

Design and practice of a novel experiment teaching system based on the optoelectronic information chain

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Abstract: The course of optoelectronic information science is a diverse science and technology with wide range of disciplines, intensive technology, and strong applicability. As a result, the practice teaching in undergraduate education occupies the strategic important position, which is a key link in the process of innovative talents cultivation of photoelectric information, plays a unique and irreplaceable role by any other teaching methods. In order to meet the requirements of national innovative talents of photoelectric information, the complete teaching reform strategy was put forward by combining with the higher education policy and development strategy of teaching and professional characteristics. The goal of the experimental teaching reform is to cultivate innovative talents and to construct the photoelectric information industry chain system of experimental teaching platform and cultivating creative personnel. The key clue is the photoelectric information surrounding photoelectric information, like “generation - modulation - transformation - detection - procession” which will be realized by resource integration and complementary among cross disciplines, and focusing on scientific research support for the teaching and the combination of professional knowledge and practical application. This teaching reform scheme presented in the paper will provide very good demonstration effect in the curriculum reform of other photoelectric information related courses.

Keywords : Optoelectronics information engineering, Experimental teaching reform, Creative talents, Strategy and scheme

1. Introduction

Nowadays, optoelectronic technology is widely used in the field of telecommunications, energy, and national defense. As a result, with the rapid development of optoelectronic technology, more and more people are enjoying the comfort and convenience brought by optoelectronic technology, such as LED lighting, all kinds of display technology, imaging technology, optical disc storage technology with progressively increasing capacity and so on. Meanwhile, people for the continuous pursuit of the photoelectric device applications, also brings the rapid development of photoelectric chain. Now the optoelectronic information chain can be mainly divided into “generation - modulation - transformation -

detection - procession". Optoelectronic technology, at present has become a rapidly developing field of research and development by all the countries. Scientific community predicted that the optoelectronic industry will become the largest industry of the world in 21st century.

In order to adapt the trend of the optoelectronics development, we need a large number of professional optoelectronics scientists and engineers. In the present course system, there are many defect in the experimental teaching in college education, such as less of experimental teaching, less system experiment to cultivate the students' comprehensive abilities, lack of perfect of teaching method which have a bad effect on students' ability to contact theory with practice. As a result, even the graduate students feel confused and don't know design and perform experiments research independently. Therefore, the creativity and practical ability of students is a key ring, bringing the experimental teaching becomes critical. In the following, we will present a new and efficient teaching method for optoelectronic experiment teaching based on optoelectronic information chain.

2. Reformation Goals

2.1 One feature of the experiment teaching system

The important feature of the experiment teaching system is to give comprehensive and innovation design experiment. We will pay attention to students' way of thinking, innovation consciousness and the cultivation of comprehensive ability. It includes correct dealing with the relationship of the traditional content of classic and modern advanced content, streamlining the traditional content of single model validation experiments, open multiple correlation discipline comprehensive design experiments independently. Efforts are made to make the experiment teaching skills and intelligence training small scientific research, and pay attention to penetration and cohesion between upstream and downstream course, coordinate relative independence and continuity of master course, interdisciplinary curriculum design experiment content, increase the organic connection between the related courses. Attention are paid to the introduction of advanced education idea, increasing the new method is introduced and the application of new technologies.

2.2 Two stages in the experimental teaching system

The first stage is from the freshman to sophomore. In this stage, students are encouraged to study basic operating skills and innovation consciousness. The experiment content arrangement gives priority to basic operation, and then integrated experiment skill training is complementary.

The second stage is from the junior to senior. The students are cultivated to integrate of theoretical knowledge and experimental skills, to develop the ability to solve practical problems, to master basic photoelectric information research method. In this stage, comprehensive experiments dominates over the experimental skill training is complementary.

2.3 Three kinds of classes

Experimental teaching system is composed of three classes, compulsory experiments, optional experiments and open experiments. Compulsory experiments are designed to ensure the students' basic training specifications and quality. Optional experiments are designed to encourage the student individuality development. While the open experiments are aimed at students' personality development,

and combining with all kinds of innovation and competition of science and technology.

2.4 For levels in the experimental teaching system

The first level is the basic operation skills in experiment projects, which is the basic requirement of photoelectric information engineering innovative talents cultivation.

The second level is the comprehensive experiment, which give chance to students to contact photoelectric information research methods through comprehensive experimental ability training.

The third level is the design experimental project and independent research experiment project. In order to develop the exploration spirit and innovation ability, students are required to independently design experiment plan through the literature, a complete experiment and experiment results analysis process. Combining with the teachers' scientific research subject, students are engaged in the research innovation projects.

The fourth level is to use scientific research platform of experimental teaching center, to offer undergraduate course graduation design topic and graduate research. By use of the practice teaching base, and providing training for undergraduate students, attention is paid to the combination of knowledge and practical application.

3. Reform measures and content

According to cultivate innovative talents as the goal of photoelectric information experimental teaching reform mentality, the proposed the reformation includes the following four aspects.

3.1 To optimize the allocation of resources and build a multi-level experiment platform.

To cultivate innovative talents as the goal, and integrate the photoelectric information experiment teaching resources of related disciplines, an experimental teaching system is formed to promote each other and complement each other mutual collaboration. The construction of multi-level modular vertical photoelectric information engineering teaching experiment platform and the carrier, the formation of lab teaching for teaching and scientific research thesis practice that is closely related to the production practice, and other forms of various modules of the practice teaching platform

3.2 To close relating the teaching and research together and highlight the support of scientific research on teaching.

Taking advantage of research in photoelectric information, the scientific research provides great support to photoelectric information teaching. The further reformation in teaching laboratory and research laboratories, resource sharing and using scientific research to support innovation training are very necessary. The method of scientific research into experimental teaching activities makes the students understand the latest science and master technology development and the academic frontier dynamic, inspires the interest of scientific research and lights the thinking of scientific research.

3.3 To close the combination of experimental teaching to industry enterprise.

To realize the combination of professional experiments and practical application, it is very emergent to close the combination of experimental teaching to the local industry enterprise, especially the pear-river regional optoelectronic industry. The establishment the cooperation of university-industry will promote the university education, strengthen the scientific research application in the practical production and conversion, and also provide technical support for the enterprise.

Conclusions

In order to maximize the role of experimental teaching, we propose and design a new teaching scheme based on the optoelectronic information chain. We describe the new system by introducing the one feature, two stages, three kinds of classes, and four levels. With the effort from the teachers, students and industry, we believe this experimental teaching system will play an important role in the future optoelectronic information engineering education.

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