

# Stormwater Management

<b>MODULE TITLE</b>	Stormwater Management
<b>LECTURER(S)</b>	Dr. Maksimović, Dr. Brilly and Dr. Drobot
<b>ECTS VALUE</b>	8
<b>PREREQUISITES</b>	None
<b>COREQUISITES</b>	None
<b>DURATION OF MODULE</b>	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.

**WEB LINK** <http://www.water-msc.org/en/wrem203.htm>

## AIMS

This module aims to provide a basic knowledge of classical and contemporary problems in stormwater management for planning, modelling, design, operational management and research of storm water collection and disposal. It also offers gaining basics of physically based modelling of storm water networks and its interactions with SUDS (Sustainable Urban Drainage Systems).

## INTENDED LEARNING OUTCOMES

### 1. Subject Specific Knowledge, Understanding and Skills

By the end of this module, the students should:

- have acquired understanding of the physical (meteorological, hydrodynamic) processes affecting surface runoff and its interactions with storm drainage components their characteristics and functioning of such systems;
- have acquired basic knowledge of storm drainage planning, water supply and distribution system management problems;
- be able to make appropriate and critical use of storm drainage modelling and management principles.

### 2. Core Academic Skills

By the end of this module, the students should:

- be able to identify, formulate and analyse a management problem in a given water storm water collection system;
- be able to critically assess research results;
- have acquired some practical experience of conceptualising and analysing storm drainage modelling tools.

### 3. Personal and Key Skills

By the end of this module, the students should have:

- 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, educational tools.

## **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, closed note and closed book.

1 assignment on practical application of modelling tools (40%, 4,000 equivalent words, including graphs and tables).

## **SYLLABUS PLAN**

1. **The role and concepts of storm drainage systems** (Natural drainage, Separate vs. combined systems, Planning design management issues)
2. **Rainfall characteristics and analysis** (Physical characteristics of clouds, frontal rainfall, measurement methods, Single record and temporal analysis, Multiple records and spatial analysis, Data base management)
3. **Catchment characteristics and data management** (Data sources and processing methods, Land use and DTM, Preparations of model inputs, Built environment vs. new developments)
4. **Rainfall-Runoff modelling and system design** (Modelling concepts, Surface runoff, Network analysis, Whole system analysis model calibration / verification, Planning, design, management tools)
5. Course work (Essay) for rainfall-runoff modelling
6. **Storm wash-off** (Pollution sources and generation, Data, Wash-of process and modelling, Pollution management)
7. **Interactions with wastewater, CSO, system separation, health issues** (Traditional design methods, System performance and environmental issues, CSO)
8. **Structural vs. non-structural measures & SUDS** (Conventional systems and shortcomings, Paradigm shift in urban storm drainage, Structural and non-structural measures, SUDS from the concept to implementation, Planning, analysis, construction and operational management issues)
9. **Urban flooding analysis and management** (The origin of flooding in urban areas (fluvial, pluvial, "technological", Approaches in modelling and data needed for analysis and modelling, Flood mitigation options and techniques, Stakeholders affecting flooding and their interactions,
10. **Coursework or essay on urban flood management**
11. **Asset management in Urban Drainage systems** ( Operational management vs. strategic planning, data sources, asset management goals and methods, case studies)
12. **Research and professional issues for the future** (Topics open for research, Topics related to future application (paradigm shift), Potential topics for the thesis)

### **INDICATIVE BASIC READING LIST**

1. Butler D., J. W. Davis: *Urban Drainage*, Second Edition, 2004, Spon Press, ISBN 0-415-30607-8 (pbk)
2. Maksimović, C. and Radojković, M., "Urban Drainage Catchments". (Pergamon Press, Oxford) 1986
3. Vignolles, M., Woloszyn, E., Niemczynowicz, J., Maksimović, Č. and Marsalek, J., "Rain and Floods in Our Cities" (World Meteorological Organization, Geneva) 1996

### **EXTENDED READING LIST**

DuChateau P.C., *Advanced Calculus*, 1992, Harper Collins, 000-0-064-67139-9

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