

# *Design of Ideological and Political Teaching in the Course of Engineering Training*

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**Abstract:** It is of great significance for improving the comprehensive quality of college students to explore the ideological and political methods and paths in the teaching process of engineering training courses. This paper makes an effective exploration of the ideological and political education of the engineering training course from the following five aspects: the design and content, the learning methods and means, the teaching evaluation and results, the characteristics and innovative points, and the teachers' perception.

## 1. Introduction

Engineering training is one of the engineering practice teaching platforms with the largest number of students in engineering colleges and universities. It is an important part of the practice teaching in the teaching plan of higher engineering colleges and universities [1-3]. It is a required practical technical basic course for students of various majors of machinery. The course was offered in the first semester of the second year of the University.

Teachers in this course adhere to the fundamental principle of high moral values establishment and people cultivation, implement the three major concepts of engineering education and certification, and enable students to have both moral integrity and ability. Students can have the basic skills of mechanical process methods and safe operation technical procedures, modern numerical control manufacturing technology, mechanical manufacturing and the application ability of solving complex engineering problems in mechanical design and manufacturing [4-6]. Through learning this course, students can also have comprehensive engineering practice literacy, practical ability and innovation ability, so as to form innovative spirit, engineering specifications and engineering ethics consciousness of mechanical and electrical product system design. Students should have family and national feelings and a strong sense of responsibility. They can make full use of the advantages of the engineering industry, take root in national construction, and engage in the design, development, testing, operation and maintenance or management of mechanical and electrical products in the field of mechanical and electrical industry [7]. They are capable of

becoming project leaders or applied senior engineering and technical talents who undertake important tasks in medium and large mechanical engineering projects [8].

## **2. Design and Content of Ideological and Political Teaching**

### **2.1. Overall Design Objectives**

Teachers implement the three concepts of engineering education certification, build a staged curriculum content system, and form a “4321” curriculum system, that is, four modules, three routes, two curriculum systems of moral and intellectual double credit, and one student-centered fundamental point. We have compiled a series of teaching materials to serve the goal of training applied senior engineering technology professionals in mechanical and other engineering majors of our university

### **2.2. Reconstruction Design of Ideological and Political Content**

#### **2.2.1. Four Modules**

The contents of engineering training involve turning, benchwork, milling, machining centers, casting, welding, ceramics, computer disassembly and assembly, numerical control, three-dimensional carving, digital modeling, virtual simulation, etc. It requires a lot of basic knowledge whose structures are complex and difficult to understand. Therefore, we should build four major content modules of engineering materials, machinery manufacturing technology, advanced manufacturing technology and special processing technology to achieve phased education.

#### **2.2.2. Three Routes**

The first route is train objective. Students focus on learning the basic knowledge of engineering materials, machinery manufacturing technology, advanced manufacturing technology, special processing technology, etc. Students can be trained to analyze processing technology and select machining process. Students will also have the ability of engineering practice, teamwork, problem analysis and solving. In this way, students can establish the concept of engineering practice and become adults.

The second route is knowledge points. In the teaching of NC machining, three theme activities are carried out, namely, the basic concept of NC machining, basic operation and safe operation procedures. First, the video is played to introduce the development of mechanical manufacturing technology. Then teachers communicate with students about the manufacturing process of typical mechanical products, the emergence and development of modern machine tools and the reasons for the emergence of CNC technology and finally analyze the development characteristics of manufacturing technology at different stages. When telling the story of the origin of NC machining, the teacher explained the tortuosity of the development path of new things. The development process of China's manufacturing technology is characterized by splendors of the past, lagging behind in modern times and rising up with ardour in modern times. Through further analysis, the teacher can conclude that it is necessary to adhere to the “four self-confidence”. When explaining the characteristics of numerical control processing, teachers can analyze the advantages and disadvantages of numerical control processing, and make clear that everything has two sides and the dialectical thought of the unity of opposites. NC machining is the key supporting technology of intelligent manufacturing. When the teacher talks about this knowledge, he can point out the systematic relationship between parts and the whole. Through the analysis of the trend that machines will inevitably replace people, it is clear that the objective laws are not transferred by the

will of people, and students should improve the subjective initiative in the face of objective laws.

In the ideological and political teaching of the engineering training course, the safe operation procedures must be taught by the teachers of all types of work, mainly involving people and materials. The teachers can carry out case teaching according to the specific conditions of the types of work. The relevant cases can fully demonstrate the craftsmanship spirit of dedication, thorough and innovation.

The third route is project. The project teaching method is adopted in the course of practice teaching. Students form learning interest groups to jointly complete difficult tasks and cultivate their sense of unity and cooperation during analysis and discussion. Teachers can choose one or two core projects in each type of work. The projects are organically linked, without repetition, affectation or farfetched, providing strong support for the student-centered talent cultivation concept.

### **2.2.3. Two Curriculum Systems of Moral and Intellectual Double Credit**

Supported by four modules and three routes, the ideological and political system of professional practice courses has been formed with intellectual education as the main and moral education as the auxiliary.

The first is intellectual education curriculum system. Based on the “4400” course system, we can effectively implement the course schedule, complete the training of knowledge objectives and ability objectives and initially achieve the quality training of students to become engineers according to the course arrangement.

The second is curriculum ideological and political system. The teaching method of moistening things silently is adopted in the teaching process of high moral values establishment and people cultivation. Under the guidance of the three ideological and political routes, the “4400” knowledge carrier is used to spread ideological and political content and a “moral and intellectual double credit” curriculum system will be formed.

## **3. Teaching Methods and Strategy of Ideological and Political Teaching**

### **3.1. Differentiated Instruction**

When teaching theoretical knowledge points, we can focus on the glorious history and deeds of celebrities in this field so as to carry out ideological and political education in history, culture, scientific thinking and other aspects for students and stimulate students’ pride and cultivate students’ innovation awareness and anti frustration ability. In addition, we can also give more examples of the application of some knowledge points in high-end fields to achieve moral and value guidance and cultivate students’ sense of social responsibility and family and country feelings. Teachers fully understand the specific situation of students and carry out practical teaching in combination with the actual situation of the course so as to find out a targeted ideological education method that students like. In the teaching mode, we should make good use of the situation to enhance the effectiveness of ideological and political education.

### **3.2. Practical Operation**

The ideological and political teaching is carried out in the explanation stage before training operation and practical training stage so that the students can identify with the craftsmanship spirit of dedication, thorough, perfection and innovation. Students’ sense of responsibility and careful attitude are cultivated. Students form learning interest groups in practical operation. They work together to complete difficult tasks and in the process of analysis and discussion students’ sense of

unity and cooperation will be cultivated. For example, when students are learning laser carving, they need to independently complete programming and the production of carving works. In this way, students' ability to solve practical problems and innovation ability and team spirit are further improved.

#### 4. Specialty and innovation of Ideological and Political Teaching

The “4321” ideological and political system has been formed. Through reconstruction of teaching content and optimization, the organic integration of teaching content and ideological and political elements can be realized. The innovation of interactive ideological and political teaching organization can be realized. Through interactive discussion, debate, games, activities and other ways, the ideological and political elements are integrated into the teaching process. The ideological and political innovation has been created based on BOPPPS teaching methods. The training objectives can be achieved by introducing the ideological and political points in the pre-test, learning and post test.

#### 5. Conclusions

The students' enthusiasm for learning is fully mobilized by carrying out the ideological and political teaching of the course. Students' ability of engineering practice, teamwork and language expression have been further improved. Teachers carry forward the spirit of nails, firmly grasp the courses they teach, adhere to moral cultivation, and practice the “three” education. The engineering training teachers actively follow up, condense years of teaching experience, constantly learn new ideas, strive to improve their teaching level, and build a “golden class” that meets the requirements.

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