

Exploration on Ideological and Political Education in Civil Engineering for High-Level Research-Oriented Universities: A Case Study of Basic Principles of Steel Structure Course

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Publication Date: 2026/05/29

Abstract: Curriculum ideological and political construction is an effective way to promote the modernization of education and build an educational powerhouse, and it has important practical significance to foster socialist builders and successors. This paper takes Fundamentals of Steel Structures of Civil Engineering as an example and analyzes the necessity of curriculum ideological and political construction. On this basis, curriculum ideological and political construction of the Fundamentals of Steel Structures course is explored from three aspects: construction of teachers' ideological and political literacy, mining ideological and political elements in teaching content, and teaching design and organization of ideological and political integration in the curriculum.

Keywords: Curriculum Ideology and Politics; Civil Engineering; Teaching Reform; Steel Structure.

How to Cite: Peiyuan Chen; Jinjin Ge; Xueyan Liang; Jin Li (2026) Exploration on Ideological and Political Education in Civil Engineering for High-Level Research-Oriented Universities: A Case Study of Basic Principles of Steel Structure Course. *International Journal of Innovative Science and Research Technology*, 11(5), 2305-2309. <https://doi.org/10.38124/ijisrt/26may1255>

I. INTRODUCTION

Civil Engineering education currently exhibits several notable characteristics. These include insufficient cultivation of cultural literacy, a narrow scope of professional education, and utilitarian phenomena. These factors tend to cause college students to place greater emphasis on learning professional knowledge. Consequently, they often display superficial cultural foundations and a lack of social responsibility. To a certain extent, these issues restrict students' individual development and the improvement of their comprehensive qualities. "Teaching and educating people" has always been the principle upheld by educators. If "teaching" is understood as the imparting of professional knowledge, then the subtle process of "educating people" should play a leading role in the cultivation of talents.

In May 2020, the Ministry of Education of the People's Republic of China issued the Guidelines for Ideological and Political Construction of Courses in Higher Education Institutions (hereinafter referred to as the "Guidelines"). These Guidelines require that the construction of curriculum

ideological and political education should focus on comprehensively improving the ability of talent cultivation, and should be promoted across all universities, colleges, disciplines, and majors nationwide^[1]. Integrating curriculum ideological and political education into professional course teaching in Civil Engineering is a positive response to the Guidelines. The essence of curriculum ideological and political education is to integrate ideological and political education into knowledge teaching. This integration ensures that knowledge imparting and core values are highly aligned. Furthermore, it aims to cultivate socialist successors with innovative technical skills, build a pattern of "Three-wide education", and realize the fundamental task of fostering virtue through education. Frontline faculty in colleges and universities bear an unshirkable responsibility for the construction of curriculum ideological and political education in professional courses.

Integrating ideological education into Civil Engineering relies on finding natural connection points to evoke emotional resonance during technical instruction. By fostering professional and social responsibility, this approach enhances

students' autonomous learning abilities, enabling them to develop an innovative mindset and put it into practice in both their studies and careers [2]. Currently, two critical issues urgently need to be addressed. First, how to deeply explore the ideological and political elements within professional courses. Second, how to integrate ideological and political education seamlessly and subtly into professional instruction.

This paper explores approaches for integrating ideological and political education into professional courses, using the Steel Structure course in Civil Engineering as a case study. Through curriculum design, frontier achievements in ideological disciplines are transformed into professional teaching content. This approach not only deepens the ideological orientation of the course but also enhances its persuasive power. By fully leveraging the guiding and motivating functions of this education, educators guide students to establish correct views on learning, quality, and talent, thereby stimulating their autonomy, self-discipline, and innovativeness in learning.

II. TEACHING OBJECTIVES AND TASKS OF FUNDAMENTALS OF STEEL STRUCTURES COURSE

The Fundamentals of Steel Structures course is a key bridging course in the Civil Engineering program. It aims to provide a solid theoretical foundation and analytical methods for subsequent structural design and engineering practice. Its core task is to help students establish a foundation in steel structure analysis and design, building a bridge from fundamental mechanics principles to complex engineering design [3].

The Fundamentals of Steel Structures course is one of the core compulsory foundational courses in the Civil Engineering major. The purpose of the course is to lay a foundation for students subsequent professional course learning, graduation design, and future engagement in the design, construction, and research of steel structures. The objective of the course is to enable students to comprehensively master the basic concepts. It enables students to comprehensively master the basic concepts, fundamental theories, methods, and essential skills related to steel structural materials, members, connections, and their design. Second, it requires students to understand the system composition and detailing requirements of steel structures. Furthermore, it guides students to stay informed about the development trends of new materials, systems, technologies, and engineering practices within the discipline. Through the teaching of the Fundamentals of Steel Structures course, students are expected to develop the following fundamental abilities:

- Students should master the design principles and design concepts of steel structures. They are expected to develop engineering awareness and basic competence in solving practical steel structural engineering problems.
- Students should be able to apply fundamental theories and design methods of steel structures. By utilizing engineering analysis and design software, they can evaluate the mechanical behavior and connection

characteristics of practical structures. This allows them to effectively solve corresponding engineering problems.

- Students should become familiar with and understand relevant codes, regulations, and standards for prestressed steel structures. They are expected to develop the basic ability to solve practical engineering problems in accordance with current specifications.

III. NECESSITY ANALYSIS OF CURRICULUM IDEOLOGY AND POLITICS CONSTRUCTION

In recent years, reports on inappropriate statements made by university students have frequently emerged [4]. Earlier cases include a student surnamed Yang, who, while studying abroad, made remarks praising “how sweet the air in the United States is”. Later, a master’s student and Party member surnamed Tian from Xiamen University published incorrect statements on Sina Weibo. And more recently, a postgraduate student surnamed Ji from the University of Chinese Academy of Sciences posted “China-insulting remarks” on Twitter. These incidents undoubtedly reflect deficiencies in patriotic education within universities, and also highlight the urgency and necessity of strengthening ideological and political education in higher education institutions.

Ideological and political education cannot rely solely on ideological and political theory courses; professional courses should also serve as an important platform for such education. This is because professional course teaching is more closely connected with students. The knowledge embedded within professional disciplines inherently contains deeper value orientations, ethical perspectives, and political principles. This method allows for a subtle and imperceptible way of ideological and political education, avoiding the direct and explicit approach of traditional ideological and political courses. Such an approach is more conducive to fostering the development of students' ideological and moral qualities.

Through the ideological and political teaching of this course, students can be cultivated to develop a strong sense of social responsibility and engineering safety awareness. Meanwhile, it enhances their sense of responsibility and commitment, and stimulate patriotic spirit and the strengthening of ideological conviction. Ultimately, throughout their four-year university education, students will gradually develop into a new generation of young people with solid professional theoretical knowledge and excellent ideological and political quality. Most importantly, they will be capability to shoulder the mission of national rejuvenation.

IV. CONSTRUCTION APPROACHES OF CURRICULUM IDEOLOGY AND POLITICS IN FUNDAMENTALS OF STEEL STRUCTURES COURSE

For the Civil Engineering program in higher education institutions, the core of Curriculum Ideological and Political construction for the Fundamentals of Steel Structures course lies in three dimensions. Professional teachers as the key, professional knowledge as the source, and instructional

design and organization as the implementation carrier. Therefore, during the construction of Curriculum Ideology and Politics (CIP), three key measures must be implemented. First, we need to strengthen the ideological and political cultivation of course instructors. Second, we should deeply explore the ideological and political elements embedded in the course. Finally, we must construct teaching design and classroom organization that integrate CIP education.

A. Strengthening the Construction of Ideological and Political Literacy Among Professional Course Teachers

As professional course instructors, teachers should first transform their mindset by shifting from being “outsiders” of ideological and political education to becoming “active participants” in promoting curriculum ideological and political construction. Only in this way can the true value and mission of Higher Education Institutions teachers be realized—namely, cultivating socialist builders and successors.

To improve their ideological and political literacy, multiple approaches and perspectives can be adopted in practice. First, relying on various university teacher training centers or online learning platforms. Instructors should participate in re-education on ideological and political courses to enhance their ideological awareness and cognitive understanding. Second, they should actively engage in teaching activities related to ideological and political education. Such as master teacher classrooms, teaching competitions, and instructional design contests, so as to strengthen their ability to design curriculum ideological and political elements. Third, communication and exchange with ideological and political theory instructors should be strengthened. Professional course teachers should fully leverage the advantages of small-class teaching to analyze generational characteristics, personality differences, and interests of students in their disciplines. While ideological and political theory teachers should utilize their strengths in theoretical literacy and moral cultivation. Through mutual complementarity, both sides can enhance students’ emotional resonance with ideological and political education, thereby forming a synergistic effect between ideological and political theory courses and curriculum ideological and political education, and improving its effectiveness. Finally, relying on grassroots teaching organizations such as departmental teaching and research offices, teaching teams, and course groups, a teaching and research system for curriculum ideological and political education should be established. Through teaching and research activities, experiences in ideological and political education should be shared to further improve practical teaching competence in moral education integration.

B. In-Depth Exploration of Ideological and Political Elements in the Course of Fundamentals of Steel Structures

The construction of curriculum ideological and political education in the Civil Engineering major must fully integrate disciplinary characteristics, teaching content, and talent cultivation objectives. It should continuously explore moral education elements that can be embedded into professional

courses, so as to carry out teaching activities in forms that are readily accepted by students. Taking the Fundamentals of Steel Structures course as an example, elements such as the “Belt and Road Initiative” and the “craftsman spirit” are selected as entry points for ideological and political education. This approach aims to enlighten students’ thinking and maximize the role of the classroom as the main educational channel.

Integrating the “Belt and Road Initiative” into curriculum ideological and political teaching in Civil Engineering. By focusing on infrastructure construction and collaborative efforts in key technological projects along these regions, students are guided to understand the background and requirements of overseas engineering projects [5]. Leveraging the opportunities embedded in such initiatives, national strategies are connected with professional needs. To encourage students to plan their career development and to maintain a positive outlook on the future development of the industry. Promoting the craftsman spirit in curriculum ideological and political teaching not only emphasizes the cultivation of students’ awareness of engineering quality, but also encourages originality and ingenuity. Students are guided not to be constrained by traditional thinking in engineering practice, to learn to break conventions, and to continuously achieve breakthroughs and innovation, while pursuing excellence in engineering construction [6].

The integration of ideological and political elements aims to innovate the methods of moral education through immersive teaching, social practice education, and comprehensive quality-oriented education. By fully leveraging the guiding role of these elements in the teaching process, students are encouraged to actively practice the Belt and Road Initiative and to promote the craftsman spirit. This not only improves students’ comprehensive development in professional knowledge, ideological education, moral education, disciplinary training, general education, and humanistic literacy. It also cultivates a professional attitude characterized by precision, rigor, pragmatism, meticulousness, and the pursuit of perfection..

C. Integration of Curriculum Ideology and Politics into Teaching Design and Organization

The construction of curriculum ideological and political education in the Fundamentals of Steel Structures course within the Civil Engineering program ultimately takes the classroom as its main channel and implementation point. The quality of classroom teaching is primarily reflected in pre-class instructional design and in-class organization.

➤ *Optimization of Instructional Design*

In the analysis of learning conditions and the formulation of teaching objectives, we should consider not only professional knowledge and competency requirements. We should also analyze students’ ideological dynamics and explicitly incorporate curriculum ideological and political objectives, thereby reflecting their integration. At the teaching content design stage, ideological and political content should be added alongside professional knowledge. Such elements should also be considered in the analysis of

key and difficult points to ensure coherence between ideological and political education and professional teaching.

In the instructional method design stage, attention should be paid to diversifying teaching approaches for curriculum ideological and political education. Methods such as heuristic teaching, research-oriented teaching, case-based teaching, and Problem-Based Learning (PBL) can be adopted to achieve the integration of ideological and political education with professional instruction. In the teaching feedback stage, both formative and summative feedback should be emphasized. Teaching effectiveness can be evaluated through multiple channels such as regular assignments, final examinations, and questionnaires. This helps analyze students' authentic perceptions and their level of identification with Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, while establishing pathways and methods for continuous improvement.

➤ *Enriching Classroom Formats*

In classroom organization, teaching should not be limited to traditional lecture-based instruction. Instead, diversified classroom formats should be adopted based on the characteristics of professional knowledge and ideological and political elements. These formats can stimulate students' learning interest and guide them to conduct deeper reflection.

For example, in the teaching of Section 1.1, classroom instruction can be organized through video viewing and thematic discussion. Before class, students are assigned group tasks to conduct a "survey report on landmark steel structure projects." In class, representatives from each group present their findings. Documentary materials are used as ideological and political resources. They range from the "Bird's Nest" and "Water Cube" of the Summer Olympic Games to the "Snow Dragon", "Snow Feiyan", "Ice Ribbon", as well as projects such as Beijing Daxing International Airport and the Hong Kong–Zhuhai–Macao Bridge. These landmark projects enable students to perceive national strength and strengthen their confidence in the institutional system. They also fulfill the ideological and political educational goal of "inspiring students through major national engineering achievements". This helps foster students' sense of national identity and their identification with socialism with Chinese characteristics.

In addition, modern information technologies should be effectively utilized in classroom organization to enrich the presentation of ideological and political elements. For instance, enabling real-time "bullet screen" interaction during video playback allows students to express their immediate thoughts. This practice not only enhances classroom engagement but also increases the affinity of ideological and political materials. It thereby achieves a subtle and imperceptible educational effect.

V. CONCLUSION

Curriculum ideological and political education in the Civil Engineering program should take professional courses as the important carrier, professional teachers as the key factor, professional knowledge as the source, and classroom teaching as the implementation point. It thereby ensures that professional instructors possess the capability of ideological and political education. Within professional knowledge, we should excavate rich ideological and political elements. We should integrate concepts such as engineering quality awareness, craftsmanship spirit, and ecological civilization construction into the instructional design of curriculum ideological and political education as the core elements. In the process of knowledge transmission, guided by the Core Socialist Values, educators should fully guide students. They should encourage students to firmly strengthen the "Four Matters of Confidence", assume social responsibility, advocate innovation-driven development, and practice scientific spirit. In classroom teaching, value shaping of students should be effectively realized, thereby contributing to the formation of a comprehensive education system characterized by full-staff involvement, full-process coverage, and all-round cultivation.

ACKNOWLEDGEMENTS

The authors would like to acknowledge the anonymous reviewers for their valuable and constructive comments. This research is supported by the Quality Engineering Project of Anhui Provincial Department of Education that Research on the Method of Cultivating Graduate Students' Innovative Thinking Based on Logical Inspiration and Reinforcement (No. 2023jyxggjY123), Fundamentals of Steel Structures (No. 2022xskc013).

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