



UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Data Science Lab On Smart Cities

2425-2-FDS01Q038

Aims

Module 1: To acquire knowledge of the typical problems of highly urbanized environments and of the methodologies that can be used to formalize these problems.

Module 2: Gain knowledge related to typical mobility issues in highly urbanized environments and tools for processing mobility data.

Contents

Module 1

- The dimensions that characterize the smart city.
- The actors who are creating and implementing the smart city
- The governance of the smart city
- Who benefits and who is excluded?
- The role of data analysts in this area

Module 2

- Towards the data-driven city
- Smart Mobility: Technology Enablers and Disruptors
- Mobility as a Service
- Mobility analytics with GeoPandas

Detailed program

Module 1:

Street level bureaucrats and data analysts in the smart city

Who are the actors making the smart city? The street level bureaucracy and the role of data analysts

Smart city and platform city

What differences between the smart city and the platform city? Actors, indicators, policies, and what outcomes. Who are the excluded ones?

Smart city and urban governance

Modes of regulation (market exchange, redistribution, reciprocity), participation and smart city. Taking into account citizens' activation and social capital.

The smart 15 minutes city

What is the 15 minutes city? What's for? How the smart can support the 15 city and with what benefits, for whom? To do what? What services do we need to reach in 15 minutes? Are smart cities more unequal/equal than other in terms of income?

How to construct a good case-study

Working with data, the effect of short-term tourism and Airbnb in touristic places.

Working with data: Smart city and inequalities

Conclusion of the module

Module 2:

Towards the data-driven city

Challenges, main elements, the augmented city

Smart Mobility - Foundational Technologies

Introduction to smart mobility - the technological aspects of smart mobility - foundational technologies

Smart Mobility - Technology Enablers

The technological aspects of smart mobility - Technology Enablers

Smart Mobility - Disruptors / Mobility as a Service

The technological aspects of smart mobility - Disruptors - Mobility as a Service model

Lab session 1: Introduction to GeoPandas

Lab session 2: Spatial relationships and operations with GeoPandas and Shapely

Lab session 3: OpenStreetMap and Street Network Analysis

Lab session 4: Mobility Analytics

Prerequisites

Basic knowledge of the Python language, virtual environments and Jupyter

Teaching form

Module 1:

- 23 hours conducted in in-person delivery mode

Module 2:

- 12 hours conducted in in-person delivery mode
- 12 hours of laboratory conducted in interactive delivery mode

Textbook and teaching resource

Slides and notes provided by lecturers

Semester

Second semester

Assessment method

The course will be evaluated through an essay and an oral presentation on a self-selected smart city topic. Students, in groups of two, will write an essay in English (or Italian), covering problem description, data analytics, visualization, and policy recommendations. The essay should address relevant indicators, data selection, cleaning, spatial and temporal analysis, and prediction or classification models if needed. Ethical and social implications should also be considered. An oral presentation of the essay is required. Evaluation criteria include clarity and coherence of problem description, quality and relevance of data, accuracy and validity of analysis and visualization, robustness and reliability of models, effectiveness of policy suggestions, consideration of ethical and social implications, overall essay quality, quality of the in-person presentation.

Office hours

Received by appointment to be arranged by e-mail

Sustainable Development Goals

GENDER EQUALITY | INDUSTRY, INNOVATION AND INFRASTRUCTURE | REDUCED INEQUALITIES | SUSTAINABLE CITIES AND COMMUNITIES
