Research on Practice Teaching and Reform of RF Circuit Course

Wanxiong Cai
Guangxi Technological College of Machinery and Electricity
wanxch83@gmail.com

Abstract. In the context of the era of high-correction transition to applied technology, as a highly applicable RF circuit course, students should continue to strengthen their practical ability. The traditional talent training model that emphasizes theory over practice is difficult to meet the actual needs of enterprises. Real cases and real training for job positions and practical work tasks are practical ways of reforming practical teaching. They are of great significance for improving students' learning ability, combining theory and practice, and achieving seamless connection between talent training and corporate needs.

1. Introduction
Radio frequency circuit is a professional core course of electronic information engineering. It is also a highly applicable course, and it is widely used in wireless communication, aerospace, modern medical treatment, remote sensing, navigation and radio frequency identification. In recent years, a lot of exploration and research have been conducted on the teaching content and teaching methods of the RF circuit course. However, according to the actual teaching effect survey, there are still many problems in the actual teaching process, which seriously affects the development of the course itself, causing students and teachers to doubt the course content and teaching methods, making the teaching effect and quality of the course unable to meet the needs of students and society. In order to transform students and teachers' understanding of course teaching and improve students' ability to apply the basic theory of radio wave propagation to solve practical engineering design problems of radio frequency circuits, it is necessary to constantly reform the teaching content and teaching methods, and increase practical teaching. At present, Practical teaching model has been explored and studied in the teaching practice of accounting, computer applications, e-commerce, marketing, advertising and other related majors and disciplines. Among them, the "dual truth" teaching reform introduced in Web application development teaching has transformed simulation teaching into a full-truth teaching mode, resetting the teaching content and teaching methods according to the job position, and integrating the real project cases and enterprises in the teaching.[1] The work flow not only allows students to learn professional technical knowledge, but also cultivates students' practical ability and team consciousness through complete project development, and the teaching effect is remarkable. In order to improve the teaching effect of the RF circuit course, cultivate modern RF circuit development talents, and connect the school education with the needs of enterprises, it is proposed to carry out the reform of the "double true teaching" model in the teaching process of the RF circuit course. on this basis, let students really participate.[2]
2. Practical teaching connotation and feasibility analysis

Practical teaching is based on the company's demand for RF circuit development engineers, according to the corresponding positions of filter design, antenna design, power amplifier circuit design, etc., to analyze the work tasks and technical capabilities, and carry out training teaching of RF circuit design and development. In the teaching process, students are allowed to participate in teachers' scientific research projects, from basic research to circuit design and development to form a perfect technical channel. Relying on the two provincial scientific research platforms of Anhui Provincial Microwave Engineering Center and Electronic Information System Simulation Design Anhui Provincial Key Laboratory, as well as the off-campus training base in cooperation with the school, etc., with the real scientific research and development environment and enterprise production practices as the carrier Real RF engineer post skill training, apply theoretical knowledge to scientific research and production practice, and test scientific theory in practice, and finally achieve the seamless connection between students' professional skills and the needs of corporate job capabilities, to achieve the goal of course teaching in RF. The practical teaching carried out in the teaching of circuit courses is divided into two stages: classroom teaching and scientific research platform teaching. Since the school's scientific research platform has advanced scientific research equipment for students to learn and practice, so students' learning on the scientific research platform is a true truth. Of teaching. It is the key point to realize practical teaching in the classroom to realize the whole truth teaching, and it is also difficult. Fortunately, RF circuit is a very engineering and practical course, because the main job of RF engineers is to complete the circuit design, the main tool used is a computer. According to this feature, it is only necessary to equip a certain number of computers in the classroom to carry out related circuit design work. Therefore, the introduction of a large number of scientific research projects and real cases of enterprise engineering design in classroom teaching allows students to complete the study of circuit design, and then process the designed circuit through the scientific research platform for processing and testing, so that students can not only complete the learning of knowledge and skills but also be able to personally Hands-on processing test, which has completely realized practical teaching.[3]

3. RF circuit practical teaching design

According to the school's existing school running conditions and enterprise survey feedback, RF transmission structure design, RF microstrip filter design, RF power distribution circuit design, RF microstrip antenna design, RF low noise amplifier design, RF power amplifier design, etc. were set up. Group of jobs. Analyze the job tasks and job abilities of different positions and formulate the corresponding job teaching content. Combined with related enterprise engineering design and teachers' scientific research projects, several engineering cases related to teaching content were sorted out, and practical curriculum design tasks combined with key teaching links were formulated, as well as corresponding curriculum design task assessment evaluation standards.[4]

3.1. Teaching content

According to the job requirements of RF engineers, combined with enterprise design and development practices and related scientific research topics for teachers, a whole set of systems is formed. The unified RF engineer teaching content is divided into basic theory, simulation software, circuit design cases and other links.[5]

3.2. Course design tasks

According to the requirements of the "Double True Teaching" reform, the focus of the course is to train students to understand and use the relevant theories and design of RF circuits. Calculation methods to improve students' comprehensive application ability, hands-on ability and engineering practice ability. Therefore, a single examination form cannot timely grasp the learning situation of students in all aspects of teaching, nor can it reflect the actual learning effect of students. In order to increase students' interest in learning and strengthen the cultivation of application and hands-on abilities, it is proposed that the key links in teaching combine engineering design cases and teacher
research projects to set enterprise engineering practice characteristics and have certain innovative design tasks. The assessment of students' academic level, on the other hand, timely adjustment of teachers' teaching content and teaching methods to improve teaching effects.[6]

3.3. Evaluation system
When the "real task" is set in the teaching link, it is necessary to evaluate and evaluate the learning effect of the students. On the one hand, this is the need for curriculum teaching, on the other hand, it is also to encourage and spur the students. As an important link in the construction of the evaluation system, we have formed an evaluation team, which is composed of several teachers and teaching management personnel. Within the stipulated time, students are required to complete the corresponding course design tasks and prepare a defense report. The assessment and evaluation team evaluates the completion of the course design tasks, and obtains the final results of students' practical assessment design by taking the average. In addition, according to the requirements of the integrity of the assessment system, students' academic assessment standards are formulated. The total scores of academic assessments are divided into two major categories: ordinary grades and practical design grades. The usual grades include: daily attendance and classroom questions.[7] Ordinary scores account for 30% of the total academic assessment scores, and the daily attendance and classroom questions in ordinary scores account for 50% and 50%, respectively. Practice assessment design results account for 70% of the total academic assessment results. As shown in Figure 1 below:

![Figure 1. Distribution of total academic results](image)

From the perspective of teaching practice, setting flexible and changeable practice design tasks in key links of teaching can not only effectively investigate students' academic level, help the instructors to master the teaching effect, adjust the teaching content and methods, but also greatly improve In order to improve students' enthusiasm for learning, exercise their hands-on ability, theory-practice ability, comprehensive application ability, etc., some students with innovative consciousness stand out. After learning practical design tasks, some students have a strong interest in RF circuits. Now they have invested in the RF circuit development industry and become RF engineers.[8]

4. Conclusion
This paper discusses the reform and practice of the double true teaching of radio frequency circuits. Based on the Anhui Provincial Microwave Engineering Center and the Anhui Key Laboratory of Electronic Information System Simulation Design, through cooperation with enterprises, we have built an application engineering talent training platform for electronic information engineering specialty, and comprehensively reformed the teaching content and teaching method assessment mode of radio
frequency circuit course. Practice has proved that the implementation of practical teaching of RF circuits has increased the enthusiasm of students on the one hand, and has attracted a group of students who are willing to engage in related work to participate in scientific research projects of enterprises and teachers; on the other hand, students have been trained through double true teaching. The application ability of the application is perfectly connected with the talent demand of the enterprise, and the teaching reform has achieved good results.

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