



Hong Kong Institute of Qualified Environmental Professionals Limited (HKIQEP)  
香港合資格環保專業人員學會有限公司 (香港環專會)

# HKIQEP

**Hong Kong Institute of Qualified Environmental Professionals Limited**

## **Qualification Examination Syllabus 2017**

The HKIQEP Qualification Examination is a 3-hour examination consisting of 100 multiple-choice questions (MC) in 6 areas: (I.) Air, (II.) Environmental Impact Assessment and Health Impact Assessment (EIA&HA), (III.) Environmental Science, Management & Policy (ESMP), (IV.) Noise, (V.) Waste, and (VI.) Water.

**To pass the Examination, candidates must achieve passing scores in each of the six areas (Air, EIA &HA, ESMP, Noise, Waste, and Water) as well as obtain an overall pass.**

After passing the Examination, candidates can apply to the HKIQEP Professional Membership and Professional Assessment will be arranged to the eligible candidates. Candidates who have passed both the Examination and Professional Assessment will be elected as the Professional Members by the HKIQEP Executive Committee.

The following is the syllabus for the Examination, along with recommended readings. These will be reviewed and amended from time to time. The candidates are advised to check that they have the latest version prior to taking the Examination.

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# I. AIR

## I. Air

### 1. Nature of Atmospheric Pollution

- 1.1 Physical structure and composition of the troposphere and stratosphere
  - 1.1.1 Temperature, pressure, density, spatial and temporal relationship
  - 1.1.2 Radiation
- 1.2 Natural composition of the atmosphere (gases, particulates, aerosols, moisture)
  - 1.2.1 Typical concentrations of common species in the natural background
  - 1.2.2 Typical concentrations of common pollutants in polluted environments
- 1.3 Air pollutants
  - 1.3.1 Definitions & characteristics (physical & chemical)
  - 1.3.2 Particulates
  - 1.3.3 Gaseous pollutants
  - 1.3.4 Toxic air pollutants
  - 1.3.5 Threshold and non-threshold pollutants
  - 1.3.6 Radionuclides
  - 1.3.7 Biological contaminants
  - 1.3.8 Odour
- 1.4 Physical and chemical pollutant processes
  - 1.4.1 Transport, dispersion, dilution, transformation, scavenging and atmospheric lifetimes
  - 1.4.2 Meteorological effects: influence of solar radiation and wind fields, lapse rate and stability conditions
  - 1.4.3 Spatial and temporal variation of air pollutant concentrations
- 1.5 Local, regional and global air pollution
  - 1.5.1 Photochemical air pollution
  - 1.5.2 Acid rain
  - 1.5.3 Long range transportation
  - 1.5.4 Global scale pollutants  
(greenhouse gases and climate change; stratospheric ozone depletion and ozone depleting substances; persistent organic pollutants)
- 1.6 Indoor air pollution

# I. AIR

## 2. Air Pollution Sources and Impacts

- 2.1 Anthropogenic sources of air pollution
  - 2.1.1 Stationary
  - 2.1.2 Mobile
  - 2.1.3 Fugitive and non-fugitive
- 2.2 Natural sources of air pollution
  - 2.2.1 Volcanoes, wild fires, earthquakes, etc.
- 2.3 Receptors (human, animal, plant, materials, atmospheric processes)
- 2.4 Source/Receptor relationships (spatial & temporal)
- 2.5 Adverse effects
  - 2.5.1 Health effects (mortality, morbidity, respiratory illness, sub-clinical effects)
  - 2.5.2 Ecological impacts, vegetation and forest deterioration
  - 2.5.3 Materials corrosion
  - 2.5.4 Lake acidification
  - 2.5.5 Others
- 2.6 Health impact assessments, economic impact assessments, air toxics and risk assessments  
(*e.g., cancer burden, acute, chronic*)

## 3. Air Pollution Modelling

- 3.1 Purposes of for air quality modelling (Environmental Impact Analysis, plant siting, emergency response planning, accidental release, public relations, economic impacts)
- 3.2 Levels of modelling effort (screening, planning, compliance)
- 3.3 Types of air pollution models
  - 3.3.1 Box, Gaussian Dispersion
  - 3.3.2 Photochemical
  - 3.3.3 Physical, CPD models
  - 3.3.4 Receptor models
- 3.4 Emission inventory and emission modelling
- 3.5 Model limitations, assumptions, accuracy
- 3.6 Source / Receptor relationships
- 3.7 Air quality forecasting

# I. AIR

## 4. Air Quality Management Strategies

- 4.1 Air pollution prevention versus control
- 4.2 Best practicable means / best available control technology, technology forcing approach
- 4.3 Air quality standards approach and criteria pollutants
- 4.4 Market-based mechanism, emission trading, emission offsetting
- 4.5 Cost-benefit approach
- 4.6 Socio-economic and political issues, polluter pays principle
- 4.7 Regulatory and non-regulatory approaches
- 4.8 Air quality and emission limits, air pollutant nuisance, prevention of significant deterioration
- 4.9 Dissemination of air quality information; air quality index/air quality health index
- 4.10 Education and public awareness of air pollution

## 5. Air Pollution Control Technology

- 5.1 Control of emissions from stationary sources
- 5.2 Control of gaseous pollutants
  - 5.2.1 Absorption, adsorption, condensation, incineration
- 5.3 Control of particulate pollutants
  - 5.3.1 Cyclone and inertial separators, wet scrubbers, electrostatic precipitators and baghouses
- 5.4 Combustion control, fuel restriction and control, material restriction and control
- 5.5 Control of emissions from mobile sources, including vehicles, automotive, vessels, aircrafts
- 5.6 Management and disposal of waste streams (multimedia)
- 5.7 Emission factors and estimates
- 5.8 Compliance planning; limits, standards, technology, and documentation

## 6. Ambient Air and Emission Sampling and Analysis

- 6.1 Ambient air quality monitoring
  - 6.1.1 Site selection required for effective and representative sampling
  - 6.1.2 Air quality monitoring system
  - 6.1.3 Air quality monitoring methods: reference and equivalent methods
- 6.2 Meteorological monitoring
- 6.3 Emission Sampling
  - 6.3.1 Site selection required for effective and representative sampling

# I. AIR

- 6.3.2 Isokinetic sampling; constant rate and exhaust gas recycling sampling
- 6.3.3 Effects of particle size on sampling accuracy
- 6.3.4 Condensable particulate matter
- 6.3.5 Continuous emission monitoring (CEMs)
- 6.4 Optical remote sensing
- 6.5 Instrumentation, data acquisition systems, data reporting
- 6.6 Quality control and assurance
- 6.7 Real-time monitoring versus intermittent discrete sampling/analysis
- 6.8 Health and safety precautions

## II. ENVIRONMENTAL SCIENCE, MANAGEMENT AND POLICY

### II. Environmental Science, Management and Policy

#### 1. Environmental Science Fundamentals

- 1.1 Types of pollution
- 1.2 Sources and types of environmental contaminants
- 1.3 Fate and transport of pollutants in the environment (air, water, land)
- 1.4 Ecology, health and ecological effects of pollutants
- 1.5 Data collection, analysis and interpretation
  - 1.5.1 Numerical calculations
  - 1.5.2 Statistics
  - 1.5.3 Modeling and uncertainty analysis
- 1.6 Pollution control technologies (physical, chemical, and biological processes and their applications)
- 1.7 Characterization of contaminated sites
- 1.8 Remediation and restoration technologies

#### 2. Global and Multi-Media Environmental Issues

- 2.1 Atmospheric ozone depletion
- 2.2 Global climate change
- 2.3 Indoor air quality
- 2.4 Nutrient enrichment of waters
- 2.5 Habitat degradation/destruction, biodiversity, endangered species
- 2.6 Bioaccumulative substances
- 2.7 Unconventional pollutants (*e.g., endocrine disruptors, pharmaceuticals*)

#### 3. Environmental Impact, Site Assessment and Risk Assessment Processes

- 3.1 Environmental impact assessment processes
- 3.2 Site assessment process
- 3.3 Risk assessment process

#### 4. Environmental Management Systems

- 4.1 Organizational environmental policy
- 4.2 Identification of environmental aspects

## II. ENVIRONMENTAL SCIENCE, MANAGEMENT AND POLICY

- 4.3 Establishing goals and objectives
- 4.4 Environmental performance indicators (*e.g., metrics*)
- 4.5 Reporting environmental performance
- 4.6 Operational controls (*e.g., processes, procedures*)
- 4.7 Emergency response planning and implementation
- 4.8 Incident investigation and corrective/preventive action
- 4.9 Environment and health
- 4.10 Environmental auditing and corrective action
- 4.11 Environmental due diligence related acquisitions and divestitures
- 4.12 Total quality environmental management
- 4.13 Financial aspects of environmental management (*e.g., environmental cost accounting, cost-benefit analysis*)

### 5. Pollution Prevention, Design for Environment, and Sustainability

- 5.1 Elements of pollution prevention (*e.g., source control, recycle/reuse, green chemistry, green procurement*)
- 5.2 Life-cycle assessment
- 5.3 Industrial ecology
- 5.4 Elements of sustainable development
- 5.5 Land use and watershed issues
- 5.6 Product and environmental stewardship

### 6. Development and Implementation of Environmental Public Policy

- 6.1 Role of the public and other stakeholders in policy development
- 6.2 Geopolitical considerations (local, regional, provincial, international)
- 6.3 Role of science in public policy formulation
- 6.4 Command-and-control regulatory framework & mechanisms
- 6.5 Market-based regulatory framework & mechanisms

### 7. International Environmental Conventions

Note: In addition to the above, the Examination (ESMP) may include questions addressing professional ethics.



### III. ENVIRONMENTAL IMPACT ASSESSMENT (EIA) and Health Impact Assessment (HA)

### III. Environmental Impact Assessment (EIA) and Health Impact Assessment (HA)

#### 1. EIA Legal System

- 1.1 Definition of Designated Project
- 1.2 Preparation Procedures – Project Profile, EIA Study Brief (EIA SB), Environmental Permit (EP), Variation of Environmental Permit (VEP), Apply Directly for an Environmental Permit (DIR)
- 1.3 EIA Ordinance Statutory Time limits
- 1.4 Function of the Environmental Study Management Group
- 1.5 Definition of Material change
- 1.6 Vetting authorities
- 1.7 Offences, penalties & appeal, Judicial Review process

#### 2. Alternative and Options Evaluation

- 3.1 Factors for consideration in project planning throughout project life cycle
- 3.2 Evaluation criteria for options development
- 3.3 Environmental Benefits of Projects
- 3.4 Scenario with and without the project
- 3.5 Evaluation of the seriousness of residual environmental impacts

#### 3. Evaluation of Impact

- 3.1 Air Quality Impact
  - 3.1.1 Statutory Control
  - 3.1.2 Baseline Review Approaches
  - 3.1.3 Understanding of Impacts Identification, assessment methodologies, mitigation measures and residual impact handling
- 3.2 Noise Impact
  - 3.2.1 Statutory Control
  - 3.2.2 Baseline Review Approaches
  - 3.2.3 Understanding of Impacts Identification, assessment methodologies, mitigation measures and residual impact handling

### III. ENVIRONMENTAL IMPACT ASSESSMENT (EIA) and Health Impact Assessment (HA)

- 3.3 Water Quality Impact
  - 3.3.1 Statutory Control
  - 3.3.2 Baseline Review Approaches
  - 3.3.3 Understanding of Impacts Identification, assessment methodologies, mitigation measures and residual impact handling
- 3.4 Sewerage/Sewage Impact
  - 3.4.1 Statutory Control
  - 3.4.2 Baseline Review Approaches
  - 3.4.3 Understanding of Impacts Identification, assessment methodologies, mitigation measures and residual impact handling
- 3.5 Waste Management
  - 3.5.1 Statutory Control
  - 3.5.2 Baseline Review Approaches
  - 3.5.3 Understanding of Impacts Identification, assessment methodologies, mitigation measures and residual impact handling
- 3.6 Land Contamination
  - 3.6.1 Statutory Control
  - 3.6.2 Baseline Review Approaches
  - 3.6.3 Understanding of Impacts Identification, assessment methodologies, mitigation measures and residual impact handling
- 3.7 Ecology (Terrestrial)
  - 3.7.1 Statutory Control
  - 3.7.2 Baseline Review Approaches
  - 3.7.3 Understanding of Impacts Identification, assessment methodologies, mitigation measures and residual impact handling
  - 3.7.4 Wetland establishment/compensation
- 3.8 Ecology (Marine)
  - 3.8.1 Statutory Control
  - 3.8.2 Baseline Review Approaches
  - 3.8.3 Understanding of Impacts Identification, assessment methodologies, mitigation measures and residual impact handling
  - 3.8.4 Wetland establishment/compensation
- 3.9 Fisheries
  - 3.9.1 Statutory Control
  - 3.9.2 Baseline Review Approaches

### III. ENVIRONMENTAL IMPACT ASSESSMENT (EIA) and Health Impact Assessment (HA)

- 3.9.3 Understanding of Impacts Identification, assessment methodologies, mitigation measures and residual impact handling
- 3.10 Landscape and Visual Impact Assessment (LVIA)
  - 3.10.1 Statutory Control
  - 3.10.2 Understanding of assessment framework and approaches
  - 3.10.3 Understanding of baseline study
- 3.11 Cultural Heritage
  - 3.11.1 Statutory Control
  - 3.11.2 Baseline Review Approaches
  - 3.11.3 Understanding of Impacts Identification, assessment methodologies, mitigation measures and residual impact handling
- 3.12 Hazard to Life
  - 3.12.1 Statutory Control
  - 3.12.2 Baseline Review Approaches
  - 3.12.3 Understanding of Impacts Identification, assessment methodologies, mitigation measures and residual impact handling
- 3.13 Health Impact
  - 3.13.1 Statutory Control
  - 3.13.2 Baseline Review Approaches
  - 3.13.3 Understanding of Impacts Identification, assessment methodologies, mitigation measures and residual impact handling

#### 4. Environmental Monitoring and Audit (EM&A)

- 4.1 Role of Independent Environmental checker / Environmental Team / Certified Arborist
- 4.2 Understanding of EP deliverables preparation
- 4.3 Design changes / VEP
- 4.4 Understanding of implementation schedule and recommended mitigation measures
- 4.5 Understanding of permit & licensing (*e.g., Construction Noise Permit, Specified Process License, Form NA, Chemical Waste Producer, Trip Ticket System*)

#### 5. Stakeholders Engagement

- 5.1 Statutory control
- 5.2 ACE composition

### III. ENVIRONMENTAL IMPACT ASSESSMENT (EIA) and Health Impact Assessment (HA)

5.3 Consultation technics

#### 6. Strategic Environmental Assessment (SEA)

1.1 Statutory requirements

1.2 Form and approach of SEA

## IV. NOISE

### IV. Noise

#### 1. Fundamental of Environmental Noise

- 1.1 Sound and noise, perception of sound, response of the human ears to noise
- 1.2 Characteristics of sound and the decibel scale (*sound pressure, A-weighting*)
- 1.3 Noise descriptors for Environmental Noise  
(*e.g., Leq, Ldn, Lden, Lnight, L10, L50, L90, Lmax, Lden, Lnight, Noise Exposure Forecast*)
- 1.4 Sound propagation  
(*e.g., point, line, area sources, reflection, refraction, diffraction*)
- 1.5 Soundscape
- 1.6 Mathematics (*e.g., Logarithm*)

#### 2. Noise Pollution Sources and Impacts

- 2.1 Typical environmental noise sources  
(*e.g., domestic premises, public places, construction, industrial, commercial, railway, lightrail, tram, road traffic, aircraft, helicopter, marine traffic, music, entertainment, crowd, nature*)
- 2.2 Noise receivers  
(*e.g., Residential Uses, all domestic premises including temporary housing, Institutional Uses, educational institutions including kindergarten and nurseries, hospitals, medical clinics, homes for the aged, convalescent homes, places of public worship, libraries, courts of law, performing arts centres, auditoria, amphitheatres, hostels, country parks*)
- 2.3 Noise Standards  
(*e.g., domestic premises, public places, construction, industrial, commercial, railway, lightrail, tram, road traffic, aircraft, helicopter, marine traffic, music, entertainment, crowd, nature*)
- 2.4 Auditory effects (hearing impairment) and non-auditory effects of noise  
(*e.g., stress, annoyance, social and behavioral effects, speech interference, sleep disturbance, cognitive and cardiovascular and physiological effects*)
- 2.5 Exposure-response relationships (*annoyance and sleep disturbance*)

## IV. NOISE

### 3. Noise Prediction Modeling

#### 3.1 Reasons for modeling

*(e.g., assessing noise impact from a noise source, assessing noise receiver affected by noise sources)*

#### 3.2 Basic Modelling Concepts

*(e.g., analytic model, Engineering model, Noise Emission Model, Noise Propagation Model, Numerical Model, Finite Element Model, Boundary Element Model, Ray Tracing Model)*

#### 3.3 Noise prediction methodologies

*(e.g., construction, industrial & commercial, railway, road traffic, aircraft, helicopter, music, entertainment, crowd, marine traffic)*

#### 3.4 Computation software

*(e.g., construction, industrial & commercial, railway, road traffic, aircraft, helicopter, music, entertainment, crowd, marine traffic)*

#### 3.5 Large Scale Model for City Noise Mapping

*(e.g., noise source data, topographic data, prediction model, computational software, presentation of results)*

#### 3.6 Methodologies and software limitations

### 4. Environmental Noise Management

#### 4.1 Prevention of noise problem

*(planning of noise sources, planning of noise receivers, noise impact assessment for Environmental Impact Assessment Ordinance submission, noise impact assessment for s16 or s12 applications under Town Planning Ordinance)*

#### 4.2 Control

*(noise control ordinance : domestic premises and public places, construction noise, construction noise permits, industrial and commercial places, noise abatement notice, noise labels, vehicle 1st registration)*

#### 4.3 Abatement

*(noise control measures, acoustics insulation, retrofitting noise barriers on road, low noise road surface)*

#### 4.4 Noise mitigation measures

## IV. NOISE

*(at noise sources: quiet equipment; at transmission path: barrier, enclosure; at receivers : insulation, special provided glazing)*

### 4.5 Soundscape

## 5. Noise Monitoring and Measurement

- 5.1 Subjective assessment for noise from domestic premises or public place
- 5.2 Construction works noise monitoring for EM&A purpose
- 5.3 Industrial and commercial noise measurement for investigation and compliance check to respond noise abatement notice
- 5.4 Road traffic noise measurement and monitoring
- 5.5 Railway noise measurement and monitoring
- 5.6 Aircraft noise monitoring
- 5.7 Musical event noise measurement and monitoring for investigation and compliance check to respond noise abatement notice
- 5.8 Verification measurement for special designed glazing for industrial noise
- 5.9 Verification measurement for acoustic window, balcony , special architecture features, etc for traffic noise
- 5.10 Product noise and vehicle noise measurement

## 6. Relevant Guidelines

- 6.1 Hong Kong Planning Standards and Guidelines
- 6.2 Technical Memorandum of Environmental Impact Assessment Ordinance
- 6.3 Guidance notes for construction and road traffic noise assessment
- 6.4 Professional Persons Environmental Consultative Committee Practice Notes (ProPECCPNs)

## V. WASTE

### V. Waste

#### 1. Waste Sources and Classification

- 1.1 Sources and Problems of Waste
- 1.2 Waste Classification
  - 1.2.1 Municipal Solid Waste (MSW)
  - 1.2.2 Overall Construction Waste
  - 1.2.3 Special Waste (*e.g., chemical waste, clinical waste, livestock waste, treatment plant residues, dredged mud and excavated material, radioactive waste*)

#### 2. MSW Composition and Properties

- 2.1 Composition Analysis and Field Surveys
- 2.2 Analysis of Properties
  - 2.2.1 Physical properties
  - 2.2.2 Chemical properties
  - 2.2.3 Biological properties

#### 3. MSW Management

- 3.1 Functional Elements of Waste Management System
- 3.2 Waste Management Hierarchy
- 3.3 Integrated Waste Management
- 3.4 Life Cycle Assessment
- 3.5 Economic Tools for Waste Management: back-end charges, front-end charges, deposit – refund system
- 3.6 Waste Management Law

#### 4. MSW Source Separation, Collection and Transportation

- 4.1 Source Separation
- 4.2 Collection: stationary container system, hauled container system
- 4.3 Transportation
  - 4.3.1 Refuse collection vehicles
  - 4.3.2 Transfer station



## V. WASTE

### 5. MSW Reduction and Recycling

- 5.1 Chain and Levels of Recycling Operations
- 5.2 Types of Recyclables
- 5.3 Recyclables Segregation and Material Recovery Facility
- 5.4 Recycling Processes
- 5.5 Market and Outlet of Recyclables
- 5.6 Government Support to Recycling (*e.g., Recycling Fund, land and infrastructure support, statutory measure*)

### 6. MSW Treatment

- 6.1 Treatment Objectives
- 6.2 Mechanical Treatment: size reduction, sorting, separation, compaction
- 6.3 Thermal Process
  - 6.3.1 Incineration
  - 6.3.2 Other thermal process (*e.g., co-combustion, gasification, pyrolysis*)
- 6.4 Biological Treatment
  - 6.4.1 Composting
  - 6.4.2 Anaerobic digestion

### 7. MSW Disposal

- 7.1 Landfill Disposal: disposal operation, waste degradation process, environmental issues (*e.g. landfill gas, leachate*), design and operation considerations
- 7.2 Landfill Monitoring
- 7.3 Landfill Restoration and Aftercare

### 8. Food Waste

- 8.1 Sources
- 8.2 Characteristics and Disposal Problems
- 8.3 Food Waste Reduction
- 8.4 Collection, Recycling, Treatment and Disposal

## V. WASTE

### 9. Construction Waste

- 9.1 Sources
- 9.2 Composition and Characteristics
- 9.3 Storage, collection and transportation
- 9.4 Construction Waste Charging
- 9.5 Reuse, treatment and disposal: public fill reception facilities, sorting facilities, fill bank and recycling

### 10. Hazardous Waste

- 10.1 Sources: households, commerce, industry, shipping (MARPOL waste)
- 10.2 Classification and Characterisations: ignitability, corrosivity, reactivity, toxicity, carcinogenicity
- 10.3 Storage, Collection and Transportation
- 10.4 Treatment and Disposal: physical treatment, chemical treatment, oil/water separation, incineration, stabilization

### 11. Clinical Waste

- 11.1 Sources
- 11.2 Classification
- 11.3 Storage, Collection and Transportation
- 11.4 Treatment and Disposal

### 12. Sludge

- 12.1 Sources: water works, sewage treatment plants
- 12.2 Characteristics
- 12.3 Storage and Transportation
- 12.4 Treatment and Disposal

### 13. Livestock Waste

- 13.1 Source
- 13.2 Characteristics
- 13.3 Collection, Treatment and Disposal

## V. WASTE

### 14. Dredged Mud and Excavated Material

- 14.1 Source
- 14.2 Classification and Characterisation: uncontaminated and contaminated material
- 14.3 Collection, Treatment and Disposal
- 14.4 Management, Treatment and Disposal: beneficial reuse, open water disposal, confined disposal, treatment to reduce contaminant levels

### 15. Radioactive Waste

- 15.1 Characteristics
- 15.2 Source and Classification: very low level, low level, intermediate level, high level wastes
- 15.3 Collection, Transportation and Storage

### 16. Contaminated Site Remediation

- 16.1 Causes and Hazards of Land Contamination
- 16.2 Contaminant Fate and Transport
- 16.3 Site Characterization
- 16.4 Investigation Methodologies
- 16.5 Remediation Standard and Technologies: ex-situ treatment, in-situ treatment, containment

### 17. Facilities Siting and Development

- 17.1 Facility Siting : controversies, NIMBY attitude
- 17.2 Siting Considerations
- 17.3 Preferred Site Identification
- 17.4 Design, Build and Operate Contract

### 18. Occupational Health and Safety

- 18.1 Health and Safety Risks of Waste Management Activities
- 18.2 Means for Up-keeping Occupational Health and Safety: safety and health management system
- 18.3 Safety and Health Legislations

## VI. WATER

### VI. Water

#### 1. Water Resources – Surface and Groundwater

- 1.1 Types of Water Systems (*e.g., lakes, rivers, estuaries, oceans, groundwater*)
- 1.2 Hydrological Cycle
- 1.3 Components of Water Systems
  - 1.3.1 Water quality: physical, chemical and biological characteristics
  - 1.3.2 Hydrology
  - 1.3.3 Bottom sediment: physical, chemical and microbiological properties
  - 1.3.4 Aquatic ecology
- 1.4 Water Quality Standards
  - 1.4.1 Beneficial uses (*e.g., potable water supply, recreation, agricultural, industrial, fish and wildlife, navigation*) and related water quality requirements
  - 1.4.2 Water quality objectives

#### 2. Water Quality Impact Assessment

- 2.1 Assimilative Capacity and Water Pollution
  - 2.1.1 Organic and inorganic pollution
  - 2.1.2 Microbial pollution
  - 2.1.3 Eutrophication
  - 2.1.4 Toxicants
  - 2.1.5 Oil, debris, litter
  - 2.1.6 Thermal pollution
- 2.2 Sources of Water Quality Impact
  - 2.2.1 Point source (*e.g., outfalls, treatment works' discharge*)
  - 2.2.2 Non-point or diffuse source
  - 2.2.3 Anthropogenic activities (*e.g., dredging, dumping and filling, bathometric or shoreline changes, aquatic traffic activities*)
- 2.3 Assessment and Prediction of Water Quality Impact
  - 2.3.1 Sensitive receivers and pollution load quantification
  - 2.3.2 Baseline quality
  - 2.3.3 Qualitative and quantitative prediction
- 2.4 Water Quality Impact Prevention and Mitigation
  - 2.4.1 Point source (*e.g., treatment and outfall disposal*)

## VI. WATER

- 2.4.2 Diffuse source (*e.g., source control, best management practices, end-of-pipe treatment*)
- 2.4.3 Mitigation of impact due to anthropogenic activities (*e.g., dredging, dumping, bathometric or shoreline changes*)
- 2.4.4 Water quality impact monitoring

### 3. Water Quality Monitoring

- 3.1 Monitoring of Ambient Aquatic Environment
- 3.2 Specific Monitoring Programmes (*e.g., bathing beach quality*)
- 3.3 Quality Assurance and Quality Control of Monitoring Programmes

### 4. Collection, Treatment, Reuse and Disposal

- 4.1 Objectives of Prevention, Control & Treatment
- 4.2 Pollution Prevention Methods (*e.g., material substitution, spill and leak prevention, process modifications, on-site recovery*)
- 4.3 Pollution Control and Treatment Methods
  - 4.3.1 Collection/distribution systems (*combined sewerage, separate conveyance system*)
  - 4.3.2 Water and wastewater treatment processes
    - Physical (*e.g., screening, sedimentation, flocculation, filtration, etc.*)
    - Chemical (*e.g., coagulation, neutralization, chemical precipitation, disinfection*)
    - Biological (*e.g., suspended growth reactors, attached growth reactors, natural systems*)
  - 4.3.3 Advanced wastewater treatment (*e.g., nutrient removal, membrane filtration, membrane bioreactor*)
  - 4.3.4 Sludge management and disposal
    - Sludge treatment (*e.g., thickening, anaerobic digestion, aerobic digestion, dewatering*)
    - Sludge disposal (*incineration, landfill*)
- 4.4 Wastewater Effluent Reuse

### 5. Legislation and Policy

- 5.1 Policy, Strategy and Plans for Water Quality Control and Improvements
- 5.2 Water Pollution Control Related Regulations
- 5.3 Total Water Management

-End of Syllabus-

## VII. RECOMMENDED STUDY MATERIALS AND RESOURCES LIST FOR HKIQEP QUALIFICATION

### VII. Recommended Study Materials and Resources List for HKIQEP Qualification

The following is a list of recommended readings that candidates may find helpful when preparing for the HKIQEP Qualification. Candidates should be aware that this list is advisory rather than definitive, and it may be updated from time to time to maintain currency.

#### 1. Air

- Thad Godish, Wayne T. Davis, Joshua S. Fu, *Air Quality*, 5th ed., CRC Press, 2015
- Noel De Nevers, *Air Pollution Control Engineering*, 2nd ed., Waveland Pr Inc., 2010
- Richard C. Flagan and John H. Seinfeld, *Fundamentals of Air Pollution Engineering*, Dover Publications, Inc., 2012
- Environmental Protection Department, HKSAR (Air quality related webpages)  
[http://www.epd.gov.hk/epd/english/environmentinhk/air/air\\_maincontent.html](http://www.epd.gov.hk/epd/english/environmentinhk/air/air_maincontent.html)
- European Commission - Environment (Air quality related webpages)  
[http://ec.europa.eu/environment/air/index\\_en.htm](http://ec.europa.eu/environment/air/index_en.htm)
- US Environmental Protection Agency (Air quality related webpages)  
<https://www.epa.gov/learn-issues/learn-about-air>  
<https://www.epa.gov/science-and-technology/air-science>
- US Environmental Protection Agency (Air Pollution Training Institute)  
<http://www.apti-learn.net/LMS/EPAHomePage.aspx>
- World Health Organization (Air webpages)  
[http://who.int/phe/health\\_topics/outdoorair/en/](http://who.int/phe/health_topics/outdoorair/en/)
- A Clean Air Plan for Hong Kong, Environment Bureau, HKSAR  
[http://www.enb.gov.hk/sites/default/files/New\\_Air\\_Plan\\_en.pdf](http://www.enb.gov.hk/sites/default/files/New_Air_Plan_en.pdf)
- Recommended Study Materials, Text Books & Resources of Qualified Environmental Professional (QEP) Certification, The Institute of Professional Environmental Practice

#### 2. Environmental Science, Management and Policy

- Richard T. Wright and Dorothy F. Boorse, *Environmental Science: Toward a Sustainable Future*, Pearson Education, Recent editions
- William Cunningham, *Environmental Science: A Global Concern*, McGraw-Hill Higher

## VII. RECOMMENDED STUDY MATERIALS AND RESOURCES LIST FOR HKIQEP QUALIFICATION

- Education, Recent editions
- Robert K. Kaufmann and Cutler J. Cleveland, *Environmental Science*, McGraw- Hill Higher Education, 2008
- Recommended Study Materials, Text Books & Resources of Qualified Environmental Professional (QEP) Certification, The Institute of Professional Environmental Practice

### 3. Environmental Impact Assessment and Health Impact Assessment

- Environmental Impact Assessment Ordinance  
<http://www.epd.gov.hk/eia/english/guid/index1.html>
- Step-by Step Guide on EIAO Process  
<http://www.epd.gov.hk/eia/hb/step/index.htm>
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