

# SUBJECT DATASHEET

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## I. SUBJECT SPECIFICATION

### 1 BASIC DATA

#### 1.1 Title

Digital Cities

#### 1.2 Code

BMEEOFTMEP1

#### 1.3 Type

Module with/without associated contact hours

#### 1.4 Contact hours

| type                   | hours/week |
|------------------------|------------|
| Lectures, Project work | 2          |

#### 1.5 Evaluation

midterm grade

#### 1.6 Credits

3

#### 1.7 Coordinator

name: Dr. György Szabó  
academic rank: associate professor  
email: [szabo.gyorgy@epito.bme.hu](mailto:szabo.gyorgy@epito.bme.hu)

#### 1.8 Department

Department of Photogrammetry and Geoinformatics, Faculty of Civil Engineering

Website

[www.epito.bme.hu/BMEEOFTMEP1](http://www.epito.bme.hu/BMEEOFTMEP1)

#### 1.9 Language of instruction

English

#### 1.10 Curriculum requirements

Compulsory in Faculty of Architecture, Masters' Program, Specialization in City Design programme

#### 1.11 Prerequisites

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#### 1.12 Effective date

September 1, 2019.

### 2 OBJECTIVES AND LEARNING OUTCOMES

#### 2.1 Objectives

The course provides an in-depth practical experience of the methods, data and information available to urbanists through investigation of live projects in the built and natural environment. The

students will learn how to use the spatial modelling and analysis techniques and identify new data and technologies platforms and apply to design, plan and manage a contemporary city.

## 2.2 Learning outcomes

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Upon successful completion of this subject, the student:

### A. Knowledge

1. Has knowledge in geospatial information technology, distributed geo-services, 3D-visualisation, spatial data infrastructure, and geocomputation based on the highest international research in the digital urban modelling, smart cities areas.
2. Can understand and, on a scientific basis, make reflections on the knowledge and identify scientific problems regarding the development of spatial enabled services, advanced geovisualisation technologies, spatial data infrastructures, geocomputation, image processing and spatial decision support systems to manage the urban planning.

### B. Skills

1. Able to create the digital model of a real city.
2. Excels in main theories that relate to the knowledge areas and in scientific methods and tools and general skills related to planning and management activities for urban development.
3. Can evaluate and select among the scientific theories, methods, tools regarding data storage, flow, processing, and visualisation - and on a scientific basis, advance new analyses and solutions.
4. Can communicate research-based knowledge and discuss professional and scientific problems with both peers and nonspecialists concerning planning and management for urban development.

### C. Attitudes

1. Aims to create on a scientific basis accurate, ethic and sustainable city models.
2. Open to use IT tools.

### D. Autonomy and Responsibility

1. Independently and cooperated in groups creates digital city models.
2. Individually capable of using design manuals.
3. Uses systematized thinking approach.

## 2.3 Methods

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Lectures, workshops, individually and team performed homework, written and oral consultation communication, use of IT tools and techniques , individual and team work.

## 2.4 Course outline

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| 1. Introduction: Urban planning in the Digital World, Digital City as a fundamental infrastructure of Smart City, GeoSpatial ecosystem: EO, IoT, BigData, AI |
| 2. Urban modelling space, time and complex urban structures  |
| 3. GIS Software, QGIS Introduction   |
| 4. Spatial data sources: EU INSPIRE, USA SDI, urban maps, cadastre, utilities, topographic, environmental, OSM   |
| 5. City project plane – Live project in a study area   |
| 6. GIS visualization techniques 2D, 3D, time   |
| 7. Socio-economical, cultural, environmental and infrastructure city indicators  |
| 8. Spatial data analysis techniques, Artificial intelligence, Spatial decision support   |
| 9. Simulation, optimization of complex city systems  |
| 10. City project workshop, consultation  |

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| 11. City project, Midterm report                                     |
| 12. City project workshop, consultation                              |
| 13. City project workshop, consultation                              |
| 14. City project presentations, Delivery of the project final report |

The above programme is tentative and subject to changes due to calendar variations and other reasons specific to the actual semester. Consult the effective detailed course schedule of the course on the subject website.

## 2.5 *Study materials*

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- a) Online materials
  - 1. Digital Cities tutorial
  - 2. QGIS Manual

## 2.6 *Other information*

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- 1) According to lecturer's instruction, in the workshops and project work own laptop have to be used.

## 2.7 *Consultation*

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The instructors are available for consultation during their office hours, as advertised on the department website.

## II. SUBJECT REQUIREMENTS

### 3. ASSESSEMENT AND EVALUATION OF THE LEARNING OUTCOMES

#### 3.1 General rules

The assessment of the learning outcomes specified in clause 2.2 above and the evaluation of student performance occurs via one midterm report and a final project report.

#### 3.2 Assessment methods

| Evaluation form         | abbrev. | assessed learning outcomes         |
|-------------------------|---------|------------------------------------|
| 1. midterm report       | R1      | A.1; B.2-B.4; C.1-C.2; D.2-D.3     |
| 2. final project report | R2      | A.1-A.2; B.1-B.4; C.1-C.2; D.1-D.3 |
| 3. semester activity    | R3      | A.1-A.2; B.1-B.4; C.1-C.2; D.1-D.3 |
|                         |         |                                    |

The dates of midterm tests and deadlines of assignments/homework can be found in the detailed course schedule on the subject's website.

#### 3.3 Evaluation system

| abbreviation  | score       |
|---|-------------|
| R1  | 30%         |
| R2  | 40%         |
| R3  | 30%         |
| <b>Sum</b>  | <b>100%</b> |
| <b>Extra point:</b> for those who create significant OSM objects on the study city area | <b>10%</b>  |

#### 3.4 Requirements and validity of signature

No signature can be obtained, but to pass the course active participation required.

#### 3.5 Grading system

40 points can be achieved in total (100%), the grades are determined as follows:

| grade            | points (P)         |
|------------------|--------------------|
| excellent (5)    | $80 \leq P$        |
| good (4)         | $70 \leq P < 80\%$ |
| satisfactory (3) | $60 \leq P < 70\%$ |
| passed (2)       | $50 \leq P < 60\%$ |
| failed (1)       | $P < 50\%$         |

#### 3.6 Retake and repeat

- 1) Because of the active participation requirements there is no retake.
- 2) In occasion of late in the repeat period possible to deliver the final report– with penalty fee applied.

#### 3.7 Estimated workload

| activity                    | hours/semester     |
|-----------------------------|--------------------|
| contact hours               | $14 \times 2 = 28$ |
| preparation for the courses | $14 \times 2 = 28$ |
| preparation for the reports | $10 + 24 = 34$     |

|         |    |
|---------|----|
| n total | 90 |
|---------|----|

3.8 *Effective date*

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September 1, 2020.