

# Urban Hydraulic Systems



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# Urban Hydraulic Systems

## *Objectives of lecture*

- To know how to handle sustainably waters in cities
- Develop an integrated approach for urban waters
- Water circuit, discharge quantification
- Concepts (Sponge city vs. drainage)
- Legal aspects
- Hydraulics of urban systems
- Fresh water net: demand, capture, storage and distribution
- Urban drainage net: components, manholes and hydraulics  
(water course as natural net)

## *Not included*

- Network design, numerical tools
- Urban hydrology (origin of urban water in small catchment)
- Quality issues (generation and transport of pollutants)

Urban Hydrology

# Urban Hydraulic Systems

## *Content*

1. Introduction
2. Legal and conceptual aspects
3. Design bases
4. Fresh water supply
5. Sewer conduit hydraulics
6. Standard manhole
7. Fall manhole
8. Junction manhole
9. Separation manholes



General

Fresh water  
net

Urban  
drainage net

# Urban Hydraulic Systems

## *Literature*

- Handouts of slides
- Butler, D., Davies, J.W. (2011). *Urban Drainage*. Spon Press, London
- Hager, W.H. (2010). *Wastewater Hydraulics*. Springer, Berlin (Moodle: download for private studies)
- Séminaire VSA/EPFL (2013, 2015, 2017, 2020). *Hydraulique des canalisations*
- SIA, DWA, VSA, SVGW, DVGW
- Federal laws 814.20 and 814.201 (<https://www.fedlex.admin.ch/en>)
- SIA 190:2017 Canalisations. Documentation SIA D0264 Hydraulique

# Urban Hydraulic Systems

## *Course*

- 3 lessens per week
- examples and exercises are included in the lecture
- “pro memoria” at the end of every chapter
- weekly repetition of precedent lecture

## *History of Sewer*

German book of sewer construction in Berlin. Which (German speaking) students would like to briefly present the content? (ca. 4h of work per person)

## *Oral exam*

- Content: relevant is what was discussed during the course (not the slides)
- Standard questions as introduction
- Oral 15 min, after 15 min of preparation
- Evaluation: Subject knowledge (3), understanding and application of concepts (3), precision of drawings (2), presentation (2), overview on resources (1)

# Urban Hydraulic Systems

## *Language*

English and French

(if you do not understand an expression, then ask!)

You may ask questions in English, French or German

## *Excursion*

We will probably visit some sewer structures in Lausanne – together with the course “Urban Hydrology” (Rossi)

# Urban Hydraulic Systems

Urban hydraulic systems	Urban hydrology
<p><i>Pfister</i></p> <p>Concepts</p> <p>Design discharges</p> <p>Fresh water supply</p> <p>Sewer hydraulics</p> <ul style="list-style-type: none"><li>• Conduit design</li><li>• Standard manhole</li><li>• Special manhole</li><li>• Pump stations</li></ul>	<p><i>Rossi</i></p> <p>Concepts</p> <p>Legislation (PGEE/PREE)</p> <p>Integrated approach</p> <p>Impacts on receiving waters</p> <p>Modelling tools</p> <p>Technical solutions</p> <p>Financial aspects</p>



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