

Research on the Reform of Curriculum System of Mechatronics Specialty in Colleges and Universities

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Abstract: In the process of talent training, colleges and universities must teach students basic courses. Among them, the mechatronics curriculum system contains more professional content. The reform is to improve the professional curriculum education system and increase the content of explanations level. On this basis, this article mainly researches and analyzes the relevant content of the reform of the mechatronics curriculum system.

1. Introduction

With the formation of an information society and the strengthening of international cooperation in various social fields worldwide, the pace of social civilization and development has clearly increased and accelerated. All kinds of mechanical and electrical talents at all levels required by society must not only have rich professional and technical knowledge and skilled professional skills in their own professional fields, but also have a complete personality, a high level of professional ethics, and a certain degree of creativity. With the continuous adjustment of China's industrial structure, the production model has changed, and the unified national electromechanical curriculum system has also affected the quality and efficiency of mechanical and electrical vocational education. This requires reform of the mechanical and electrical professional curriculum, and Factors such as students, schools, and the curriculum itself have put forward requirements for reform of the vocational education curriculum system. Only through reform can the course structure have the stability to adapt to the targeted occupational post group, and the flexibility to respond quickly to changes in the labor market demand to adapt to the development of the market economy.

The construction of a complete practical teaching system design is a requirement of the new curriculum reform. It requires teachers to adopt a scientific and reasonable teaching plan and conduct some practical teaching activities appropriately in the process of mechatronics. Teaching model, and then cultivate students' social practice ability and independent innovation ability. At present, classroom teaching is the main teaching form of school education, so teachers should set up a form of practical teaching activities when teaching. Practical teaching is an important way to cultivate students' innovative consciousness and practical ability. It can not only stimulate students' interest in studying professional courses, but also effectively improve the efficiency of classroom teaching.

2. Analysis of Teaching Status of Mechatronics Majors in Universities

With the continuous development of society and economy, mechanical and electrical technology has developed along with it, and various technical schools also take mechanical and electrical integration as an important professional course. But in actual teaching, there are still some shortcomings. In the classroom teaching process, some teachers pay attention to the teaching of theoretical knowledge and neglect the cultivation of practical ability. However, the practice teaching and the study of theoretical knowledge need to promote each other. The practice teaching system of the mechatronics major is immature and has not been well improved. Some teachers' design of teaching courses only focuses on theoretical knowledge, and takes improving students' performance as the main teaching purpose. The development of practical training courses has not

received good teaching results, and the theory and practice cannot be well linked in the course content. Some teachers have not established a scientific and effective practical teaching system plan, which makes the existing teaching objectives of mechanical and electrical majors less than ideal results. The teaching mode of college education in the major of mechatronics integration and the cultivation of students' practical ability are lagging behind. In teaching, teachers should change their teaching concepts, break through the traditional teaching model, build a practical teaching system, and cultivate comprehensive social talents with innovative consciousness and strong practical ability. Therefore, in the process of teaching mechatronics in colleges and universities, teachers should explore more scientific and reasonable teaching methods, update teaching concepts and attach importance to the development of practical teaching.

3. Objectives and Principles of the Curriculum Reform of Mechatronics

The competitive development of modern society is fierce. Different countries and regions are constantly seeking technical cooperation and expanding the economic scope in a market-based competitive environment. China's socialist market economy is constantly developing, and the development benefits of the manufacturing industry are outstanding. In order to further expand the development scale of the manufacturing industry, on the one hand, it is necessary to increase research investment in production technology, and on the other hand, it is necessary to pay more attention to the cultivation of talents. The study of the mechatronics curriculum system is to clarify the goals and approaches of talent cultivation. Mechatronics courses have strong practicality and comprehensiveness. The core courses include "Single Chip Microcomputer", "PLC", "Principle of Machinery" and "Control Theory of Mechanical Engineering", etc. Analysis of the theoretical knowledge in the course can be found to still exist. There are more outdated theories, so they should be removed appropriately. Mechatronics courses are many and repetitive. Students need to spend a lot of time in the theoretical research part. In order to control the teaching rhythm and improve the teaching effect, the teacher should combine case analysis in the class to guide students' practical operations and make students grasp the core part of the problem. In addition, in order to prevent repeated teaching, modular teaching can be used to allow students to make full use of experimental opportunities, think about analysis and research, debug, deepen the understanding of the curriculum, and accumulate experience, and learn in an organized, step-by-step, and targeted manner.

At present, the "mechatronics specialty" in higher vocational colleges in China is a front-line position for machinery manufacturing, electronic information service enterprises and related fields. It requires the cultivation of good ethics and professional ethics and mastering certain professional theoretical knowledge. Have strong practical ability, have the ability to operate, install, maintain and design mechanical equipment; have the ability to operate, install, maintain and design control systems; have the ability to design and technical management of mechanical equipment and control systems, and have certain capabilities. The comprehensive quality can be achieved through the channels of vocational training, continuing education and other continuous learning channels to achieve all-round development of high-level application-oriented talents.

With the continuous development of the machinery manufacturing industry and the electronic information industry, in order to better realize the functions of higher vocational colleges, it is urgent to reform the old curriculum system. The principles for curriculum reform include:

Competence-based principles guided by industry professional standards. First of all, the curriculum setting of higher vocational colleges should reflect "professionalism", put the improvement of students' professional ability first, consider the requirements of the company's production (service) front-line response around professional standards, and design courses based on this principle and cultivate High-quality workers urgently needed by enterprises. In addition, the curriculum of vocational education should reflect the "human nature", and strive to cultivate students' ability to master new knowledge, new technologies, and new methods while fully grasping the knowledge and skills required by vocational standards, laying a foundation for future development.

Systematic principles guided by industry professional standards. The curriculum of higher

vocational colleges should clearly reflect the requirements of national (industry) professional standards, while taking into account the cultivation of other qualities and abilities of students, so that the curriculum of school education breaks through the empirical curriculum of systematization of disciplines and combination of modules to form a new "professional A Systematic Competence Course."

Advanced courses under the guidance of industry professional standards. In formulating the curriculum, we must pay attention to the latest development of information technology, adjust school curriculum and teaching content in a timely manner through school-enterprise cooperation and other forms, highlight new knowledge, new technologies, new processes and new methods in this field, and overcome the stale content of professional teaching Disadvantages of slow update and inability to meet the needs of industrial development.

4. Reform of Teaching Goals

The existing curriculum teaching goals have a tendency to place too much emphasis on knowledge transfer, ignoring the development of students in the learning process, methods, and attitudes, which is not conducive to the overall development of students. The new teaching goal reform is the primary task of curriculum reform. The training goal of mechatronics professionals is to cultivate solid mechanical and electrical technology expertise and strong practical skills. They can engage in the operation and use of mechatronics equipment, installation and commissioning, maintenance and technical transformation in the production line, and simple electromechanical technology. Advanced application talents who can carry out workshop production organization and management, as well as marketing and technical services of mechanical and electrical products.

This article determines the teaching objectives of this course based on the training objectives and employment positions of the major in mechatronics. The new teaching goal of the "Mechatronics Technology" course is to enable students to master the composition of mechatronics systems, to be familiar with the application of related technologies in mechatronics systems, to improve students' comprehensive ability to use professional knowledge, and to further understand the specialty The development direction and the knowledge required to improve this professional skills make it a specialized person with strong expertise in mechatronics.

5. Reform of Eaching Content

The reform of the curriculum content system is the soul of curriculum construction. Mechatronics technology is no longer a simple combination of mechanical technology and electrical technology in the past, but integrates mechanical technology, microelectronics technology, computer technology, electrical technology, and information. The organic unity of technology. The "Mechatronics Technology" course has a lot of content, which requires teachers to make reasonable choices on the content according to the requirements of the training objectives of this major. In a limited class time, they should give full play to their strengths and select the students who are closest to the actual situation of students and students. The most concerned and most interesting content for teaching can also be based on the knowledge points, expand the extension of the textbooks, and make breakthroughs in depth and breadth. As a mechanical and electrical major, its teaching content should focus on competence. The bedclothes appropriately increased or decreased the content of the "Mechatronics Technology" course according to the new teaching goals of the course. The teaching of "mechatronics technology" should emphasize practicality. For difficult to understand microscopic theories and formulas in the course, there is no need to make mathematical derivation, no need to investigate the ins and outs, and only analyze and compare physical concepts to deepen the impression and focus on the application. Such as the mechanical system performance analysis and its impact in the mechatronics mechanical system design theory, the relevant theories and formulas for displacement, velocity, acceleration, force and torque detection in the mechatronics detection system, computer control and industrial control computer in its interface technology The basic structure and characteristics, the working principle and mechanical

characteristics of the motor in the servo control system can be deleted. Add application content, such as strengthening software technology in mechatronics, analysis of design and application of mechatronic control system, and training some important content repeatedly in practice.

In addition, training in operational skills needs to be enhanced. Higher vocational graduates will be employed at the front line of production and require strong practical skills. In the teaching of the "Mechatronics Technology" course, this ability is reflected in the hardware design, then the use of electronic devices to connect circuits, and finally the preparation of control programs to achieve mechatronics control systems. To meet the above requirements, there must be sufficient practice time and means. For this reason, in the "mechatronics technology" teaching arrangement, the practice teaching time must be increased. Only after many practice, students get systematic training in mechanical body design, control system design, circuit connection, system debugging, etc., can improve students' mechatronics technology level, and realize the transformation of knowledge to ability. After completing the real project, the students felt the important role of the knowledge they learned to guide the practice, and at the same time understood the professional knowledge and skills requirements of the employment position, thereby clarifying the learning purpose.

6. Reform of Teaching Methods and Means

The current teaching and learning methods of the "Mechatronics Technology" course are still characterized by passive acceptance and are still teacher-centered. Students lack opportunities for independent inquiry and cooperative learning. They often talk about theory in the classroom and do it after class. Homework and theoretical lessons account for most of the time, giving students less time for hands-on learning, which seriously affects students' practical ability. Aiming at the new course teaching goals, further reforms of teaching methods and methods are conducted to ensure the quality of teaching and improve teaching results. Due to the strong practicality of "mechatronics technology", most of the topics can be carried out in the training room. Teachers talk and students operate to realize integrated teaching. Interaction between theory and training can help students grasp the knowledge firmly.

"Mechatronics Technology" course teaching should focus on the process. Through teaching activities, students can experience the fun of learning, enhance students' initiative in learning, and cooperative learning provides students with a platform for cooperation and interaction. On this basis Group discussions and consultations were held to further improve and deepen the training programs. Teachers must ask cooperative issues in the process of organizing students to conduct cooperative learning of "Mechatronics Technology" course, and carry out purposeful cooperation and fruitful cooperation. They should not let them flow by themselves, let students learn by themselves, let alone students. Sitting together without talking about the subject, or just learning along the teachers' minds, did not think independently. Cooperative learning is the best way to improve students' communication skills. In cooperation, students can learn from each other and make progress together; they can learn from each other's strengths and make use of each student's strengths; learn to interact with others; and cultivate students' teamwork spirit. Through independent and cooperative learning, students' ability to search for literature materials, obtain information, and process inductive information is developed.

7. Reform of Curriculum Evaluation System

The evaluation system should attach importance to development, focus on comprehensive evaluation, and realize the diversification of evaluation methods. "Mechatronics Technology" course evaluation, combined with the work combination mode, adopts a comprehensive and diverse evaluation system that is compatible with quality education. The course attaches great importance to procedural evaluation. It has established a student performance and vocational ability evaluation system based on work processes, comprehensively assesses students' learning results and vocational ability, and effectively promotes students' learning, skills training, and improvement of teaching

content and methods. The evaluation system includes professional skills, learning attitudes, work style and professional ethics, self-learning ability, communication and ability to cooperate with others. It uses methods such as student self-evaluation, group mutual evaluation, teacher evaluation, and enterprise evaluation to quantify according to different weights. Get comprehensive assessment results.

8. The Key Work of the Reform of the Mechatronics Curriculum System

The main purpose of mechatronics curriculum system research is to improve the previous teaching model, continuously innovate methods, improve teaching efficiency, and continuously strengthen the cultivation of talents in the specialization construction. The most important step in professional development is to conduct social research. Through social research, you can understand the actual development of related industries and the demand for professional talents, so as to establish the target positions of mechatronics. According to the distribution and demand of target positions, Characteristics, comprehensively strengthen the cultivation of talents from the aspects of attitude, knowledge and skills. In the construction of the mechatronics curriculum system, we must follow careful, meticulous, objective and comprehensive guidelines, use interviews, document analysis, and observations to investigate and analyze the positions that mechatronics students engage in after graduation and the positions they expect to engage in. According to the position ranking, the education direction is established.

The teaching of mechatronics courses pays more attention to the cultivation of students' practical skills. Therefore, in the process of carrying out a variety of education and teaching activities, the school should arrange more sufficient practical opportunities for students. In order to enable students to have a more in-depth understanding of mechatronics knowledge, teachers usually use experimental teaching methods in the classroom to allow students to guess the experimental results that may occur based on the experimental principles. Students are divided into experimental groups in free groups. Then, under the guidance of the teacher, prepare experimental equipment, continuously assemble, debug, analyze in the classroom, and finally complete the production of basic mechatronics products. Throughout the experimental operation, the teacher gives students the opportunity to think independently, and in the hands-on operation, completes the verification of the mechanical theory. This teaching method has an important role in mobilizing students' enthusiasm for learning.

The mechatronics major of universities and colleges is set up to meet the talent needs of the social equipment manufacturing industry. In practice, a practical teaching system that conforms to the adjustment and technological development of the mechatronics industry is established. Teachers should have a relatively clear teaching plan, and divide the teaching curriculum into several stages to complete teaching tasks rhythmically, so that students can have great gains and professional skills improvement after each stage of learning. Schools should adopt scientific and reasonable teaching methods to stimulate students' interest in professional learning, improve classroom teaching efficiency, and then achieve the teaching goals of improving students' practical skills and cultivating talents that are zero-dominated with corporate talent needs. The school should take corresponding reform measures according to the requirements of the students and the market, effectively design the practical teaching system, and ensure that the teaching content is suitable for the needs of market development.

In order to better carry out practical teaching activities, schools need to build corresponding training bases. The school's training base is an important pillar of practical teaching. The construction of a practical teaching system for the mechatronics major cannot be separated from the construction of the school's training base. The training base is an important base for colleges and universities to achieve the goal of talent training. The cultural atmosphere of the training base should be based on the culture of training, improve the quality of education and teaching, and improve the quality of graduates. All technical equipment and teaching requirements of the training base will have a certain height, and teaching equipment will be continuously updated. The school needs to make a planned capital investment in the training base to better meet the market demand of

the mechatronics specialty and promote the development of the technology industry and economy.

In the professional construction of the mechatronics curriculum system, the emphasis is on teaching students professional theoretical knowledge, and training students 'thinking, logical analysis, and practical skills. In order to effectively test students' learning results, schools can organize Arrange a variety of subject competitions to encourage the active participation of students. In the course of mechatronics, students have accumulated certain product design methods and product debugging capabilities. The school organizes competitions to test students' technological skills. Students can sublimate and consolidate their knowledge in the operation of the competition, gain stronger scientific research and hands-on innovation ability through mutual competition, cooperation, learning, and reference, and also lay the foundation for future study and development. In addition, schools can also incorporate student performance and performance in subject competitions into the curriculum performance evaluation system to improve the educational evaluation model.

9. Conclusion

In the continuous development of modern society, competition between different industries is intensifying, and the demand for professional talents is also increasing. As for the machinery manufacturing industry, the demand for mechanical and electrical talents is also increasing. In this case, it is necessary to strengthen the analysis of the construction of the mechatronics curriculum system.

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