University of Illinois at Urbana-Champaign, USA

Prof Vernon L. Snoeyink holds a B.S. in civil engineering (1964), M.S. in sanitary engineering (1966), and Ph.D. in water resources engineering (1968), all from the University of Michigan. He was on the faculty of the department of Civil and Environmental Engineering at the University of Illinois from 1969 until 2005, when he retired. Prof Snoeyink is a member of the National Academy of Engineering, the American Water Works Association, the Association of Environmental Engineering and Science Professors, and the International Water Association. He served as President of the Association of Engineering and Science Professors and currently is on the Editorial Advisory Board of AQUA.

Who will benefit

If you are an Engineer or Scientist with at least 5 years experience working in the field of water quality and treatment, join us in this 5-day course on Water Quality management.

Course Fee: \$2990 (excluding tax)

Register your interest today

For enquiries and course registration, please contact:

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