

Construction Scheme of Curriculum Ideology and Politics Teaching System for Engineering Courses: Taking Electrical Machinery Course as an Example

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Abstract: *Helping students shape correct world outlook, outlook on life and values is a necessary part of talent cultivation in colleges and universities. This needs to integrate value building into knowledge imparting and ability training in curriculum teaching. Therefore, it is a new task and requirement to build a scientific and reasonable curriculum ideology and politics teaching system. Taking the engineering professional course "electrical machinery" as an example, This paper implements the concept of "casting soul-strengthening foundation-cultivating ability", and adhere to the ideological and political construction direction of the cross integration of intellectual education and moral education. The key work will be put on the revision of professional training plan and course syllabus, the compilation and production of moral education plan and courseware, the improvement of teaching team, and the implementation of teaching. The electrical machinery course will be built into a model course with breadth, depth and temperature.*

Keywords: *curriculum ideology and politics. electrical machinery. engineering courses.*

1. Introduction

In May 2020, Ministry of education clearly pointed out in the "guidelines for the curriculum ideology and politics construction of university" that comprehensively promoting curriculum ideology and politics construction is the strategic measure to implement the fundamental task of moral education. This puts forward new requirements for every educator in the new era, that is, to integrate value guidance into the teaching of professional knowledge and the development of professional skills. In the process of training, we should help students establish correct world outlook, outlook on life and values, and cultivate qualified builders and reliable successors with all-round development of moral, intellectual, physical, aesthetics and labour for socialism with Chinese characteristics.

In recent years, many experts and scholars have been exploring the essence of curriculum ideology and politics education [1], teaching system [2-3], and construction approaches[4-5]. Through these theoretical studies, we deeply understand the relationship between the curriculum ideology and politics and the ideological and political curriculum, make clear the goal and key content of curriculum ideology and politics construction, and understand the reasonable design of curriculum ideology and politics teaching system. However, on the practical level, each discipline has its own characteristics, and each professional course has its own teaching requirements and limit of class hours. This requires every teacher to consider comprehensively, plan as a whole, study attentively and design carefully. Then teachers can integrate the ideological and political education into every class and every teaching link, so as to realize the implementation and effectiveness of the strategic measures of moral education.

Electrical engineering and automation is one of the advantageous majors of our university. With the characteristics of cultivating applied talents serving local economic construction and power industry, it is committed to improving the theoretical knowledge, engineering ability and comprehensive quality of students. Electrical machinery is a core course of the major, which plays an important role in the training program. In order to construct the curriculum ideology and politics teaching system, the professional training program and curriculum syllabus should be recompiled and revised. The ideological and political points in the teaching content should be deeply excavated to form a list of educational elements, and on this basis, the moral education plan and courseware should be compiled and made. In the aspect of

curriculum implementation, teaching means and methods are innovated and reformed, so as to achieve the unity of explicit and implicit, combine hardness with softness, and achieve the silent effect of education. The construction of teaching team should be strengthened, and the education consciousness and ability of teaching team should be improved.

2. Revision of the professional training program and course syllabus

The training program of electrical engineering and automation major and the course syllabus of electrical machinery are revised purposefully. Combined with the background of the professional certification of engineering education, the curriculum ideology and politics elements are integrated into the training objectives and requirements of the professional training program. For example, students are required to understand the relationship and interaction between electrical engineering and objective world and society, to be able to think about the sustainability of electrical engineering practice from the perspective of environmental protection and sustainable development, to be able to consciously abide by the code of good faith and other engineering professional ethics and norms in electrical engineering practice, to be able to correctly understand and deal with the relationship between individuals and teams, and effectively communicate and work with members of other disciplines in a multi-disciplinary background, etc. At the same time, the curriculum system should be reconstructed and the courses of engineering philosophy or humanistic quality should be added appropriately to achieve the training objectives and meet the training requirements.

As the core course of professional training program, electrical machinery course plays an important role. In the syllabus, the ideological and political elements are integrated into the aspects of teaching objectives, teaching contents, teaching methods and means, teaching evaluation, etc. In the teaching objectives of the course, knowledge imparting and ability training are the main line, and the implicit integration of the ideological and political objectives of the course are strengthened. The ideological and political objectives of the course are consistent with the professional training objectives and requirements. In addition to excavating the ideological and political points in the contents, the latest developments of electrical industry, celebrity anecdotes and engineering cases are also integrated into teaching, so as to strengthen the students' engineering ethics education, cultivate the students' great craftsman spirit of striving for perfection, stimulate the students' feelings of serving the country with science and technology. According to the different characteristics of the ideological and political teaching contents, the network teaching means, problem inquiry method, case method and interactive methods can be used. Ideological and political elements are integrated into the diversified evaluation system. Diversified evaluation system refers to the combination of process evaluation and summative evaluation, teachers' evaluation and students' self-evaluation and mutual evaluation. The evaluation mechanism based on "evaluation-reflection-improvement" is adopted to promote teaching and learning by evaluation, so as to realize the continuous improvement and optimization of curriculum ideology and politics teaching effect.

3. Excavation of the ideological and political points in the teaching contents and formation of the educational elements list

Focusing on political identity, national feelings, moral cultivation, awareness of law, and cultural literacy. The teaching team deeply excavates the ideological and political elements of electrical machinery course and constantly perfects the course contents. The ideological and political elements in electrical machinery course is shown in Table 1.

4. Innovation of teaching means and methods

Network teaching is an important means of personnel training. Based on the education concept of "student-centered", the teaching design of electrical machinery course is carried out by using BOPPPS model (Bridge in, Objective 1, Pre-assessment, Participatory learning, Post-assessment and Summary). The internet cloud platform is made full use to carry out the cloud ideological and political teaching of "electrical machinery+ideological and political", which expands the coverage effectively and benefits more students.

Using question inquiry method, case method, interactive method and other teaching methods to carry out moral education for students, as shown in Table 2. During the implementation, the entry point, matching degree, coupling degree and mutual consistency between the ideological and political elements

and teaching contents are noticed. In order to avoid "narrowing" and "generalization" of moral education, the "insufficient integration" and "excessive guidance" of ideological and political elements is prevented.

Table 1 The ideological and political elements in electrical machinery course

chapter	knowledge points	the penetration point of ideological and political education	ideological and political elements	value shaping
Introduction	development and function of motor	Teachers can explain the cases of carbon peaking and carbon neutralization proposed in the 14th five-year plan to let students understand the latest development of the power industry.	to cultivate students' sense of national pride, the consciousness of social responsibility and human destiny community, and to enhance the four self-confidence	socialist ideology with China's characteristics
Chapter one magnetic circuit	the basic law of magnetic circuit	According to the previous research, the discovery of any scientific law can only be completed through the accumulation of one or several generations.	To cultivate students' scientific spirit of pursuing truth, innovation and rigorous research, and to form correct academic attitude and values	career ideal: serving country with science and technology, pioneering and innovation
	saturation of magnetization curve	The working point of motor core is selected near the keen point to avoid entering the saturation zone.	to tell students not to be too full and leave adequate leeway for everything.	cultivate one's morality
Chapter two transformer	efficiency characteristics of transformers	In order to reduce core loss, silicon steel sheet is commonly used as core material.	to actively respond to the national policy of energy saving and emission reduction, to improve the awareness of saving and develop a low-carbon, green, environmental protection and energy-saving lifestyle	patriotism, prosperity and harmony of socialist core values
	parallel connection of transformers	Three conditions should be followed for parallel connection operation of transformers.	to tell students to abide by certain laws and regulations and a series of rules within a certain framework	the observation of law and discipline
Chapter three DC motor	the structure and composition of DC motor	components and functions of DC motor	To complete a job, everyone should perform their own duties and be dedicated to their work.	professional spirit of dedication
	mechanical characteristics of separately excited and shunt excited DC motors	With the change of electromagnetic torque, the speed of DC motors changes little and the stability is good.	to tell students to have strong psychological quality when anything crops up, reduce panic and fluctuation, think calmly and find a solution to the problem	Cultivate one's morality
Chapter four Induction motor	structure and working principle of induction motor	Different types of motors have their own advantages and disadvantages, and they are selected according to the use situation.	to know how to develop self strengths and avoid self weaknesses and learn from the advantages of others.	Cultivate one's morality
	Step-down voltage starting of three phase induction motor	The purpose of step-down voltage starting is to reduce the starting current, but the starting torque will also be reduced.	People can't have both fish and bear's paw. At this time, people should know which is the most important and how to give up.	Cultivate one's morality
Chapter five Synchronous motor	grid connected operation of synchronous motor	The frequency, voltage and exciting electromotive force of synchronous generator are required to be the same as those of large power grid.	To be a member of the collective, people must focus on collective interests, obey the collective arrangements, and contribute to collective.	the relationship between individual and collective

Table 2 Examples of teaching methods

knowledge points	teaching methods	knowledge and ability objectives	curriculum ideology and politics objectives
voltage equation and equivalent circuit of transformer	problem inquiry method: the definition of the load operation of transformer - characteristics of magnetomotive force in load operation-balance equation of magnetomotive force in load operation-basic equations of transformer-T-type equivalent circuit of transformer	to master the basic equation and equivalent circuit of transformer to cultivate students' ability of comprehensive analysis circuit, comparison and summary	to cultivate students' problem consciousness and critical thinking In order to get twice the result with half the effort, scientific methodology education is carried out for student so that they can use methods and strategies correctly.
grid connected operation of synchronous motor	case method: Several typical positive energy cases during the epidemic period is in series. For example, through academician Zhong Nanshan and volunteers around students, the relationship between individual and collective is explained.	to master the conditions and methods of grid connection of synchronous generator	to cultivate students' spirit of loving and obeying the collective and selfless dedication to the collective
all knowledge points of electrical machinery course	interactive method: through the cloud platform, wechat, QQ and other ways to interact with students, become empathic learning companions, and make common progress with students	through "leading, guiding, supporting and pushing" to help students further master the key and difficult points of electrical machinery course	to stimulate students' endogenous motivation, to let students internalize the correct values in mind, externalize in practice, to strengthen the continuous effect of the curriculum ideology and politics

5. Promotion of the moral education consciousness and ability of teaching team

Teachers are the main force of teaching and educating students. They teach, communicate and guide students face to face. Their ideological awareness and behavior have a strong influence and demonstration effect on students. Therefore, teachers should realize the necessity and importance of curriculum ideology and politics, constantly strengthen themselves awareness, improve themselves ability, and form the internal driving force of ideological and political education.

Firstly, in 2015, our university established a "123" work system of one leading group, two guiding documents and three kind of moral education courses. All teachers began to explore and practice "moral teaching plan and moral classroom". Secondly, our university integrated the internal and external resources and established the "Shandong Provincial curriculum ideology and politics research center". Around the construction goal of the center, teachers are encouraged and guided to form high-level research results, which are embodied in the teaching reform, practiced in the classroom and serviced for students. Finally, teachers' teaching training, on-site teaching observation and typical experience exchange activities are often carried out, so as to continuously improve teachers' educational awareness and ability.

6. Conclusions

Taking the construction of curriculum ideology and politics teaching system as an important task, this paper design, upgrade and implement it from macro to micro and from top to bottom. For electrical engineering and automation major and electrical machinery course, the reform of curriculum ideology and politics teaching system is deeply studied from the revision of professional training plan and course syllabus, the compilation of moral education plan and courseware (the excavation of ideological and political elements), the innovation of teaching means and methods, the construction of teaching evaluation system and the implementation of teaching. It provides an important guarantee for the ideological and political education to be upright and innovative, and provides value inspiration and practical experience for the ideological and political education to improve quality and efficiency.

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