Teaching Practice of High Frequency Electronic Circuit Course Driven by New Technology

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Abstract: With the rapid development of modern science and technology, various new technologies have also emerged. In this environment, new requirements are put forward for the teaching of high-frequency electronic circuits. It is necessary to keep up with the development trend of the times and carry out course teaching reforms.

Keywords: New Technology; High Frequency Electronic Circuit; Course Teaching; Practice

Introduction

High-frequency electronic circuit is a basic course offered by communication engineering, electronic information science and technology majors. After the study of this course, students can master the basic theories and concepts of high-frequency electronic circuits, and lay the foundation for the study of subsequent courses. In recent years, with the development of various technologies, curriculum teaching should seize the opportunity to speed up the reform of curriculum teaching.

1. High frequency electronic circuit course teaching

1.1 Teaching content

High-frequency electronic circuits have undergone a long period of change, and they cover a lot of teaching content, including the basic circuit power supply, communication indicators and performance of devices. With the development of new technology, the corresponding curriculum system has also changed. Under the new technology, the original teaching content should be reformed to meet the teaching needs.

1.2 Teaching principles

First, a main line. In the teaching of high-frequency electronic circuits, the principles and functions of wireless communication systems and unit circuits should be regarded as the main line. The basic structure of the wireless communication system and the basic principles of functional circuits are described, and then the functional principles of each unit are systematically described. When describing this part of the content, it is necessary to analyze its role in the overall system and the impact on each indicator. Under the condition of mastering the basic principle of each unit's functional circuit, the advantages and disadvantages of each system are commented.

Second, five links. According to the relevant investigation and research, the teaching of high-frequency electronic circuit courses in major vocational colleges is mainly composed of basic theoretical knowledge teaching, practical teaching, and curriculum design. The training of basic concepts, principles, skills and various abilities of the curriculum is integrated into all aspects of teaching in a targeted manner.

Third, two abilities. In the teaching of high-frequency electronic circuit courses, attention should be paid to the cultivation of students' ability to analyze and solve problems. At the level of course assessment, the assessment system should include two parts: theoretical and practical assessment. At the extracurricular practice level, students should be supported and encouraged to participate in

electronic design-related competitions. Through competitions, students' ability levels should be cultivated and students should be guided to solve problems with the knowledge they have learned.

2. Teaching practice strategies of high-frequency electronic circuit courses driven by new technologies

In the teaching of high-frequency electronic circuit courses under the new technology, it is necessary to comprehensively consider the technical innovation of the physical layer, the changes in the basic broadband, the technical characteristics of electronic equipment and the new technology of information reception. Among them, the new physical layer technology includes radio frequency and base band smart antenna technology, TURBO channel coding technology, etc. Driven by new technologies, electronic equipment has the following characteristics: computer-aided design; intelligent testing; low-loss compact assembly process. Driven by new technologies, the teaching of high-frequency electronic circuit courses can start from the following aspects:

2.1 Optimizing theory teaching

First, to grasp the whole. In the theoretical teaching of high-frequency electronic circuit courses, teachers should grasp the whole, optimize and integrate the theoretical knowledge involved in the course, so that students can have a systematic understanding of the content of the course and determine the direction of subsequent learning.

Second, we must highlight important and difficult points. The high-frequency electronic circuit course covers a lot of content. In order to let students understand the content of the course, teachers must summarize the key and difficult knowledge, highlight it, systematically analyze it, and run it through the whole process of course teaching. When speaking, teachers can first give simple examples to let students have a preliminary understanding of the concept of modulation and demodulation, then introduce its principles, and finally describe the modulation and demodulation circuits. In addition, when describing the performance indicators of each part of the circuit, the content of formula derivation should be reduced.

2.2 Update teaching content

In the new technology environment, the previous circuit teaching based on discrete components has been unable to meet the current development requirements of electronic technology. Many electronic devices are now integrated, such as high-frequency power amplifiers, angle modulation and so on. Therefore, when conducting high-frequency teaching, new technology content or more classic integrated circuit modules can be added to the existing teaching content to enrich students' knowledge reserves.

2.3 Flexible application of various teaching methods

2.3.1 Increase the application of multimedia and network teaching technology

In the new era, network information technology is widely used in various fields, and the teaching field is no exception. The promotion and application of multimedia and network teaching technologies have injected new vitality into the traditional single course teaching. Combined with the characteristics of high-frequency electronic circuit courses, multimedia video animations can be used scientifically to demonstrate complex circuits in teaching, so that students can understand abstract circuits. The process has a systematic understanding. At the same time, teachers can also make effective use of online platforms, such as Learning Link. To communicate and interact with students, teachers can upload the teaching video materials prepared before teaching to the learning website, which is convenient for students to review after class, discover problems in their own learning, and discuss with students and teachers on the online platform. In addition, an online question bank can also be set up on the network platform, which is convenient for students to learn, so that students can check and fill in the gaps and ensure the learning effect.

2.3.2 Effective application of simulation software

The experiment of the test box is based on the circuit system, which is integrated, and there are few parts that students can operate, which is not conducive to the cultivation of students' innovative ability. Therefore, simulation software such as multisim and EdA can be applied to the teaching process. Through simulation design, students' understanding and understanding of knowledge can be strengthened, and students' ability to analyze and solve problems can be improved.

2.3.3 Further strengthen the application of new technologies and new products

The development speed of electronic technology is relatively rapid, especially in the advent of the 5G era, the requirements for course teaching are gradually increasing. As a high-frequency electronic circuit teacher, we must keep pace with the times, effectively apply various new technologies and new products to the course teaching, mobilize the enthusiasm of students to participate in the course learning, and let the students experience the course in real life. specific application and value. For example, when the frequency synthesis technology is described, the application of digital direct synthesis technology in various fields such as communication can be introduced, so that students can continuously extend and expand their knowledge according to the needs of social development.

2.4 Strengthen practical teaching and improve practical ability

The high-frequency electronic circuit itself is more practical. Practical teaching is a very key teaching link. It is an effective way to promote students' theory to practice and improve students' practical ability and innovation ability. In order to innovate the traditional single practical teaching method, the practical teaching of the high-frequency electronic circuit course can be divided into basic verification experiments, comprehensive design experiments, and electronic competitions. According to the specific situation of students' learning, teachers carry out relevant experiments from simple to complex. For example, the basic experiment of LC series resonance can be done at the beginning, so that students can master the function of series connection and the value of the application of modern technology, and then conduct experiments related to integrated frequency modulation, transmission, etc., and finally do experiments on radio kit assembly and debugging, and students participate in the experiment. You can learn more about the application of high-frequency electronic circuits in reality. Regarding the design of courses, teachers should guide students to use different design schemes, and design tasks should leave room for students to think so as to mobilize students' innovative thinking. At the same time, it is necessary to strengthen the skills training of students, and improve students' innovative ability and level by arranging students to participate in electronic design competitions.

2.5 Innovative assessment methods

In the past, the examination results were mainly written examinations. Although the assessment standard is usually 30%, experiments account for 20%, and exams account for 50%, but mostly stay on paper documents, including homework, laboratory reports and test papers. This kind of assessment form cannot reflect the real level of students, nor does it meet the teaching purpose of the course. Therefore, it is necessary to innovate the assessment method. For example, comprehensive design can be added to the experimental item, and it is not limited to the classroom. Students need to complete it after class to increase their practical ability. Usually, you can also use learning software and other teaching software and increase the practice after class. Through these methods, understanding and supervising students' mastery of theoretical foundations and skills acquisition can also allow students to discover problems in students' learning or in their own teaching in time, and make corrections in time to ensure the effectiveness of course teaching.

3. Conclusion

All in all, the high-frequency electronic circuit course is an abstract and complex course. Under the traditional teaching mode, the teaching effect is not good. As a course teacher, we must recognize the importance of course teaching reform, optimize theoretical teaching, update teaching content, and be flexible. Use a variety of teaching methods. At the same time, it is necessary to innovate the assessment method to better achieve the goal of curriculum reform.

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