

## PhD Summer School

### Smart Urban infrastructures

October 7 – 11, 2019, Lille University, France

<http://www.sus-lille2019.com/phd-summer-school/>

#### Directors:

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#### Organization

This summer school will be organized by the Civil and geo-Environmental Engineering Laboratory of Lille University and the Civil Engineering college of Tongji University (Shanghai, China).

#### Registration & Fees

The number of students will be limited.

Registration on the website: <http://www.sus-lille2019.com/phd-summer-school/>

The fees of this summer school are 300 €. They cover lunches, coffee break, dinner gala and documentation.

#### Objective

This PhD summer school aims at training PhD students in an emergent area, which concerns the use of both digital technology and social innovation within the Smart City concept for the modernization of infrastructures used for urban services such as transportation, water, energy, economic activity as well as education, health and sport. The smart City concept combines different disciplines such as information technology, civil engineering, environmental engineering, energy and social sciences. This summer school will provide to PhD students both the basic concepts of the Smart City solution as well as its implementation through real smart city projects. After this school, attendants will be able to use the smart emergent technology as innovative solution in their PhD works or future career.

#### Methodology

The summer school is based on lectures and discussions supported by movies and data concerning real smart infrastructures projects. During this summer school, participants will work on group projects for the design of a “smart solution” for an urban infrastructure.

#### Content

After a presentation of the smart city concept, the course presents the basic components of this concept such as the 3D digital modelling of infrastructures, smart monitoring, data processing and analysis and smart platform. Then it presents the application of this concept on major urban infrastructures such as the underground space, drinking and storm water, district heating and buildings.

## Program

### Monday, October 7

- 8:30 - 10:15 Opening - Introduction to the city challenges (Why do we need smart solutions?)
- 10:30: - 12:15 Smart City Concept and Implementation (What and How?)
- 12:30 – 13:45 Lunch
- 14:00 - 15:45 Smart Monitoring (How to collect data?)
- 16:00 - 18:00 Project: Smart Solution Design (How to start a Smart City Project?)

### Tuesday, October 8

- 8:30 - 10:15 Smart Water (design and implementation of Smart solution for drinking water)
- 10:30: - 12:15 Smart Building (design and implementation of Smart solution for Buildings)
- 12:30 – 13:45 Lunch
- 14:00 - 15:45 Project: Smart Solution Design (Problem statement, smart solutions requirements)
- 16:00 - 18:00 Project: Smart Solution Design (Design of the smart solutions)

### Wednesday, October 9 *(Conference Smart Underground Space & Infrastructures)*

- 8:30 - 10:15 Smart Planning
- 10:30: - 12:15 Smart Underground Space
- 12:30 – 13:45 Lunch
- 14:00 - 15:45 Smart Infrastructures
- 16:00 - 18:00 Resilient Infrastructures

### Thursday, October 10 *(Conference Smart Underground Space & Infrastructures)*

- 8:30 - 10:15 Smart Geo-Environment
- 10:30 - 12:15 Smart Geo-Environment
- 12:30 – 13:45 Lunch
- 14:00 - 15:45 Smart Infrastructures
- 16:00 - 18:00 Resilient Infrastructures

### Friday, October 11

- 8:30 – 10:15 Smart Energy (design and implementation of Smart energy solution)
- 10:30 – 12:30 Smart Governance (How to involve city stakeholders in Smart city projects?)
- 12:30 – 13:45 Lunch
- Project: Smart Solution Design (Presentation & Discussion)
- Project: Smart Solution Design (Presentation & Discussion)

## Courses description

### **Smart City Concept and implementation**

This lecture presents the concept of the smart city with particular focus on the use of the digital technology for monitoring, data transmission, data analysis and decision-making. It also presents the implementation of this technology supported by feedbacks from major smart city projects.

### **Smart Monitoring**

This lecture presents important issues related to the smart city: smart monitoring included smart sensors, data transmission and storage and smart platforms that ensure the coordination of tasks related to data management and analysis, decision-making, regulation and users' interaction.

### **Smart Planning**

This lecture presents the need for a comprehensive urban planning for both the subsurface and the underground, that integrates sustainability and resilience requirements as well as social and technical innovations.

### **Smart Underground space**

This lecture presents the use of the Smart Technology for the construction of a knowledge-based system for the lifecycle management of the urban Underground Space. The system uses digital technology to address the major challenges of the Underground Space, in particular safety, sustainability and lifecycle management. The lecture presents first the major challenges of the underground space in urban area, then it presents the Smart City concept and shows how this innovative concept could help to address the challenges of the underground space throughout its lifecycle.

### **Smart Water**

This lecture presents the use of the Smart Technology for the management of the water cycle. It includes monitoring and data processing to be used in drinking and sewage water services to reduce leakage, control the water quality, reduce flood risk, optimize water treatment and improve customers' information.

### **Smart Energy**

This lecture presents the use of the Smart Technology for safe and optimal management of the energy in cities including electricity, public lighting, gas and district heating/cooling. After a presentation of the smart technology for each "energy", it presents the construction of a comprehensive smart energy system.

### **Smart buildings**

This lecture presents the use of the Smart Technology for the optimal and safe management of residences and apartments. It presents the challenges related to user's comfort, security and energy savings, then describes how the Smart Technology trough could help to meet the "home" challenges.

### **Smart & resilient infrastructures**

This lecture presents the increasing hazards due to climate change as well as the increase in the complexity of socio-technical systems in urban area. It shows the basic of the concept of smart resilient urban infrastructures, through the development of a comprehensive system that monitors urban infrastructures as well as natural and human hazards and learn from historical events in order to enhance the capacity of urban systems to meet urban hazard through the reduction of systems perturbation and improvement of their adaptation capacity.

**Smart City project**

Participants will work in groups on a case study concerning the design of a smart solution for an urban infrastructure. They have to define the issue (why, what) and then propose a smart solution for this issue (how). By the end of the training, each group will present their “Smart Solution”.