

Fundamentals of Drainage

Agenda

09:15 Arrival – Registration / coffee / tea

09:30 Session 1 The basics

- **Why we need drainage?**
different types of drainage – household, highway, rainwater, agricultural etc
- **History of drainage systems.**
UK, other countries and continents

11:15 *Coffee / tea break (15 mins)*

11:30 Session 2 The science of drainage systems

- **The physics of drainage**
fluid mechanics, water traps, mechanical traps, air flow, steady-state flow, transient flows, wave reflections, gravity, vacuum, pumps, infiltration, run-off, etc.
- **The statistics of drainage**
probability, obtaining data, appropriateness and reliability of data, forecasting, etc.

13:00 *Lunch (60 mins)*

14:00 Session 3 The impact of drainage systems beyond the pipe

- **The impacts of drainage on the environment**
pollution, flooding, land-take, safety, climate change factors etc.
- **SuDS, NFM and IWM**
Overview of SuDS components, techniques and examples, Overview of NFM. Implications for IWM systems of different drainage options.
- **The different philosophies of drainage design**
Filling degrees, pipe sizes, bend radii, velocity breaks, swirl, mechanical ventilation, materials, cost, location of pipework, expandability, separating system, packaging systems, incinerating systems, links to solid waste management systems, small-bore pumping systems, basement drainage issues, water reuse systems, CSOs, the ‘super sewer’, porous paving, linear drainage, etc

For more information about this course contact the training team:

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15:00 *Coffee / tea break (15 mins)*

15:15 **Session 4 The law and the future**

- **Legislation and Standards relating to drainage**
National Building Regulations, ISO Standards, EU Directives, Sewers for adoption 8, etc.
- **Future drainage systems**
Impact of reinvented toilets, waterless technologies, intelligent and smart systems, zero-discharge systems, autonomous buildings, new materials, utilization of 'waste', Toilet Board Coalition,
- **Other CIBE drainage courses**
Above ground drainage, Below ground drainage.
- **Review of issues covered by questions and answers.**
About 20 questions that are answered in class. The answers given help influence the next presentation and may require some material updates

16.00 - 16.30 **Q & A**

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