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The Construction and Integrated Teaching of Core Courses in Urban and Rural Planning Profession under the Territorial Spatial Planning System

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Abstract: *Based on the background of territorial spatial planning system, this study on teaching practice research examines the necessity of core curriculum reform and discusses the characteristics of the core curriculum system in the field of urban and rural planning under the context of territorial spatial planning. Building upon this foundation, a knowledge graph of territorial spatial planning is constructed by focusing on the core content and technical points within the territorial spatial planning system. Additionally, case-based integrated teaching is implemented to enhance the connection between core courses and establish a logical framework for integrated teaching of core courses within the territorial spatial planning system. This plays a critical role in promoting the integration of curriculum systems and talent development.*

Keywords: *Territorial Spatial Planning System, Urban and Rural Planning, Core Curriculum System, Linkage Teaching*

1. Introduction

China has established the overall framework of the territorial spatial planning system in 2019. Since then, research and practice in urban and rural spatial planning have been carried out nationwide under the new system of "five levels and three categories" of territorial spatial planning. This reform in the structure and policies of the planning system has had a significant impact on the training of traditional urban and rural planning professionals and the curriculum teaching system [1]. Currently, land spatial planning is still in the preliminary stage of practice in terms of compilation procedures, planning levels, content frameworks, and technical requirements. However, the technical operation requirements based on spatial planning, integration of multiple planning regulations, and interdisciplinary collaboration have been clearly stated. As an integrated applied discipline, urban and rural planning education has always been closely connected with national policies and industry practices. The establishment of the land spatial planning system not only poses challenges to the development of the urban and rural planning discipline but also presents new demands for the training of professionals in this field [2-3]. The current framework of the urban and rural planning curriculum teaching system still primarily revolves around the traditional knowledge and skills training of the urban and rural planning system. In response to the new requirements of interdisciplinary integration, collaboration, and the territorial spatial planning system, the talent development programs, curriculum systems, teaching content, and teaching resource construction are all in the early stage of active exploration and research practice. How to actively respond to the applicability development of planning professionals under national policies and industry changes is a common problem and challenge faced by all universities in the transitional period of urban and rural planning talent development[4-5].

In the talent development program, the core curriculum system plays a crucial role in establishing the logical framework of professional knowledge, cultivating professional skills, and enhancing professional competitiveness for students. Under the background ofterritorial spatial planning, the updating of teaching content and reform of teaching methods in the core courses of urban and rural planning profession need to keep pace with the times in order to cultivate planning and design professionals with comprehensive qualities and practical abilities that are adaptable to the future. Therefore, this study aims to explore the integrated teaching mode of the core curriculum group in the field of urban and rural planning profession under the background of territorial spatial planning[6-8]. It focuses on the teaching logic, teaching content, and methods, aiming to enhance students' abilities to

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meet the knowledge and practical application requirements of territorial spatial planning in the new era.

2. Reform Necessity of Core Curriculum System in Urban and Rural Planning Profession under the Background of Land Spatial Planning

2.1 Reform of Territorial Spatial Planning System

In 2019, China passed the Amendment to the Land Management Law of the People's Republic of China, clearly establishing the national land spatial planning system. Since then, legally approved land spatial planning has become the fundamental basis for various development, protection, and construction activities. With the establishment and implementation of the land spatial planning system, overall land use planning and urban-rural planning will no longer be separately formulated and approved[9-10]. Instead, a national spatial planning system is being established to supervise its implementation, integrating various spatial planning aspects such as functional zoning, land use planning, and urban-rural planning into a unified land spatial planning system, achieving "integration of multiple planning regulations." The new land spatial planning system constructs a planning framework known as the "five levels, three categories, and four systems" (As shown in Figure 1). It includes overall planning, detailed planning, and relevant special planning for the development and protection of certain regional land spatial areas. Among them, overall planning consists of five levels: national, provincial, municipal, county, and township Territorial spatial planning[11-12]. The four systems refer to the formulation and approval system, implementation and supervision system, regulatory and policy system, and technical standards system. The territorial spatial planning system is based on "dual evaluation," coordinating ecological, agricultural, and urban spaces. It delineates the "three zones and three lines" to implement land spatial control, establishes a national land information platform, and creates a nationwide "one map" for land spatial development and protection. It serves as an important guarantee for the implementation of scientific and strategic development at the national level [3]. Overall, the new planning system emphasizes the integrity, scientificity, and sustainability of land spatial planning and control in terms of planning objectives, formulation methods and techniques, and regulatory and implementation procedures.

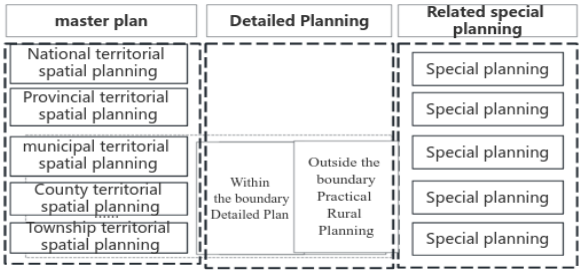

Figure 1: Territorial spatial planning system

2.2 The Differences between Traditional Core Curriculum System and Talent Development in Land Spatial Planning.

The urban and rural planning profession is aimed at training professionals who can adapt to and serve the national urban and rural construction. National urban and rural development is a dynamic process closely aligned with national strategic deployments and has strong policy orientation. Therefore, the design of traditional urban and rural planning talent development programs and core curriculum systems is closely linked to the national urban and rural planning and construction system.

Under the original urban and rural planning system, based on the guidance for undergraduate urban and rural planning programs in higher education institutions (2013 edition), the knowledge system of traditional urban and rural planning profession can be roughly divided into five modules: urban and regional development, urban and rural planning theory, urban and rural spatial planning, urban and rural special planning, and urban and rural planning practice. According to the core knowledge points of these five modules, the guidelines propose that undergraduate urban and rural planning programs should include the following types of core courses: urban and rural planning principles, urban and rural ecology and environmental planning, geographic information system application, urban construction history and planning history, urban and rural infrastructure planning, urban and rural road and

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transportation planning, overall urban planning and town planning, detailed planning and urban design, urban and rural social comprehensive survey and research, and urban and rural planning management and regulations, totaling ten courses [13-16].

The emergence of the territorial spatial planning system, under the background of "integration of multiple planning regulations," has placed new requirements on talent development. Currently, the traditional core curriculum system of the urban and rural planning profession does not align well with the knowledge, technology, and policy system of land spatial planning, especially in terms of professional knowledge modules, urban and rural planning techniques and methods, and integration of interdisciplinary knowledge.

3. Design of Core Curriculum System in Urban and Rural Planning Profession under the Background of Land Spatial Planning

3.1 Research and Practice on Knowledge System Oriented Towards the Core Elements of Land Spatial Planning

Since the release of the "Guiding Opinions on Strengthening the Construction of Disciplines and Talents in Key Areas of Economic and Social Development" by the National Development and Reform Commission, Ministry of Education, and Ministry of Finance in 2021, the study of curriculum systems for talent development in territorial spatial planning has become an important topic in the development of the urban and rural planning discipline and profession [17]. Scholar Sun Shiwen proposed a comprehensive content that covers the entire land spatial planning system during the first "Land Spatial Planning Annual Conference and Planning Discipline Construction Conference." Based on the needs of land spatial planning work, the barriers between different disciplines are broken, and the categories and framework structure of knowledge content under the land spatial planning system are determined (As shown in Figure 2). Scholar Zeng Peng proposed the "five categories and twelve groups" land spatial planning system, which includes five major categories of curriculum systems: planning theory, planning methods, management and implementation, technical support, and planning practice. The planning theory category mainly includes basic principles and interdisciplinary spatial theory courses. The planning methods category includes spatial layout methods, supporting element courses, and detailed planning methods. The management and implementation category includes spatial control courses and urban management courses. The technical support category includes measurement and analysis techniques, as well as spatial analysis techniques[18-20]. The planning practice category includes overall planning practice, detailed planning practice, and special planning practice. These studies and practices on the logical framework of knowledge based on the land spatial planning system have laid a solid foundation for the adaptive training of professionals in the urban and rural planning field.

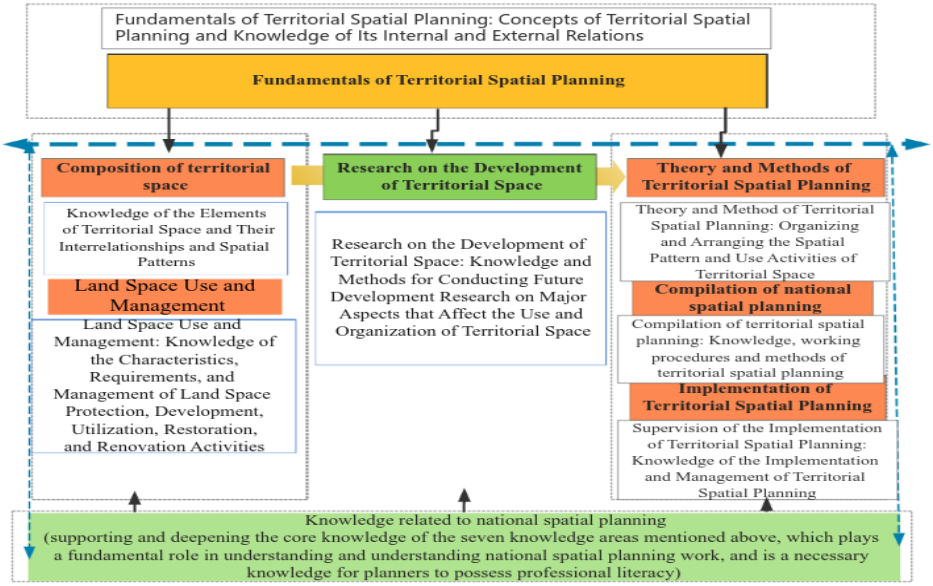

Figure 2: Knowledge System Structure of Land Spatial Planning (Theoretical Source: Sun Shiwen 2023)

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3.2 Design of Curriculum System for Urban and Rural Planning Program at Our Collage

Focusing on cultivating professionals who serve the national urban and rural construction, possess a sense of social responsibility and good professional ethics, and have humanistic and scientific literacy, the overall objective of our urban and rural planning program is to develop high-quality innovative and applied talents with the following qualities: basic theoretical knowledge in urban and rural planning, proficiency in the theories, principles, and technical methods of land spatial planning, familiarity with industry standards and norms in the field of urban and rural planning, practical skills in planning and design, abilities in planning construction management and comprehensive coordination, and creative thinking and integrated design capabilities. In the design of our curriculum system, we adhere to the laws of talent development in urban and rural planning, integrate multiple disciplines such as architecture, ecology, sociology, urban geography, regional economics, landscape architecture, land resource management, and art, highlighting the training of talents in the context of interdisciplinary integration in land spatial planning. At the same time, we establish a core curriculum chain that consists of fundamental theories of land planning, techniques and methods of land spatial planning, and planning implementation practices, emphasizing the integration between the land spatial planning system and the curriculum system [21-22]. In line with the positioning of cultivating innovative talents, we strengthen the curriculum system for innovation practice, conduct specialized comprehensive practices based on new theories, new technologies, and new methods, and enhance students' abilities to meet the diverse talent demands in land spatial planning (As shown in Figure 3).

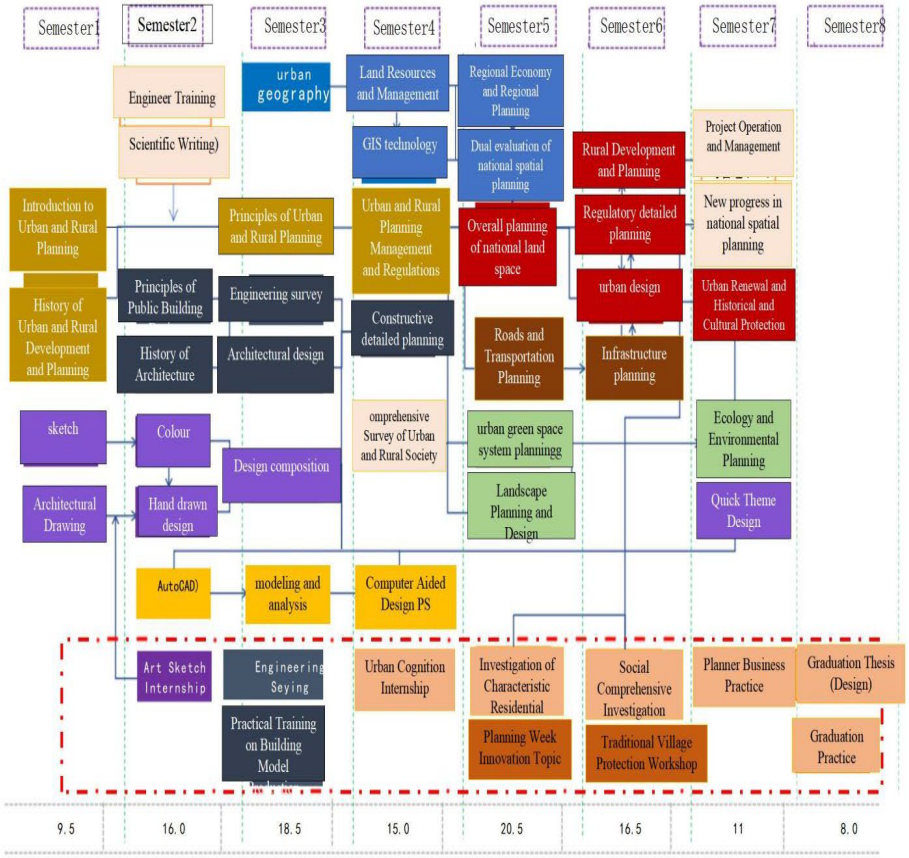

Figure 3: 2022 Undergraduate Talent Training Curriculum System for Urban and Rural Planning at Our Collage

4. Construction and Practice of Integrated Teaching Model in Core Curriculum System

The urban and rural planning program firstly enrolled students in 2017 in our collage. Undergraduate education in this field is currently undergoing a transition between the old and new urban and rural planning systems. The knowledge system of territorial spatial planning, curriculum reform, and the development of textbooks in the field of territorial spatial planning are currently in the

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early stages of rapid updates and iterations at universities nationwide. This brings significant challenges and teaching pressures in terms of providing quality education and serving the strategic development of the country. It is urgently needed to develop a practical and feasible teaching model that integrates teaching content and practices of spatial planning into the core curriculum system of the profession to compensate for the lag in curriculum systems and teaching resources[23].

In this study, we have explored and implemented an integrated teaching approach within the core curriculum system. This approach includes updating the core curriculum system, constructing a knowledge and technical method map for core knowledge in territorial spatial planning, and incorporating case studies throughout the curriculum system to ensure integrated teaching.

4.1 Continuity and Updating of the Core Curriculum System

Taking into consideration the bench-marking requirements for talent development, the urban and rural planning program adheres to the "National Standards for Undergraduate Programs in General Higher Education Institutions" and the "Guidelines for Undergraduate Urban and Rural Planning Programs in Higher Education Institutions (2013 edition)" as the standards in our collage. At the same time, in alignment with the talent development transformation requirements of the land spatial planning system, we have constructed a core curriculum group for the profession. The core curriculum group of the latest talent development program mainly consists of the following courses: Principles of Urban and Rural Planning, Overall Territorial Spatial Planning, Dual Evaluation of Territorial Spatial Planning, GIS Applications in Urban and Rural Planning, Urban and Rural Infrastructure Planning, Urban and Rural Road and Transportation Planning, Regulatory Detailed Planning, Urban Design, Urban and Rural Planning Management and Regulations, Urban and Rural Ecology and Environmental Planning, and Construction Detailed Planning.

4.2 Construction of the Knowledge and Technical Method Map for Territorial Spatial Planning

Table 1: Core course group integration into national spatial planning knowledge graph

Course Name	Original Planning System Theory	Integration of Land Spatial Planning Theory
Principles of Urban and Rural Planning	City and Urbanization Development of urban planning ideas Urban Master Planning System and Compilation Content	The Thinking Method and Values of Territorial Spatial Planning National Land Spatial Planning System and Compilation Content and Procedure Classification of land and sea use for land spatial survey, planning, and use control Regulations, policies, and standards related to national spatial planning Territorial spatial ecology and environmental restoration system
Overall planning of national land space	Urban population, industry, economy Urban functional area planning Positioning of urban overall planning	Land spatial planning system Delineation of "Three Zones and Three Lines" Dual evaluation and planning evaluation of national land and space Compilation Technology of Land Spatial Planning Case analysis of national spatial planning
Dual evaluation of national spatial planning		Dual evaluation system and technical methods for land spatial planning
Application of Urban and Rural Planning GIS	GIS technology	Utilization of GIS Technology in Land Spatial Planning
Urban and rural infrastructure planning	Infrastructure planning Design of municipal engineering pipeline network	----
Urban and Rural Roads and Transportation Planning	Urban and Rural Roads and Transportation Planning	-----
Regulatory detailed planning	Content and Procedures for Compiling Regulatory Detailed Planning	Method for Compiling Regulatory Detailed Planning under the Territorial Space System
Urban design	Urban design	Urban design in the context of national spatial planning
Urban and Rural Planning Management and Regulations	Urban and Rural Planning Management and Regulations	Supervision and spatial control over the implementation of national spatial planning
Urban and Rural Ecology and Environmental Planning	Urban and Rural Ecology and Environmental Planning	Delineation Technology for Ecological Protection Red Line of "Three Zones and Three Lines" in National Land Space; Special planning for ecological space
Land Resources and Management	land resource Land use system	Management of Land Space Use Urban construction land use and management Rural collective land use and management
Rural Development and Planning	Rural planning	Practical Village Planning

In line with the "five levels and three categories" planning system of territorial spatial planning, the

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core contents of territorial spatial planning, including the basic theories and formulation methods of territorial spatial planning, land spatial composition, land spatial use and management, and territorial spatial planning implementation, are integrated into the curriculum system. At the same time, while respecting the historical development of urban and rural planning and adhering to the teaching laws of talent development, the curriculum teaching ensures the integration and connection of knowledge between the old and new planning systems. This means incorporating the knowledge points of the territorial spatial planning system into the core curriculum system of the profession, constructing a knowledge and technical method map for territorial spatial planning, and enhancing the relevance and connectivity of the core curriculum system[24].

Based on the technical points of territorial spatial planning formulation in the "five levels and three categories" planning system and the planning control of the "three zones and three lines," the core knowledge points of it, such as the fundamental theories, formulation techniques, and implementation and management of territorial spatial planning, are respectively integrated into the core and major courses such as Principles of Urban and Rural Planning, Territorial Spatial Planning (formerly Urban Master Plan), Dual Evaluation of Land Spatial Planning, GIS Applications in Urban and Rural Planning, Regulatory Detailed Planning, Urban and Rural Planning Management and Regulations, Urban and Rural Ecology and Environmental Planning, Land Resources and Management, and Rural Development and Planning (As shown inTable 1). This achieves the knowledge connection and expansion between the old and new planning systems, meeting the dual-line integration and development of students' professional knowledge and skills during the transitional period.

4.3 Integration of Case Studies in the Curriculum System for Integrated Teaching

To achieve integrated teaching in the core curriculum system and effectively enhance the connectivity between the courses in the old version of talent development program and the knowledge system of territorial spatial planning, the teaching team utilizes local land spatial planning practice projects as continuous case studies throughout the core curriculum system. These case studies are integrated into the teaching and practical segments of core courses such as "Principles of Urban and Rural Planning - Overall Land Spatial Planning - Dual Evaluation of Land Spatial Planning - Urban and Rural Infrastructure Planning - Regulatory Detailed Planning - Urban and Rural Ecology and Environmental Planning - Land Resources and Management - Urban and Rural Planning Management and Regulations."

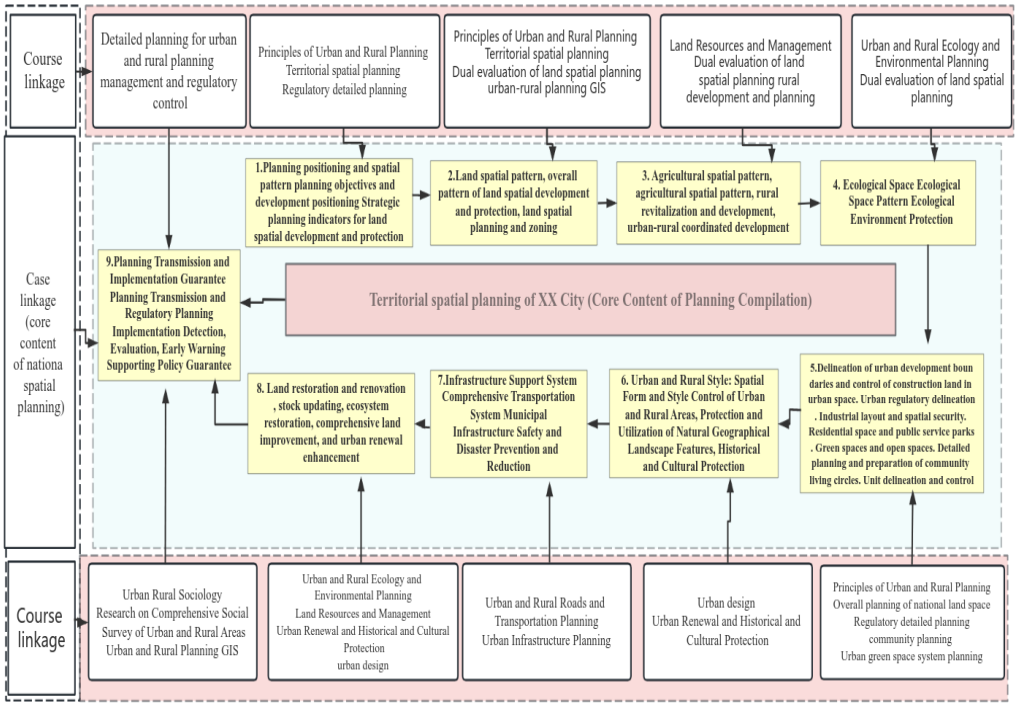

Figure 4: Linkage relationship between core curriculum system and case teaching of national spatial planning

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By decomposing the knowledge graph of core courses under the territorial spatial planning system and combining it with specific case studies of "municipal-level land spatial planning," specific technical requirements of the municipal-level territorial spatial planning process in a particular city were derived. A total of 30 core technical points across 9 major sections were identified. These were then matched with the knowledge graph of the curriculum system, which includes the core content and technical points of land spatial planning formulation. This clarifies the relationship between the content of the core curriculum system and the interconnections of the courses (As shown in Figure 4), thereby creating a logic for the integrated teaching of the core curriculum system. The specific city practice case serves as a link between practical teaching in various courses. It strengthens understanding and enables students to systematically study the entire process of a city's "land planning-detailed planning-specialized planning" core aspects, thereby enhancing their ability to adapt to future comprehensive land spatial planning practices.

5. Conclusion and Outlook

The territorial spatial planning system is an important national policy for coordinating urban and rural land spatial planning and achieving sustainable development. The training of professionals in the urban and rural planning field who can meet future national urban and rural construction needs is vital for land spatial planning and practice. The core curriculum system, as the central teaching component of talent development, plays a crucial role in constructing the logical framework of students' professional knowledge and theoretical understanding and shaping their practical skills. This research on teaching practice focuses on the core content and technical points under the territorial spatial planning system, constructing a knowledge graph of territorial spatial planning within the core curriculum system. Additionally, through case-based integrated teaching, the connection between core courses is strengthened, thereby establishing a logical framework for integrated teaching of the core curriculum system within the land spatial planning system. This plays an important role in promoting the integration of curriculum systems and talent development.

However, it is important to note that this research primarily focuses on the core curriculum system and has certain limitations in terms of interdisciplinary integration and the training of professionals in territorial spatial planning that align with the "integration of multiple planning regulations." To comprehensively address the training needs of professionals in the territorial spatial planning field, further research and development are required to study and construct a talent development system that can adapt to the comprehensive demands of future urban and rural planning professionals.

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