

# 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*

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

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



# Urban Hydraulic Systems

