



UNIVERSITY OF NAIROBI

DEPARTMENT OF ENVIRONMENTAL AND BIOSYSTEMS ENGINEERING

5TH YEAR CLASS

FEB 524 WATER SYSTEMS ENGINEERING

Module 1 Water engineering overview

- Global, national and local water issues
- Emerging challenges and opportunities in water engineering
- Engineering responses
- Smart water solutions

Module 2 Feasibility of water projects

- Technical feasibility
- Economic/financial feasibility
- Environmental aspects
- Social-cultural aspects

Module 3 Water distribution system layout

- Factors influencing layout
- Alternative layout
- Evaluation of alternative layouts

Module 4 Water demand analysis

- Determinants of water demand
- Tools and methods for demand assessment
- Demand estimation

Module 5 Alternative water supplies

- Alternative water supply concepts
- Identifying and certifying alternative water supply
- Establishing an alternative water delivery program

Module 6 Roof water harvesting systems

- Layout and components
- Health aspects – water quality, health risks and benefits
- Tanks design

Module 7 Water distribution system design concepts

- Water system components
- System demand, water design and flow criteria
- Rate of water use
- Distribution system appurtenances and their locations
- System evaluation and design

Module 8 Water distribution system modeling

- Modelling overview
- Spreadsheet models
- EPANET model

Module 9 Water distribution system design using EPANET

- Data requirements and collection
- Scenario formulation and simulation
- Interpretation of simulation outputs

Module 10 Design of a water pumping sub-system

- Alternative water lifting technologies
- Water energy requirements
- Pump selection

Module 11 Engineering drawings

- Design drawing requirements and standards
- Use of DraftSight drawing software

Module 12 Bill of quantities

- General principles
- Units of measurements
- Layout and guidelines for BOQ

Module 13 Operation and maintenance of water supply projects

- Management of water supply projects
- Maintenance of water supply projects
- Performance assessment of water supply projects