Water Supply and Distribution

MODULE TITLE  Water Supply and Distribution Management.
LECTURER(S)   Dr Makropoulos and Dr Lesnic
ECTS VALUE    8
PREREQUISITES None
COREQUISITES None
DURATION OF MODULE 15 weeks

TOTAL STUDENT STUDY TIME
Overall, the module is expected to involve students in approximately 200 hours of learning: 12 5-hour lectures; 58 hours assignments; 78 hours private study; 4-hour examination.


AIMS
This module aims to provide a basic knowledge of classical and contemporary problems in management of water supply and distribution systems for the practising engineer. It also offers gaining practical experience in using water supply and distribution modelling tools.

INTENDED LEARNING OUTCOMES
1. Subject Specific Knowledge, Understanding and Skills
By the end of this module, the students should:
   a) have acquired understanding of water supply and distribution system components, their characteristics and functioning of such systems;
   b) have acquired basic knowledge of water supply and distribution system management problems;
   c) be able to make appropriate and critical use of water supply and distribution modelling and management principles.

2. Core Academic Skills
By the end of this module, the students should:
   a) be able to identify, formulate and analyse a management problem in a given water supply/distribution system;
   b) be able to critically assess research results;
   c) have acquired some practical experience of using water supply/distribution modelling tools.

3. Personal and Key Skills
By the end of this module, the students should have:
   a) improved further the necessary skills for independent learning;
   b) enhanced report and presentation skills;
   c) improved some IT skills.
LEARNING/TEACHING METHODS
Lectures, problem sheets, tutorials.

ASSIGNMENTS
One assessed coursework assignment (4,000 equivalent words including graphs and tables).
Problem sheets and computer based problem solving.

ASSESSMENT
Examination paper (60%), Course work (40%)
3-hour examination, use of notes and books allowed.
2 assignments, on practical application of modelling tools and literature review (40%, 4,000 equivalent words, including graphs and tables).

SYLLABUS PLAN
1. Introduction and Module overview: System anatomy and types, simulation model concept, application of models, brief history
2. Water system components: Pipes, junctions and reservoirs/tanks, pumps and valves
4. Water treatment: Principles and practice
7. WDS Design: Design flow, pipe sizing, hardy-cross method.
8. WDS Pressure: Pressure management, pumping, low pressure, high pressure during low demand conditions extending the system, new pressure zones, PRVs, fire flows. Pressure Management Overview and Animation
9. Assembling a model: Representation, building, skeletonisation]: & Model Calibration [predicted vs measured, sources of error, approaches. AWWA Calibration Guidelines; EPANET Tutorial 1/3
10. Transients: incl. Water Hammer; EPANET Tutorial 2/3
11. Water quality: Water age, discolouration, too low/high chlorine, etc. and solutions: disinfection, flushing, etc. EPANET Tutorial 3/3
12. Performance indicators: Overview, IWA, WLC methodology. IWA Guidelines; Introduction to Asset Management

INDICATIVE BASIC READING LIST

EXTENDED READING LIST
AUTHORS
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