



Sana'a University

**Water and**  
*Environment Centre*

# Lab Experiments, Tests and Its Application in WaSH

## Short Course Information Sheet

### Objective:

Apply and practice the lab experiments and tests in WASH. Raise the capacity building of IWRM students and other water sector trainees and researchers on the role of WEC Lab in the field of analysis in water and environment.

### Duration Time:

20 hours over five days (4hr/day)

### Targeted Audiences:

IWRM students; NWRA engineers, Civil engineers, Agriculture Engineers, Science students; water sectors engineers and researchers as well as the community.

### Expected Outputs:

Attendees of the short course will be able to:

- 1- Get to know the WEC lab capacity and capability in the water sector;
- 2- Apply and practice the different tests and experiments of water and environment in the IWRM program and in the applied research;
- 3- Recognize the WEC lab in the water sector and among the community;
- 4- Conduct experiments and tests to raise their capacities and getting to know the available and the importance of the lab in the field of WASH.

### Contents:

1-Water/ wastewater sampling and geographical location

- 1.1. Sampling Water and wastewater using Automatic Duckbill Sampler
- 1.2. Locating the geographical location of water and wastewater facilities Using GPS
- 1.3. Applying Automatic Sludge Blanket Level Detector in the lab and field

2-Physical experiments and analysis

- 2.1. Pressure test of Plastic Pipe using "plastic pipe Pressure Testing Equipment"
- 2.2. Conducting Leakage detection measurements in water pipe network using the "leakage detection equipment"
- 2.3. Flow measurement in pipes (up to 8 inch pipes) using Electromagnetic or acoustic flow meter
- 2.4. Flow measurements in open stream
- 2.5. Turbidity measurement of the stream and ponds in the field using secchi disk

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- 2.6. Suspended Solids analysis test using bughner system (including suction pump, funnel, filter papers)
- 2.7. Total and volatile solids analysis using Ashing Furnace equipment
- 2.8. Groundwater level /salinity measurements –shallow (50m) and deep (up to 500m) using “Depth sounder meter integrated with salinity”
- 2.9. Measurement of soil moisture, soil temperature, water temperature

### 3-Chemical experiments and analysis

- 3.1. Producing chlorine using WATA PLUS
- 3.2. Applying chlorine for disinfection of water
- 3.3. Producing distilled water using “Distillatory”
- 3.4. Chemical parameters analysis in water and wastewater using "Portable Spectrophotometer
- 3.5. Na and K analysis in water and wastewater using "Flame photometer"
- 3.6. Fluoride analysis in water using "Fluoride probe"
- 3.7. Salinity, pH and temperature measurements in water and wastewater using "Handheld field equipment for salinity, pH and temperature"
- 3.8. Residual Chlorine measurements in water and wastewater using "Chlorine test kit"
- 3.9. DO measurement in water and wastewater using "DO with optical electrode"
- 3.10. Measurement of Kj-N in wastewater using "micro Kj-N field kit"
- 3.11. Measurement of Oil and grease in water and wastewater
- 3.12. Measuring of Air pollutants using "Air quality pollutants equipment”
- 3.13. Analysis of iron in water using "Iron Low Range - Water Testing Kits"
- 3.14. Analysis of hardness in water using "Test Kit Hardness"
- 3.15. Analysis of hydrogen sulfide in groundwater and wastewater using "H2S Test Kit"

### 4-Biological experiments and analysis:

- 4.1. Measuring BOD in wastewater using "BOD field kit "
- 4.2. Measuring COD in wastewater using "COD field kit"

### 5-Microbiological experiments and analysis:

- 5.1. Analysis of Fecal Coliform in water and wastewater using "Fecal Coliform Field Kits"
- 5.2. Analysis of Vibrio cholera in water and wastewater using "field kit"
- 5.3. Analysis of Algae growth and concentration in water and wastewater

### 6-Treatment process:

- 6.1. Conducting Jar test for coagulation and flocculation of surface water treatment using " Jar Testing Equipment"
- 6.2. Applying sedimentation experiment of surface and wastewater using "Model sedimentation tank"
- 6.3. Settling and SVI index
- 6.4. Applying digestion experiment in wastewater using "Anaerobic digester"
- 6.5. Applying ion exchange for water treatment using "Ion exchange unit"
- 6.6. Applying aeration in distilled water using "Aeration unit"



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- 6.7. Conducting Batch reactor /Continuous stirred tank reactor experiments using " Batch reactor /Continuous stirred tank reactor"
- 6.8. Conducting Tubular reactor experiment using "tubular reactor (plug flow)"
- 6.9. Applying Activated carbon for odor control experiment
- 6.10. Applying Reverse Osmosis (RO) for water treatment using "RO lab scale unit"
- 6.11. Fluoride removal from drinking water
- 6.12. Applying Silver filter in water treatment using "silver filter"
- 6.13. Applying Ceramic filter in drinking water treatment using "ceramic filter"
- 6.14. Applying Sand filter for surface and groundwater treatment using "Sand filter"

7-Water use technology:

- 7.1. Design and applying greywater treatment using "Greywater model"
- 7.2. Design and applying stormwater treatment using "Stormwater model"

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