Syllabus

Urban Geometry

Course Name (Chinese)	城市几何学		
Course Name (English)	Urban Geometry		
Course Number	020580	Language	English
Credits	1	In-class Hours	17
Course Type	Elective Courses	Examination/Evaluation	Evaluation
Prerequisite Courses	N/A		
Availability of English courses	Yes		
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1. Course Orientation and Requirements

1. Course Orientation

This course is an English elective course for undergraduate students in urban and rural planning major and beyond. It is intended for 3rd-4th year undergraduate students in urban and rural planning, architecture, and landscape architecture. The various geometric elements of cities at multiple scales are important objects for various spatial interventions in urban planning and design, as well as a realistic grip for planning implementation and construction. With the evolution of urban data and analysis techniques, the perception and analysis of urban geometry has become an important part of the new urban science. Urban Geometry integrates knowledge from various disciplines such as urban planning, urban design, socio-physics, regional science, GIS, etc., and focuses on various urban geometric elements and their analysis at various spatial scales, with an emphasis on the theory, methods and applications of urban geometry. The course aims to provide students with an understanding of the definition, theoretical and methodological evolution of urban geometric elements, and a preliminary grasp of quantitative analysis of different geometric elements at various spatial scales. Theories, methods and models of urban geometry analysis are important tools for quantitative research in urban and rural planning professions and have direct significance to the intelligence of planning and design.

2. Course Objectives

Course objective 1: Understand and get familiar with the elements, definitions, theories, and models of urban geometry.

Course objective 2: Learn and master the basic principles and methods of urban geometric analysis and its application scope.

Course objective 3: Master the interpretation of urban geometric analysis results at different spatial scales.

Course objective 4: Recognize the evolution of urban geometric elements at different spatial scales and have the ability to analyze and evaluate basic urban geometric elements.

3. Indicators of Graduation Requirements Supported by the Course

Serial No.	Indicators of Graduation Requirements	Contents
1	Indicator 2-1	Establish the concept of lifelong learning and have strong lifelong learning ability.
2	Indicator 2-2	Require basic knowledge of general category science, engineering and technology.
3	Indicator 2-3	Have the ability to think independently, with strong comprehensive, systematic, logical and critical thinking.
4	Indicator 2-4	Have strong theoretical and practical skills, good at problem identification, problem analysis and problem solving.
5	Indicator 3-1	Good planning professionalism and basic planning research skills.
6	Indicator 3-2	Acquire the necessary basic knowledge and skills in disciplines related to urban and rural planning.
7	Indicator 3-3	Master the basic theory of urban and rural development and planning, methods and skills of urban and rural planning investigation and analysis, methods and skills of urban and rural planning design and expression.
8	Indicator 3-5	Learn about new directions and advances in urban and rural research and planning at home and abroad.

4. Correlations between Course Objectives and Graduation Requirements

Course Objectives / Graduation Requirements	Course objective 1	Course objective 2	Course objective 3	Course objective 4
Indicator 2-1	●	●	●	●
Indicator 2-2	●	●		
Indicator 2-3			●	●
Indicator 2-4	●	●	●	●
Indicator 3-1	●		●	●
Indicator 3-2	●	●	●	●
Indicator 3-3	●		●	
Indicator 3-5				●

2. Course Content, Teaching Requirements, Credit Hour Allocation, and Teaching Methods

No.	Knowledge Modules	No.	Knowledge/Competency Points	Requirements	Supported course objectives	Teaching Methods	In-class Hrs	Extracurricular Hrs
1	Introduction to the concept of urban geometry	1	Course introduction and overview of urban geometry	Understand	Course objective1、2、3、4	PPT	4	0
		2	The main theories of urban geometry: definitions, categories, connotations and identification	Acquaintance				
2	Urban geometry analysis method	1	Geometric theory of urban networks: analysis of complex urban networks	Master	Course objective 2、3、4	PPT	6	0
		2	Urban fractal geometry theory: scale, self-similarity and complexity analysis	Master				
		3	Dynamic Urban Geometry: Simulation of Urban Geometric Evolution	Master				
3	Urban geometry and socio-economic effects	1	Urban geometry and socio-economic effects	Master	Course objective 2、3、4	PPT	7	0
		2	Urban Geometry and Cultural Landscape	Master				
		3	City geometry in the new data environment	Master				
		4	New Developments and Reflections in Urban Geometry Research	Acquaintance				

3. The connotation of "moral education" in the curriculum

Urban geometric elements are the concrete embodiment of the city and the main object of urban planning and design. The arrangement of urban geometric elements is important for the implementation of spatial justice and ensuring steady and high-quality socio-economic development. This course will cultivate a correct understanding of urban geometric elements and their socio-economic implications, motivate students to adhere to professional ethics in the process of practice, pursue scientific truth and social justice, and contribute to the sustainable development

of society.

4. Assessment, grading methods, and retake requirements

The course assessment takes the form of a combination of the usual grades (attendance + extra-curricular assignments) and a final paper examination, accounting for 50% and 50% of the total grade respectively (on a percentage basis).

In the premise of passing the usual grade re-take can be exempted from the examination; failing the usual grade need to repeat with the class.

Assessment method	Percentage	Supported course objectives	Notes
Course participation	20%	Course objective 1	Full attendance is 100 points, 1 missed class, minus 10 points, 4 or more missed classes will result in a failing grade for this item.
		Course objective 2	
		Course objective 3	
		Course objective 4	
Out-of-class assignment 1	20%	Course objective 2	Urban Geometric Analysis Methods Assignment 1, to be completed outside of class, independently on the computer, in English as the language of assignment.
		Course objective 3	
		Course objective 4	
Out-of-class assignment 2	20%	Course objective 2	Urban Geometric Analysis Methods Assignment 2, to be completed outside of class, independently on the computer, in English as the language of assignment.
		Course objective 3	
		Course objective 4	
Final paper	50%	Course objective 1	The final paper should be written in English according to the topic proposed by you, and the marks will be reduced according to the seriousness of the case.
		Course objective 2	
		Course objective 3	
		Course objective 4	

5. Evaluation criteria

1. Evaluation criteria for course participation

Supported course	Evaluation details and score

	100-90	89-80	79-70	69-60	59-0
Objectives 1-4	Full attendance; completion of all paper critiques; active participation in Q&A.	1 absence; 1 missed paper critique; less active participation in Q&A.	2 absences; 2 missed paper critiques; participation in Q&A.	3 absences; 3 missed paper critiques; few participations in Q&A.	4 or more absences; 4 or more missed paper critiques; no participation in Q&A.

2. Evaluation criteria for research proposals

Supported course objectives	Evaluation details and score				
	100-90	89-80	79-70	69-60	59-0
Objectives 1-4	Submitted on time; clear research questions; ability to review relevant literature and identify knowledge gaps; appropriate research methods; clear and feasible technical route; appropriate writing.	Submitted on time; less clear research questions; ability to review relevant literature; less appropriate research methods; less clear and feasible technical route; less appropriate writing.	Submitted on time; research questions are basically clear; can review some relevant literature; research methods are basically reasonable; technical lines are feasible; writing is basically appropriate.	Short late submission; research question is fair; can list relevant literature; research method is fair; the technical route is fair; writing is fair.	Severe overdue or non-submission; unclear research questions; lack of literature review; unreasonable research methods; infeasible technical routes; and inappropriate writing.

6. Textbooks and main reference books

Name of teaching book	Authors	Press	Edition	ISBN	Textbook situation	Textbook/Main reference books
Space is the machine: a configurational theory of architecture	Bill Hillier	Cambridge Press	1	9780521645287		Main reference book
Cities and complexity: understanding cities with cellular	Michael Batty	The MIT Press	1	9780262025836		Main reference book

Name of teaching book	Authors	Press	Edition	ISBN	Textbook situation	Textbook/Main reference books
automata, agent-based models, and fractals						