



# ABC Waters Professional Programme

## INTRODUCTION TO MODULES

### **CORE MODULE CU 1: Understanding ABC Waters Design Guidelines and Certification**

Duration: 8 hours including lectures, case studies, MCQ Assessment & Site Visit

#### Competency Areas

- 1) ABC Waters Professional Programme - Overall Course Roadmap
- 2) ABC Waters Design Guidelines
  - Catchment, treatment, collection & storage elements
  - Treatment elements – ABC Waters design features
  - Public health, safety and maintenance considerations
- 3) ABC Waters Certification Scheme & Submission requirements for developments
- 4) Mainstreaming ABC Waters design - Masterplanning in the context of ABC Waters design
  - Design Considerations
  - Infrastructure Planning
  - Developing a blue-green masterplan
- 5) Integrating ABC Waters Design in Project Planning & Integration of Waterbody Design in Masterplan and Architectural Concept
- 6) Design principles from a Landscape Architect perspective

### **CORE MODULE CU 2: Stormwater Management - Hydrology, Hydraulics and Water Quality in ABC Waters Design**

Duration: 8 hours including lectures, case studies & MCQ Assessment

#### Competency Areas

- 1) Stormwater Quality & Management Strategies
- 2) Introduction to the Hydrological cycle and impact of urbanization on runoff
  - a. Impact of watershed characteristics on runoff generation ( $T_c$ ,  $C$  etc)
  - b. How ABCWDFs fits into this cycle
  - c. Rainfall (IDF curves etc.)
  - d. Runoff (Rational Method)
- 3) Hydraulics
  - a. Manning's roughness
  - b. Hydraulic capacity and flow velocity
  - c. Hands-On Exercise
  - d. SWMM & MIKE Modelling

### **CORE MODULE CU 3: Design, Construction and Maintenance of Swales and Buffer Strips**

Duration: 8 hours including lectures, case studies & MCQ Assessment

#### Competency Areas

- 1) Overview of Swales & Landscape Design
- 2) Engineering Design of Swale
- 3) Practical Swale Design
- 4) Construction management, construction sequence and important considerations
- 5) Operations and maintenance of swales & Case Study on Swales and Buffer Strips

### **CORE MODULE CU 4: Design, Construction and Maintenance of Bioretention Basins and Bioretention Swales**

Duration: 12 hours including lectures, case studies & MCQ Assessment

#### Competency Areas

- 1) Overview of Bioretention Systems & Application and types
- 2) Engineering design of bioretention basin & bioretention swales
- 3) Hands On Practice on bioretention basin and swale calculation
- 4) Landscape Design of Bioretention systems
- 5) Construction of bioretention basin
- 6) Maintenance of bioretention systems
- 7) Construction of bioretention basin II - Erosion Control Measures
- 8) Soil Specifications for Bioretention Systems



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## INTRODUCTION TO MODULES

### **ELECTIVE MODULE EU 1: Design, Construction and Maintenance of Sedimentation Basins**

Duration: 8 hours including lectures, case studies & MCQ Assessment

#### Competency Areas

- 1) Introduction to theory of Sedimentation Basin
- 2) Brief Recap of hydrology hydraulics  
Engineering Design of a Sedimentation Basin
  - a. Sizing considerations
  - b. Flow considerations
- 3) Introduction to types, design and other practical aspects of sedimentation basins
- 4) Construction and maintenance requirements

### **ELECTIVE MODULE EU2: Design, Construction and Maintenance of Constructed Wetlands – Horizontal Flow and Floating Wetlands**

Duration: 8 hours including lectures, case studies, MCQ Assessment & Site Visit

#### Competency Areas

- 1) Overview and introduction to constructed wetlands
- 2) Ecological design of stormwater treatment wetlands in Singapore
- 3) Wetland monitoring and management: water quality, biodiversity, plant growth
- 4) Engineering design of constructed wetlands
- 5) Wetland design and considerations / Construction process and considerations
- 6) Plant selection, Operation and maintenance

### **ELECTIVE MODULE EU3: Design, Construction and Maintenance of Cleansing Biotopes**

Duration: 8 hours including lectures, case studies, MCQ Assessment & Site Visit

#### Competency Areas

- 1) Overview of cleansing biotopes & Engineering Design Process
- 2) Construction techniques including liner installation, pipe laying and filter media preparation and filling techniques
- 3) Selection of construction materials for lining, water distribution and drainage systems, filter and plant materials
- 4) Plant selection for Biotopes: Plant adaptation and planting techniques, and maintenance

### **ELECTIVE MODULE EU 4: Slope Design and Bioengineering**

Duration: 8 hours including lectures, case studies & MCQ Assessment

#### Competency Areas

- 1) Slope stability principles
- 2) Channel design considerations
- 3) Applications: Bioengineering techniques
- 4) Construction
- 5) Maintenance

### **ELECTIVE MODULE EU 5: Managing Peak Runoff**

Duration: 8 hours including lectures, case studies & MCQ Assessment

#### Competency Areas

- 1) Structural detention systems – pumped v.s. gravity
- 2) Introduction to COP, Submission requirements & common mistakes
- 3) Operation and maintenance requirements of detention systems
- 4) Introduction to ABCWDFs as detention and examples
- 5) Submission Requirements