

# Curriculum Reform and Practice of Sensor and Detection Technology

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## Abstract

**This paper analyzes the necessity of teaching reform, and compares the differences between the traditional teaching method and the reformed teaching method, through the teaching place, teaching content, teaching mode, assessment methods and other aspects. This paper emphasizes the advantages of the curriculum reform through examples. students get better teaching effect through the curriculum reform.**

## Keywords

**Traditional teaching; Multi-media; Training room.**

## 1. Introduction

Sensor and detection technology is an important professional skill course for the major of electrical automation technology. It is not only the continuation of the early theoretical course, but also the premise of learning other professional courses. This course mainly cultivates students' ability to select, apply, debug and maintain various sensors, to form various detection systems, and to analyze and debug automatic detection systems. These abilities are an important part of the common vocational abilities in the professional and technical fields, and lay the foundation for graduates' employment. The "Internet Time" has put forward new requirements for talents training. In order to meet the needs of the times and society, it is urgent to change the traditional teaching mode according to the type of courses. Therefore, the teaching mode and teaching methods of this course must be reformed.

## 2. Changing the Teaching Venues

The traditional teaching place of sensor and detection technology has two parts, one is the multi-media classroom, the other is the training classroom. Multi-media classroom teaching is the main teaching method, supplemented by training room teaching. If there are 60 classes in a semester, 50 classes are in the multi-media classroom and 10 classes are in the training room. After the reform, there is only one teaching place, All the teaching is completed in the training room, implementing the teaching mode of learning while doing and doing while learning.

## 3. Changing the Teaching Content

The main teaching content of "sensor and detection technology" is the basic principle and application of sensor. It takes about half of the total time to learn these two pieces of content. Traditional teaching, introduce a kind of sensor, spend about half the time to explain the basic principle of sensor, spend half the time to explain the application of sensor. For the application of sensors, only 4-5 kinds of sensors are tested in the training room, and other applications are mainly taught by teachers. Therefore, the time of practical operation in the training room is only 10% of the whole teaching time, the teachers mainly finish teaching in multi-media in 90%

of the whole teaching time. This kind of teaching content based on theory teaching can not keep up with the demand of the times for higher vocational talents.

After the reform, the main teaching content of this course is the basic principle and application of sensors, and the time proportion becomes 1:3. It takes about 25% of the time to introduce the basic principle of the sensor, 25% of the time to introduce the application of the sensor, and 50% of the time to spend on the practical operation. Using the sensor to design the corresponding circuit, and then to analyze the application and principle of the sensor.

#### **4. Changing the Teaching Mode**

The traditional teaching mode is mainly based on the way of teachers' teaching. Students mainly receive knowledge as a listener. The application of a lot of knowledge is to get the corresponding conclusion through pictures and their own imagination. For students, learning the knowledge without practical is not easy to master. even if mastered, it is easy to be forgotten. After the reform, the teaching mode is student-centered and teacher assisted. After shortening the teaching time of teachers, the task should be distributed before class, so that students can preview the corresponding basic knowledge first, and come to the classroom with the problems they don't understand. The teacher mainly explains and solves the confusion about the knowledge that they don't understand. For the knowledge that has been understood, it can save a lot of time. The time saved in class is mainly spent on the practical application of sensors. Students build their own circuits, test the corresponding results and draw conclusions. These processes are completed by the students. Occasionally, if there are problems that the students don't understand, the teacher will teach them.

The reformed mode realizes the teaching mode of learning in doing and learning by doing. It is helpful to improve students' understanding of sensor basic knowledge and application, improve students' circuit design ability, and lay a good foundation for future employment.

#### **5. Changing the Way of Assessment**

The traditional course evaluation mainly consists of the usual score and the final score. The usual score accounts for 20% and the final score accounts for 80%. The main purpose is to evaluate the students through the final examination paper.

After the reform, the evaluation method has changed the traditional evaluation method, paying attention to the diversity of evaluation, strengthening the process evaluation, weakening the result evaluation, combining the process evaluation with the result evaluation, combining the qualitative evaluation with the quantitative evaluation, paying attention to and respecting the personality differences of students, so as to improve the quality of students in an all-round way. In each project, the understanding of the project, the completion of the design, hands-on operation, the completion of the training report and other aspects of the investigation, the formation of a project evaluation results, evaluation results accounted for 60% of the total score. Usual attendance accounts for 10% of the total score, and the course comprehensive assessment score accounts for 30% of the total score.

#### **6. A Specific Case--Gas Sensor**

Whether it is the traditional teaching mode or the reformed teaching mode, the teaching hours of gas sensor are two classes. the knowledge need to be learned about gas sensor, include the working principle and characteristics of gas sensor, common gas sensor, application of gas sensor.

Traditional teaching is in the multi-media classroom, spend 2 classes to explain the knowledge, assign the corresponding homework to complete the teaching task.

After the reform, the basic knowledge of gas sensitive resistance should be taught by the students. The tasks to be completed are as follows.

- 1) Definition of gas sensitive resistor.
- 2) Why do gas sensors need heating when they are working?
- 3) What are the gas sensors used commonly?
- 4) What is the type of gas sensitive resistor for testing alcohol?
- 5) There are several pins in the component. How to use these pins is studied.
- 6) Understand which occasions in life need to use gas sensors.
- 7) The application circuit of gas sensitive resistor in teaching material is analyzed.

After the preview, ask the teacher questions in class with doubts. There will be three types of students when they come to class. They are as follows.

The first kind of students fully understand the task assigned by the teacher, so the teacher can directly assign basic tasks to these students in class. The task is to complete the production of simple alcohol tester, and then give the students a more difficult task which is to design a complete and stable alcohol tester through the circuit simulation software.

The second kind of students are those who have some basic knowledge and have doubts about it. The teacher answers the questions in turn, and then arranges the task which is the production of simple alcohol tester.

The third kind of students don't understand it at all. They can explain the corresponding knowledge slowly. and they have time to complete new tasks in class. if they don't have time, they can distribute the corresponding components for students to complete after class.

From the traditional teaching of knowledge to the formation of the teaching mode of "teaching, learning and exploration", let the classroom really do, let the students fully use their hands, mouth and brain in class, get more information, consolidate the knowledge they have learned, improve their professional skills, and cultivate and enhance their comprehensive practical application ability.

With the help of teachers, the students can summarize and summarize independently through analysis and reasoning, so as to enhance their understanding of the working principle and application direction of various commonly used sensors; Through classroom explanation and discussion, project driven, case analysis, integration of learning and doing and other methods to promote students' understanding and application of the knowledge, in order to cultivate their ability of sensor selection and application, analysis and debugging of automatic detection system.

## 7. Conclusion

Through the teaching reform, we should strengthen the cultivation of students' practical skills and cultivate their comprehensive professional ability and quality; Ability to learn and acquire new knowledge, skills and methods independently; Attitude and ability in communication, cooperation, etc; It will lay a solid foundation for the future work of electrical technology.

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