

Curriculum Ideology and Politics Teaching Design and Construction Path for Mathematical Geology

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Abstract

As a professional basic course for students majoring in resources prospecting engineering, mathematical geology not only has the characteristics of interdisciplinary, but also has the characteristics of serving for practical petroleum exploration. Therefore, it contains abundant curriculum ideology and politics elements. The curriculum ideology and politics design of mathematical geology should be based on a deep understanding of the curriculum ideology and politics connotation of the course, and determine the requirements and standards of curriculum ideology and politics integration of mathematical geology. On this basis, the curriculum ideology and politics teaching design of this course is carried out in the aspects of syllabus, course content, teaching methods, teaching ideas, textbook selection, course evaluation, resource case base establishment and so on. In the actual curriculum ideology and politics teaching and construction of mathematical geology, the key is to dig deep into curriculum ideology and politics elements of this curriculum. The curriculum ideology and politics elements of this curriculum is mainly from hot frontiers of mathematical geology, existing course contents, and oil and gas exploration. Finally, the students should cultivate their patriotism, scientific and rigorous attitude, pass on correct values, instill the artisan spirit, enhance their ability to solve practical problems, cultivate their innovative spirit of courage to explore and practical ability to solve petroleum geology problems.

Keywords

Mathematical geology; Curriculum ideology and politics; Patriotism; Science ethics.

1. Introduction

Since the 18th CPC National Congress, the fundamental education question of "What, How and for Whom to Cultivate" has been put forward (Feng, 2021). Curriculum ideology and politics is of great significance to the solution of this educational problem. General secretary Xi Jinping stressed in the national university ideological and political work: all kinds of specialized courses "should keep a canal, plant responsible fields and do the same as the political theory course" (Zhu, 2017), and form a collaborative effect (Qiu, 2018). As an important part of college students' courses, professional courses occupy nearly 80% of their learning time in their career. Therefore, it is necessary to carry out effective curriculum ideology and politics education teaching design and construction of professional courses (Ding, 2020; Ding and Zi, 2020).

Mathematics geology is a professional basic course for students majoring in resources prospecting engineering. Through the study of this course, we need to train students' ability of applying mathematics geology method for oil and gas resource evaluation, and lay the relevant foundation for students to analyze the complex geological problems in the process of resource exploration and evaluation, the economic evaluation of resource exploration engineering and the decision-making of management.

According to the characteristics of this course and its importance in the training plan, it is necessary to carry out the curriculum ideology and politics teaching design and construction of mathematical geology.

2. General Idea for Ideological and Political Elements Extraction

To design and construct the curriculum ideology and politics teaching of mathematical geology, we must first determine a general idea for ideological and political elements extraction. Based on the in-depth study of the Guiding Outline of Ideological and Political Construction of Higher Education Curriculum issued by the Ministry of Education in 2020, the teaching team believes that the integration of ideological and political elements in mathematical geology curriculum should be considered from the following two aspects.

2.1. Deeply Understanding the Connotation of Curriculum Ideology and Politics

A deep understanding of the connotation of curriculum ideology and politics is the premise and key to construct the curriculum ideology and politics teaching design of mathematical geology. According to the Guidelines for Ideological and Political Construction of Higher Education Curriculum issued by the Ministry of Education in 2020, "According to the characteristics and advantages of different disciplines, professional education courses should deeply study the educational objectives of different majors, and deeply dig and refine the ideological value and spiritual connotation contained in the professional knowledge system". Therefore, as a professional course of resources prospecting engineering, mathematical geology contains the ideological value and spiritual connotation of petroleum exploration, conveys the rigor and scientific spirit of petroleum scientific research, and also contains the patriotism of petroleum workers. It is of great significance for the curriculum ideology and politics teaching design and construction of mathematical geology course to extract these ideological and political elements deeply.

2.2. Grasping the Requirements and Standards of Curriculum Ideology and Politics Integration in the Curriculum

According to the Guidelines for Ideological and Political Construction of Higher Education Curriculum issued by the Ministry of Education in 2020, it is necessary to thoroughly sort out the teaching content of specialized courses, combine the characteristics, thinking methods and value concepts of different courses, deeply extract the ideological and political elements of the courses, organically integrate them into the course teaching, and achieve the effect of cultivating students silently. Based on this requirement, the curriculum ideology and politics construction of mathematical geology course should be: 1) In the classroom teaching, the teachers should combine education of Marxist position, viewpoint, and method with the cultivation of scientific spirit. 2) Because mathematical geology involves a lot of mathematical knowledge, so in the course teaching process, we should pay attention to the training of scientific thinking method and the education of scientific ethics, to cultivate students to explore the unknown, pursue the truth, and climb the peak of scientific responsibility and sense of mission. 3) As students majoring in resources prospecting engineering ultimately need to apply what they have learned to explore oil and gas, they should cultivate the artisan spirit of a great country that strives for perfection, and stimulate their patriotism and their sense of mission.

3. The Idea of Curriculum Ideology and Politics Teaching Design

For mathematical geology, it is necessary to carry out the curriculum ideology and politics teaching design from the aspects of curriculum syllabus, curriculum content, teaching methods,

teaching ideas, textbook selection, curriculum evaluation, resource case base establishment and so on. The focus should be on the following three aspects:

3.1. Ideological and Political Elements into the Syllabus

According to the graduation requirements of students majoring in resources prospecting engineering, the curriculum ideology and politics objectives of mathematical geology course are formulated. On this basis, the teaching contents, teaching methods, examination contents, selection of teaching materials, examination contents and methods involved in the syllabus are revised to fully integrate the ideological and political elements. In the process of revision, each teaching link should be carefully implemented to ensure the integration of ideological and political elements in each chapter, and the curriculum ideology and politics teaching objectives of each chapter should be clarified.

3.2. Ideological and Political Elements into Classroom Teaching

After the ideological and political elements enter the syllabus, the key lies in the implementation. The classroom is the main place to carry out the ideological and political education, so how to integrate the ideological and political elements in the mathematical geology syllabus into the classroom teaching is the key. In the classroom teaching of mathematical geology, the teaching team deeply extracted the ideological and political elements involved in each chapter. In the actual teaching, the ideological and political elements will be in-depth into the classroom teaching in the form of typical role models, practical exploration cases, videos and so on.

3.3. Changing Teaching Methods and Methods, Organically Integrating the Ideological and Political Elements into Curriculum

It is necessary to change the teaching mode and method in order to achieve the effect of moistening things silently. As a course combining mathematical knowledge and geological knowledge, mathematical geology has the characteristics of interdisciplinary, so in the teaching process, it is necessary to change the teaching methods to achieve the integration of ideological and political elements. In the actual teaching process, by selecting the character deeds closely related to the chapter content (e.g., Mathematician Hua Luogeng, academician Zhao Pengda, academician Weng Wenbo, etc.), the scientific attitude embedded in mathematics, the artisan spirit and the patriotism reflected in the actual work of petroleum explorers, etc., using PPT + rain class + blackboard writing, teaching methods such as interactive, discussion and heuristic are adopted to carry out teaching. Finally, the ideological and political education elements are organically integrated into teaching.

4. The Extraction of Ideological and Political Elements in Mathematical Geology Course

In the actual teaching and construction of curriculum ideology and politics, the extraction of ideological and political elements is the most crucial. The ideological and political elements of this curriculum is mainly from hot frontiers of mathematical geology, existing course contents, and oil and gas exploration. In mathematical geology, the following ideological and political education elements can be extracted:

4.1. Patriotism and Values

There are too many ideological and political elements from patriotism and positive values in petroleum exploration, so for the course of mathematical geology, we should first extract the pioneering examples contained in it. Based on the course content, the team has extracted Hua Luogeng's contribution to oil and gas exploration, Zhao Pengda's pioneering role in

mathematical geology, Weng Wenbo's establishment of Weng cycle model and other examples. Based on these examples, the main purpose of this course is to convey to students the power of example, a sense of mission, to cultivate their patriotism and sense of responsibility.

4.2. Artisan Spirit

Because oil and gas are hidden underground, so exploration and discovery are difficult, which often made petroleum geologists facing the risk of failure in the actual exploration. In the face of these exploration risks, petroleum geologists need unremitting efforts, so petroleum exploration also needs the artisan spirit. Most content of mathematical geology is about how to explore oil and gas. Therefore, in the course teaching process, based on the exploration practice and the characteristics of this course, the artisan spirit is also needed to be organically instilled into students.

4.3. Scientific Rigorous Attitude and Scientific Ethics

Mathematical geology is a science combining mathematics and geology, so there are a lot of data processing, mathematical formulas, result interpretation and so on. Mathematics is very rigorous, so a scientific attitude should be always instilled in the students during the course. In addition, mathematical geology serves oil and gas exploration, so the authenticity of the data and the rigor of the calculation are crucial to the result. In the process of teaching, students should also be instilled with relevant scientific and ethical knowledge.

4.4. Combining Learning and Thinking, Unity of Knowledge and Practice

The ultimate purpose of mathematical geology course is to train students to use mathematical knowledge to solve practical exploration problems. Therefore, in the course teaching process, it is also necessary to cultivate students' ability to apply theory to practice through interactive, guided, discussion and other teaching methods, and constantly enhance students' innovative spirit of courage to explore, and practical ability to solve problems.

5. Conclusions

As a course combining mathematics and geology, mathematical geology contains abundant ideological and political elements because of its interdisciplinary nature and the characteristics of service production. Through the practice of the teaching team, the curriculum ideology and politics teaching design and construction path of the course are discussed, and the following conclusions are drawn:

(1) The curriculum ideology and politics design and construction should be based on a deep understanding of the connotation of curriculum ideology and politics, and determine the requirements and standards for the integration of curriculum ideology and politics applicable to this course.

(2) Based on establishing the requirements and standards of integrating curriculum ideology and politics into the curriculum, the teaching design of curriculum ideology and politics is carried out in the aspects of syllabus, curriculum content, teaching methods, teaching ideas, textbook selection, curriculum evaluation, resource case base establishment and so on.

(3) In the actual curriculum ideology and politics teaching and construction of mathematical geology, the key is to dig deep into curriculum ideology and politics elements of this curriculum. The curriculum ideology and politics elements of this curriculum is mainly from hot frontiers of mathematical geology, existing course contents, and oil and gas exploration. Finally, the students should cultivate their patriotism, scientific and rigorous attitude, pass on correct values, instill the artisan spirit, enhance their ability to solve practical problems, cultivate their innovative spirit of courage to explore and practical ability to solve petroleum geology problems.

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