

On the Construction and the reform of course ideology and politics of Ordinary Differential Equations in ethnic universities and colleges

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ABSTRACT : According to the characteristics of ordinary differential equation course and its development, this paper discusses the methods and strategies of ordinary differential equation course construction and course ideological and political teaching reform in ethnic colleges and universities from three aspects.

KEYWORDS: course construction, course ideology and politics, ordinary differential equations, teaching reform.

I. INTRODUCTION

Ordinary differential equation is the core basic course of undergraduate mathematics, is a bridge between calculus theory and practical problems, is the basis of further learning the course of differential approximation of functional analysis of partial differential equations, is one of the keys to play a role in engineering technology. The content of this course includes, introduction, elementary solution of first order differential equations, Existence theorem for solutions of first order differential equations, high-order differential equation, linear differential equations. The class is taught to second-year mathematics undergraduates. As a college for nationalities, it is essential to continuously strengthen the curriculum construction, improve the level of teaching and scientific research, actively explore the curriculum construction and curriculum ideological and political teaching reform, according to the course characteristics and development of ordinary differential equations, combined with the needs of education and teaching reform in order to adapt to quality education and personnel training objectives and train a large number of qualified middle school teachers and applied professionals in ethnic minority areas.

II. PRESENT SITUATION OF ORDINARY DIFFERENTIAL EQUATION COURSE CONSTRUCTION

Curriculum is the foundation of the teaching construction in colleges and universities, and the construction of curriculum is one of the important contents of the teaching construction. Strengthening the construction of curriculum is an important guarantee to effectively implement the teaching plan, improve the teaching level and the quality of personnel training. The content and teaching methods of ordinary differential equations are constantly changing and updating to meet the needs of the society. The teaching methods have also changed from the traditional mode to the modern teaching concept based on multi-media software platform, and the teaching methods have also changed from the single teaching mode of teachers to the present diversified teaching methods. Our course was approved as a university-level excellent course in 2015 and a university-level first-class course in 2021, it has formed its own teaching system and teaching mode. The teaching content of ordinary differential equation course should be more interesting and ideological, demonstrate the scientific, educational, practical and demonstrative nature, teachers must have advanced education and teaching ideas, be brave to innovate in the teaching process, and fully embody the educational principles of strengthening the foundation, paying attention to application, cultivating ability, and enhancing logical thinking and ideological and political values. The study of teaching methods is accompanied by the process of education, and we should pay attention to the use of advanced teaching methods and means, rationally use modern information technology and other means, and reform teaching methods, teaching means and teaching management. First-class courses should be good at combining the network for teaching and management, the relevant teaching outline, teaching plans and exercises should be updated at any time. It should be emphasized that teachers should pay special attention to the concept of theorems when explaining ordinary differential equations. It is necessary to introduce some common models based on the

background. For example, in the teaching of solving first-order equations, practical problems such as weather prediction, population prediction, biological population prediction, and infectious disease prediction are typical examples that can be transformed into ordinary differential equations. It is necessary to give full play to the characteristics of the course, make full use of computer multimedia to process the problems solved by differential equations and related practical problems, improve the potential of students to apply what they have learned, cultivate students' ability to transform practical problems into mathematical problems, strengthen the combination of theory and practice, timely enable the knowledge learned to be flexibly applied, and improve students' comprehensive ability to solve problems and the ability of dialectical thinking. For example, when learning variable separable equations, students can observe the laws of population change in a certain area outside the classroom, establish a differential equation model of population, and solve and explain its practical significance and predict the trend of future population change. In the elementary integral method of first-order differential equations, the first-order linear equations, Bernoulli equations and Riccati equations are gradually introduced in the background of "new product sales model", which makes students have a strong desire to learn about this course and lays a good foundation for the boring learning of pure theoretical equations. The content of ordinary differential equations is the professional basic knowledge of mathematics and applied mathematics in undergraduate mathematics teaching. Relatively speaking, the formulas and theorems involved in this part are not cumbersome, how to enrich classroom teaching, how to deal with teaching materials, and how to cultivate students' creative learning ability cannot be ignored. In the teaching process, we need to flexibly integrate mathematical modeling and ideological and political thinking into the teaching process of ordinary differential equations, and achieve the goal of curriculum construction in the mode of "multi-way standards", so that the teaching content, teaching methods, teaching materials and teaching management reflect the characteristics of this course: scientific, educational, practical and exemplary.

III. REFORM OF TEACHING CONTENT

"Curriculum thinking" is an important measure for colleges and universities to take Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era as the guide, take General Secretary Xi Jinping's important exposition on education work as the fundamental follow-up, and implement the fundamental task of Lide Shuren, which is an effective entry into the construction of an education system and a high-level talent training system for the comprehensive cultivation of morality, intellectuality, physical fitness, beauty and labor, and is also an important starting point for improving the all-round "three all-round education" of all employees. In the classroom, we combine the elements of political thinking with our professional courses, integrate the elements of political thinking into the knowledge of professional courses, and do not simply explain professional knowledge.

Appropriately optimize and integrate teaching content: Due to its location in ethnic minority areas, in order to take care of students at different levels, while ensuring the quality of teaching and improving the teaching effect, consider some appropriate integration of the teaching content of existing textbooks (Higher Education Press, edited by Wang Kaohsiung). First of all, optimize the content of the chapter content with the same theory and method, or similar, and avoid repeated lectures of similar content to save lesson time. Secondly, according to the characteristics of the mathematics and applied mathematics major, the requirements for the ordinary differential equation course can be appropriately reduced, and the more difficult links in the textbook can be treated as optional content to meet the needs of students at different levels. In addition, according to the teacher's research on the topic of differential equations and the research of scientific research work, it is appropriate to select some cutting-edge application papers to improve students' learning interest, understand the development and application of the curriculum, and lay a foundation for the design of students' graduation thesis (i.e., [1]).

Paying attention to the penetration of mathematical ideas, culture, and dialectics in the classroom: Combined with the history of mathematics, students should have scientific exploration and the courage to study hard. An overview of differential equations to enable students to better appreciate the discovery and development process of mathematics and the various mathematical ideas and methods of mathematical thought resulting therefrom; It can also cultivate students' mathematical feelings, correct learning attitudes and establish correct mathematical values through moving stories and mathematical inventions and creations to promote the development of science and technology, and the display of mathematicians' spirit. Combined with the establishment of infectious disease models, it talks about issues such as the route of infection. Combined with the new crown epidemic, we will educate contemporary college students to treat the epidemic with a scientific attitude, respect science, and rationally look at the new coronavirus and various epidemic prevention measures. With the

development of modern science and technology, more complex scientific problems have emerged, such as: the interaction law of species in the life sciences, the quantitative and precise description of the laws of economic and financial fluctuations, the development of aerospace technology and interstellar exploration, etc., making the theory and teaching content of differential equations more and more abundant. We should integrate the ideas and methods of modern theory of differential equations into teaching, and introduce some vivid and practical examples, such as the derivation of the macro development equation of economics, the population evolution model of ecology, the determination of spacecraft orbit, etc. for special teaching; Through the introduction of these teaching contents, students understand the importance of differential equations in the development of contemporary science, and master the basic theories and methods of using ordinary differential equations to solve practical problems and stimulate students' interest in learning (i.e., [2]).

IV. REFORM OF TEACHING METHODS AND TEACHING METHODS

In addition to the rational selection of teaching materials, it is also necessary to have a good team of teachers, good teaching methods and teaching methods. A sophisticated teaching team is the fundamental guarantee for the construction of a first-class curriculum. It is necessary to emphasize the close integration of teaching and scientific research, and pay attention to absorbing the latest scientific research results for lesson preparation and classroom teaching; Closely integrate teaching research with academic research, and closely integrate curriculum construction with discipline construction. Actively carry out the reform of teaching methods and means, and carry out research on the teaching methods and learning methods of the "ordinary differential equations" curriculum (i.e., [3]).

The reform of teaching methods should focus on the purpose of strengthening the cultivation of students' innovative spirit and creative ability, especially in view of the weak foundation of students in ethnic minority areas, it is necessary to reform the teaching methods of "indoctrination" and excessive emphasis on teaching, and implement various teaching methods such as heuristic, discussion, research, and lecture teaching. In the teaching, we will pay attention to learning, rethinking, re-guiding and re-researching, fully reflect the main position of students, and mobilize students' enthusiasm, initiative and creativity. Strengthen students' self-learning ability, problem analysis and problem-solving ability, pay attention to the cultivation of students' innovative thinking and innovative ability, and then promote the all-round development of students' personality and talents. The focus of the reform of teaching methods is the use of modern teaching techniques and means, especially multimedia technology. The biggest advantage of multimedia is its rich graphics, images, animation, video, audio, and network functions. On the one hand, it can effectively stimulate the learner's senses, stimulate learning interest, and improve learning enthusiasm; On the other hand, it can provide learners with rich information resources and increase the amount of information imparted (i.e., [4]).

Construct a hybrid teaching model that combines traditional classroom and online teaching, and use QQ group classrooms, Tencent conferences, WeChat groups, etc. to carry out interactive teaching, so as to realize the interconnection and commonality of online and offline course resource information and data sharing, so that the online and offline teaching environments reflect the characteristics of collaboration and cooperation. Hybrid teaching integrates intelligent and information-based teaching methods, changes the one-way indoctrination teaching mode, changes the situation that students mainly rely on teaching materials and teaching resources taught by teachers in the classroom, gives play to the leading role of teachers in guiding, inspiring and monitoring the teaching process, reflects the initiative, enthusiasm and creativity of students as the main body of the learning process, greatly extends the spatial dimension of teaching, activates teaching resources, enriches teaching methods, and improves teaching efficiency.

V. CONCLUSION

In short, we must pay attention to the new concepts and new models of education and the new quality of education and teaching, and cultivate compound talents that meet the requirements of the new era. Since the curriculum is the basic unit of talent training, changing the traditional teaching mode and running the classroom ideology through the whole process of classroom teaching will help enhance the teaching effect and improve the quality of talent training. Just like any other professional course, especially the characteristics of students in colleges and universities in ethnic minority areas, which determine the curriculum training goals of the major, the common differential equation is also committed to cultivating independent learning ability, application knowledge ability, analysis and problem solving ability, innovation and practical ability. Then, in line with the development trend of first-class curriculum construction, try to explore and reform the teaching of ordinary differential equation

courses, and strive to achieve "student-centered" and improve students' independent learning ability and practical ability, which is a timely move to meet the new requirements of higher education development.

ACKNOWLEDGEMENTS

I would like to express my sincere thanks to the anonymous reviewer for his/her valuable comments and suggestions, which have contributed much to the improvement of this paper.

FUNDING INFORMATION: This work was supported by the NSFC No. (12161071), Key projects of university level planning in Qinghai Nationalities University grant (2021XJGH01), and Scientific Research Innovation Team in Qinghai Nationalities University.

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BIOGRAPHIES AND PHOTOGRAPHS

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