

# **Teaching Digital Circuit Class and Cultivating Students' Innovation Ability based on Curriculum Thinking**

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## **ABSTRACT**

Digital circuit is an important course in the major of electronic information. In the teaching of the digital circuit course, in addition to imparting basic knowledge and skills, it should also focus on the construction of ideology and politics to promote the overall development of students. This paper discusses the following aspects based on the construction of the digital circuit course Civics in colleges and universities: first, the digital circuit course should focus on the ideological and political education of students.

Second, the teaching content of the digital circuit course should keep pace with the times, follow the pace of industry development, focus on practice and application, so that students can master the latest technology and tools, with the ability to solve practical problems and practical experience. Finally, the digital circuit course should focus on the cultivation of students' innovation ability, encourage students to actively participate in research projects and practical activities, and provide opportunities and platforms to help students give full play to their strengths and realize the unity of personal and social values.

*Keywords: [Digital Circuit, Curriculum thinking, Ideological and Political]*

## **1. INTRODUCTION**

Digital circuit course is a very important basic course in electronic information majors, and is also an important threshold for students to master electronic information technology. With the rapid development of science and technology and the increasing social demand, digital circuit technology has been widely used and promoted. Digital circuit course teaching Civics construction, not only focus on the cultivation of students' knowledge and skills, but also focus on the cultivation of students' ideological and moral quality, social responsibility and innovation spirit.

With the continuous development and application of information technology, digital circuit technology has been widely used in various fields. In this digital era, digital circuit technology is an important force to promote social progress and economic development. The construction of digital circuit course Civics is not only a necessary path for students to master electronic information technology, but also an effective way to shape students' ideological and moral quality and improve their sense of social responsibility and innovative spirit. Therefore, the construction of the thinking and politics of the teaching of digital circuit courses is not only about the learning effect of students and the quality of personnel training,

but also about the sustainable development of the electronic information industry and the prosperity and strength of society.

## **2. IDEOLOGICAL AND POLITICAL EDUCATION IN DIGITAL CIRCUIT COURSES**

The digital circuit course is a basic course for electronic information majors, which plays an important role in the mastery of students' professional knowledge and the cultivation of innovation ability. However, the teaching of digital circuit course focuses not only on students' professional knowledge mastery, but also on students' ideological and political education.

Students need to acquire the basic knowledge and skills of digital circuits through theoretical studies and experimental operations in the digital circuits course. In the teaching process, students are introduced to the importance and role of digital circuits in practical applications and the impact and responsibility of digital circuits for the development of society through the introduction of cases, problems or experiments of an ideological nature.

In addition, this course also guides students to think about the role and impact of digital circuit technology in society by designing some experimental projects with social responsibility and public welfare, and deepens students' understanding and awareness of ideological and political education in digital circuit courses.

To address the ideological and political education in the digital circuit course, this study will discuss how to focus on students' ideological and political education and improve the teaching quality of the digital circuit course by combining the teaching practice of the digital circuit course.

## **3.PRACTICAL TEACHING OF THE COURSE**

With the continuous development of information technology, digital circuits, as a basic course in the field of information, needs to keep up with the times and keep pace with the development of the industry in order to meet the practical needs. In the teaching process of the digital circuit course, we focus on practice and application so that students can master the latest technologies and tools, and have the ability to solve practical problems and practical experience. To address this issue, we focus on introducing practical teaching and application cases into the digital circuit course to improve students' practical skills and ability to solve real-world problems. By studying how to use advanced digital circuit simulation tools and experimental equipment, we strengthen practical teaching sessions to help students better understand and master digital circuit principles and design methods.

With the continuous development of digital electronics and the expansion of application fields, the teaching contents of digital circuit courses also need to be updated and improved.

First of all, digital circuit design as a practical task requires students to have certain ability to solve practical problems and practical experience, and it is not enough to stay only at the theoretical level; students need to practice to deeply understand and master the knowledge they have learned. In the course, students will be able to experience the practical application and role of digital circuits by designing and implementing experiments on digital circuits. Students can also develop practical application and problem-solving skills through practice and case studies so that they can better cope with real-world problems in their future jobs; in addition, the digital circuits curriculum focuses on the latest technologies and tools. With the

continuous development of technology, the tools for digital circuit design are constantly updated and upgraded. Therefore, the digital circuit curriculum needs to be updated to include the latest technologies and tools to keep students up-to-date with the latest digital circuit design methods and tools. Students also need to be taught how to use these tools for the design and simulation of digital circuits.

As a practical example, the popularity and application of the Internet of Things (IoT) has become very common today, and digital circuits play an important role in IoT applications. In the digital circuits course, digital circuit components and modules commonly used in the IoT field, such as microcontroller-based digital signal processors, data converters, sensors, etc., are introduced. It also introduces how to apply these components and modules in IoT scenarios, such as controlling lights, temperature, humidity, etc. in smart homes, or sensors and control modules in autonomous driving systems for vehicles. By teaching in this way, students not only learn about the latest IoT technologies and applications, but also are able to apply their knowledge of digital circuits to real-world scenarios, enhancing their practical skills and experience. In addition, this teaching method of combining digital circuit courses with cutting-edge technologies such as IoT can also cultivate students' innovative thinking and spirit of inquiry, thus laying a solid foundation for their future development.

#### **4. INNOVATIVE CAPACITY DEVELOPMENT**

The innovative ability cultivation of the course should be reflected in several aspects. First, the teaching content needs to be close to practical applications, and students are encouraged to focus on innovative thinking in the learning process. For example, during the lecture, introduce some new technologies and tools that are being used in the industry, and encourage students to explore the principles and mechanisms behind them and come up with their own ideas and improvement plans; secondly, in order to stimulate students' enthusiasm for innovation, organize some research projects and practical activities, so that students can learn and improve their innovation ability in practice. Through these practical activities, students can gain an in-depth understanding of the principles and applications of digital circuits, acquire practical skills and problem-solving abilities, and have the opportunity to come up with their own innovative ideas. In addition, to help students better utilize their strengths, the university has set up a number of student science and technology innovation bases and research practice platforms to encourage students to actively participate in them and provide professional guidance and support. Students can form teams and participate in academic competitions at home and abroad, such as the National Student Electronic Design Competition, to showcase their research results and innovations.

The digital circuit course takes the following measures in focusing on the development of students' innovative abilities.

Guiding students to conduct research projects and practical activities. In the course, students are encouraged to actively participate in research projects and practical activities to improve their practical skills and problem-solving abilities by setting up teaching contents and case studies to stimulate their interest and creativity. For example, a course project on digital circuit design is set up to allow students to design, build and test digital circuits on their own to improve their innovation and practical skills.

Provide opportunities and platforms to help students bring their strengths into play. The university has built a digital circuit laboratory to provide students with a better learning environment and a practical platform. Students are encouraged to participate in various competitions and activities, such as electronic design competitions, which give students the

opportunity to showcase their innovative achievements and practical experience, and also enable them to be exposed to more industry information and cutting-edge technologies.

Focus on the unity of students' personal development and social values. The digital circuit course can set up some course projects or extracurricular practical activities, focusing on cultivating students' teamwork spirit and sense of social responsibility. For example, a digital circuit application project can be designed to allow students to team up independently to design and implement a digital circuit application with practical social value, such as a smart home system or an intelligent health monitoring device, based on the actual needs of society, thus allowing students to realize the unity of personal and social values in innovative practice. Or, let students team up on their own to design and create a digital clock circuit that is required to display hours and minutes and can be adjusted by pushing buttons. The circuit consists of a clock circuit, a frequency divider circuit, a counter circuit, a display control circuit and a push-button control circuit. Through this project, students can learn and apply knowledge and skills of digital circuits, such as timing circuits, logic circuits, circuit design and simulation, as well as develop their practical skills and creative thinking skills.

Through the implementation of the above measures, the digital circuit course can not only improve students' innovation and practical ability, but also cultivate students' sense of social responsibility and teamwork spirit, further promoting students' overall development and growth.

## **5. CONSTRUCTION EFFECTIVENESS**

Through the construction of digital circuit course Civics, students not only learn the knowledge and skills related to digital circuits, but also focus on the ideological and political education, practical ability and innovation ability of students. The comprehensive training of these aspects enables students to have a more comprehensive understanding of the application and significance of digital circuits, as well as the ability to apply them in a practical and innovative way, and the ability to solve practical problems.

At the same time, the construction of Curriculum Civics also provides an important platform for the university to promote the integration and innovation of teaching resources and stimulate the creativity and enthusiasm of teachers. Through research projects and practical activities, students and teachers jointly explore the frontiers and new technologies of digital circuit applications, improving teaching and research.

The active participation and innovative spirit of students and teachers have contributed to the development and progress of the digital circuit field. At the same time, the successful experience in the construction of digital circuit curriculum thinking and politics also provides reference and inspiration for the construction of curriculum thinking and politics in other disciplines.

## **6. SUMMARY AND OUTLOOK**

Through the continuous improvement and development of the construction of digital circuit course Civics, it is foreseen that the future digital circuit course will pay more attention to the ideological and political education, practical application and innovation ability cultivation of students. Teachers will not only be the role of imparting knowledge and skills, but also the guide and thought leader of students' growth, guiding them to focus on the cultivation of social responsibility, innovation and teamwork while learning digital circuits. At the same time, the digital circuit curriculum will continue to keep pace with the times, follow the pace of industry development, focus on the application of the latest technologies and tools, and

combine student learning with practice to equip them with the ability to solve practical problems and practical experience. Future digital circuit application projects will also continue to emerge, providing students with more opportunities and platforms to showcase themselves, practice their skills, and realize their values. These measures and practices will help improve the teaching quality of digital circuit courses and the overall quality of students, promote the continuous improvement of talent training quality, and contribute to the development of China's information industry to train more outstanding talents.

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