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**Form and configuration, as the universal language in teaching urban morphology  
theory and practice**

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**Abstract**

*The Department of Civil Engineering at the University of Debrecen fosters the Urban Systems Engineering MSc programme. The English language teaching programme has started in 2019/2020, tailored to the complex requirements of contemporary urban planning and beyond. The participating students came from different parts of the globe (Africa, Asia, South America, Europe) with mixed educational training backgrounds. Although we consider the urban form and its configuration as a universal language of urbanism and for understanding the urban environment, working with such a colourful group of young professionals has been challenging and rewarding at the same time. The current study introduces the challenges we faced during the theoretical lectures, practical fieldwork and projects of our classes: Urban Architecture, Urban Morphology and Urban Renewal Processes. As a summary, the paper highlights the main lessons learned by reviewing the courses' challenges. We discuss the teaching methods, both traditional and experimental, together with the adaptation of analyses of urban form and configurations, and the supervision tactics in the projects dedicated to Urban Architecture. Our students take part in talent fostering programmes beyond the framework of the official curricula under our mentorship. The results are inspirational and open new horizons on both sides – the next step is for some of our students to continue the academic path, namely doctoral studies under our supervision, choosing urban morphology and Space Syntax related topics.*

**Keyword:** teaching, urban morphology, configuration, Urban Systems Engineering

**Introduction**

The education of urban system engineers has a longtime tradition at the University of Debrecen, Faculty of Engineering. The Hungarian language master programme is within the framework of the Civil Engineering Department, unlike the rest of the similar programmes in Hungary, which are related to architecture majors. The program's objective is to prepare future urban system engineers to control the activities related to urban planning and utilities, services both on the administrative level and planning, although practical planning was underrepresented in the programme. The English language teaching programme of urban system engineering has started in 2019/2020, tailored to the complex requirements of contemporary urban planning and research. At the beginning of the programme, the curricula were based on the original Hungarian one, but it changed according to the new focus areas of the leading lecturers, from urban morphology, renewal processes, space syntax towards smart cities. The English language programme became more project and practice-oriented with new subjects, the Hungarian one implemented the urban morphology and urban design as well. Our Hungarian students take the masters programme as their specialisation studies, as they

are already working in related fields and they return to their activities. At the English language masters, our students are from various countries, with diverse educational backgrounds and different career levels. They are the real potentials for talent fostering programmes (TalentUD) and PhD studies, as many of them chose academia together with the practice or over their career as practising engineers.

## Background

The English Urban Systems Engineering MSc programme has three main subject groups: Natural Sciences, Social Sciences and Planning Studies. Among the Social Sciences is the Urban Morphology (Lovra), the rest of the subjects thought by us (Urban Design/Berczki-Lovra, Urban Planning/Berczki-Lovra), Urban Renewal Processes (lecturer: Lovra) belong to the Planning Studies. The core programmes, as the base of the talent fostering programme and the PhD programme, are (until now) the Urban Morphology, Urban Design, Urban Renewal and Smart Cities (lecturer: György Csomós). The TalentUD is an individual research programme within the framework of the University of Debrecen with mentorship. The result of their research is presented in student conferences and published in scientific journals. A common practice is that participation in the programme brings extra credits (and more chance) at the PhD preliminary exam. Our first generation of masters students finished their studies, 3 of them continue their PhD studies, all of them in Hungary, Debrecen (overall 11 students finished this year from the 18 enrolled).



*Figure 1. Territorial distribution of the students 2019–2022 and 2020–2022: Brazil (8), Syria (6), India, Kazakhstan (2) Turkey, Iraq, Iran, Jordan, State of Palestine, Morocco, Tunisia, Kenya, Ghana, Albania, China, Mongolia (1). 30 students overall.*

Background of the students: most of them are architects, civil engineers, engineers specialised in environmental fields, but some of them are geographers or coming from other non-engineering areas. We tailored introductory courses to prepare the non-engineer students for the core subjects, which requires preliminary knowledge in urban studies or urban design. The students had various previous experiences,

some of them were practising architects or demonstrators at their former universities before starting our programme.

## **Methodology**

M1: Urban Morphology: lectures: interactive + frontal lecture + various tasks at the lectures + group discussions and individual consultations)

M2: Urban Renewal Processes: urban rehabilitation is an integrated part of the Urban Design Studio (design task) and goes along with the Urban Morphology. Lectures: interactive + frontal lecture + various tasks at the lectures + group discussions.

M3: Urban Architecture (Urban Design): Lectures: interactive + frontal lecture + various tasks at the lectures (study trip and on-site analyses) + group consultations and individual consultations with the selected groups.

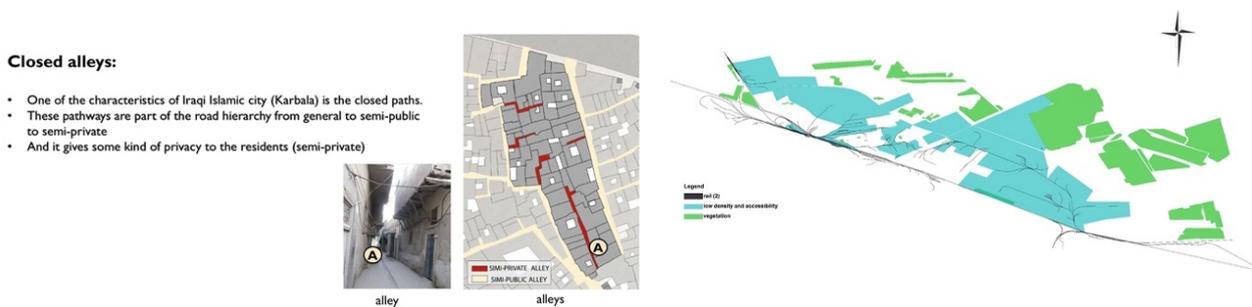
M4: Final thesis: complex planning and theoretical study (individual consultations).

## **Core subjects: Urban morphology**

One of the core subjects of the course is Urban Morphology (UM) in the 1st semester of their studies. In the first part of the semester, the students learn about the methods and approaches of UM (stage No 1). Together with its history and application in design and analyses aided design. Although the first part is mainly theoretical, part of the learning process is the discussion of case studies. The aim is that at the end of the theoretical introduction, the students will be able to outline the different urban forms and types, urban tissues and make UM analyses and conclude the character of the fabric independently. The sections of the theoretical introduction to UM: different morphological approaches, morphological schools and the aspects of urban forms; paths of understanding the town from the urban form (Conzen) to the mental perceiving of the city (Lynch) through the flows (space syntax) with the importance of the history (Caniggia); typomorphology; UM as a generative process: it is a product of a sociocultural process, the type is a greater notion than the configuration; hierarchy and the related disciplines of the UM (history, economics, policies, architecture, geography, transport, planning, aesthetics, sociology, health, philosophy); urban tissue; character areas; morphogenesis (time - form), poly-morphogenesis and the evolution of forms; different analyses and urban design measures, from the traditional (UM, Typo-Morphology) to the new methods (Spacemate, Morpho) together with pilot methodologies (Morphometrics). During these classes, the students will be familiar with each of the methods on such a level, that they became able to choose between the methods they would like to use in their research paper (stage No 2). In the second part of the semester, they work on their research papers (topic is chosen by them and discussed with the instructor), which is consulted independently or during the classes (presentations by them, more information on the research

methods given by the instructor and group discussion). Each of the students specialised in one or mixed methods and wrote a case study paper or made a poster type work with the results.

The result of the analyses serves as a base of the Urban Renewal Processes paper, which contains practical proposals both on the theoretical and practical (planning level). In the Fringe-belt analysis and recommendations for the revitalization of an industrial district in Nur-Sultan (Aiganym Kumisbek, 2020), the student analysed the map of the northern part of the city close to the railway tracks was analysed using GIS software, for the density of structures and road accessibility. She concluded that these zones satisfy three out of four characteristics for fringe-belt zones given by Jeremy Whitehand, and identified the potential or future fringe-belt zones. She distinguished the most crucial steps for renewal: development of a clear plan for the streetscape, land use and plots, building a strong legal basis for increasing participation of various stakeholders, and finding ways to attract investments and funds.



**Figure 2a:** Closed alleys in Karbala, Iraq (author: Basim Riyadh Haswah); **Figure 2b:** Fringe-belt zones in Nur-Sultan industrial area, Kazakhstan (author: Aiganym Kumisbek)

### Core subject: Urban Renewal Processes

The teaching programme includes the topics: phenomena, tools and procedures of urban rehabilitation processes via actual, already finalized or ongoing programmes in the EU and worldwide; segregation; improvement of housing conditions as an essential criterion of these actions; good and bad practices: explanation along with the structural, economic, legal background of the projects; urban heritage; discussion and profound analysis of the urban renewal programmes; the future path of more efficient rehabilitation. Each topic is followed by a group discussion with the active participation of the students as they bring first-hand examples. The project part of the subject sometimes goes hand in hand with the Urban Morphology research, but this is not a requirement of the final paper which could be theoretical (Industrial Heritage: Importance and Legislation - comparison between Portugal and Brazil) or a practical one, which is dealing with an emerging problem: Preservation and revival of the old city of Aleppo and the public participation role in the process (example from 2019).

The Urban Design studio also implements parts from the Urban Renewal Processes and Urban Morphology (the subjects are in the autumn semester of the 1st year).

## Core subjects: Urban architecture

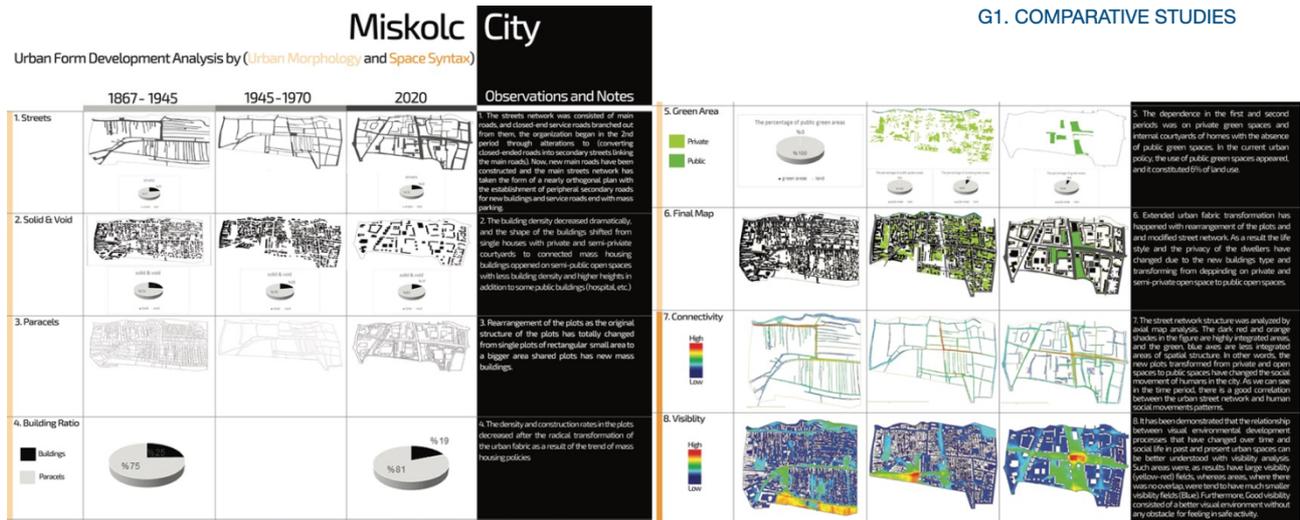
The subject Urban Design focuses on the current problems of contemporary cities and tries to offer solutions for them. During the semester the actual questions of the urbanisation is discussed; namely the problems of the post-industrial age, the rehabilitation, the urban sprawls, the legacy of the modernism; and the newest trends of urbanism. During the practical lectures, the students have to solve design problems in groups, focusing on typical problems: renewing dense urban areas, constructing infill ensembles, transforming urban areas, establishing linear city space and new local centres.



**Figure 3a.** Topic: establishing linear city space (Qingfang Li, Ola Darwish, Matheus Franco Carvalho , 2019). **Figure 3b.** Topic: transforming urban areas – industrial area rehabilitation (Amanda Oliveira Mesquita, Abdo Mhrez, Andrew Kioko Mboloi, 2019)

Urban Design became the most challenging subject (lecturers: Zoltán Berczki and Éva Lovra) since, in the first semester (1st year) subject, the students have to work on their project as a group. Usually, our first Urban Design class is our first meeting with them as well. The class and the semestral work starts with a historical outline of urban planning, then a presentation about a city (its features: street network, built environment with a particular highlight on the weaknesses and strength). The students are asked to prepare a presentation about their home city based on the lecture they just heard in the first class and tell about their educational background. Based on the results we create the groups and choose the topics for them. The groups are announced just after the field trip when we visit the sites – the visit is a first-hand experience of urban morphology analyses and urban, planning and architectural history of Central Europe. As soon as the groups are announced (diverse groups by nationality, educational background and gender) the students start

to work on their project in groups: fieldwork, planning, preliminary sketching. Week after week the students make presentations to show their peers the development of their project. Thus they have a motivation to work week after week. We also ask the students to comment on the proposals and discuss each of the works, before the lecturers get word to do so. We create a creative and open environment where they don't have to be afraid to express their thoughts. During the classes, we introduce new techniques or guide them towards new ways – isovist analyses, space syntax and place syntax, but in the summer school, they have the real opportunity to dive into these methods and use them creatively.



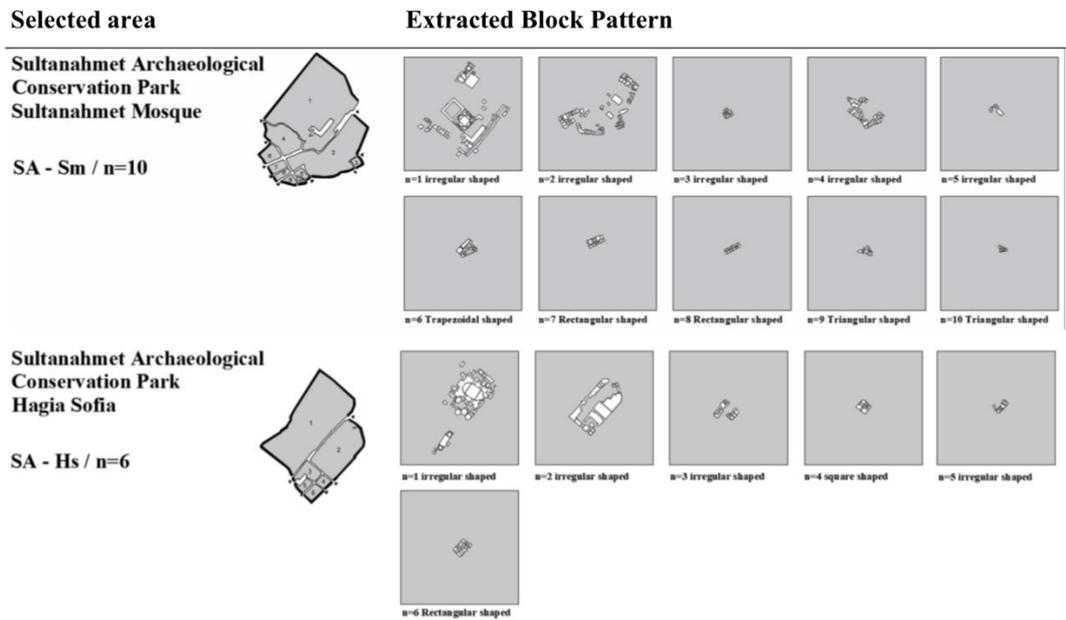
**Figure 4a.** Examples of the students works: comparative analyses of a selected area in Miskolc, Hungary. Urban development from 1867 until 2020. (Summer school 2020, authors: Abdullah Alrammo, Abdo Mhrez, Elif Sarihan, Bashar Mahfoud).

**G2. SOLUTION TO THE NEIGHBOURHOOD OF THE NEW UNIVERSITY CAMPUS)**



**Figure 4b.** Neighbourhood of the new university campus of the Faculty of Engineering (authors: Ali Dayoub, Ola Darwish, Riwaq A.M. Saleh, Saleem Shaheen)

Five students chose us to supervise their final thesis – they chose the topic according to their interest but some of them asked for advice. 11 students finished their MSc in 2021, 4 of them were selected to compete with their works to win the best MSc thesis in the field of urban planning (3 of them our students who chose us as supervisors) and 3 of them started the PhD in this September (2 of them our students who chose us as supervisors). In their works, they implemented all the studied methods and approaches (urban morphology, space syntax, urban renewal approaches).



**Figure 5.** The types of blocks extracted from the six selected areas revealed 37 combinations of different shapes and sizes (the table is not complete). Source: Elif Sarihan (MSc thesis, supervisor: Dr Lovra Éva)



**Figure 6.** Local syntactic analysis (Integration, Radius: 800m) of present condition of Miskolc. Source: Adbo Mhrez (MSc thesis, supervisor: Dr Bereczki Zoltán)

## **Conclusions**

Although we consider the urban form and its configuration as a universal language of urbanism and for understanding the urban environment, working with such a colourful group of young professionals has been challenging and rewarding at the same time. The current study introduces the challenges we faced during the theoretical lectures, practical fieldwork and projects of our classes: Urban Architecture, Urban Morphology and Urban Renewal Processes – but more the way how and what we teach during the classes. The programmes are tailored to the needs of our students and constantly developing based on their interests and questions. Our teaching methods are both traditional and experimental with the adaptation of analyses of urban form and configurations. The supervision tactics in the projects dedicated to Urban Architecture has three levels: the students present their works and before the lecturers give their comments, their peers have to comment and suggest. We also did group and individual consultations since some of the students felt more comfortable in this way at the beginning. Our experience with such working groups is positive: creating diverse groups (by nationality, educational background and gender) increase their work ethic and creativity and creates active discussion also between the groups. Our students take part in talent fostering programmes beyond the framework of the official curricula under our mentorship. The results are inspirational and open new horizons on both sides – the next step is for some of our students to continue the academic path, namely doctoral studies under our supervision, choosing urban morphology and Space Syntax related topics.

## **Acknowledgements**

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