

Research on the teaching of intelligent and networked electrical control course driven by projects

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Abstract: Intelligent and networked electrical control technology refers to the application of new technologies such as intelligence and networking in the traditional electrical control field, so that the traditional electrical control has intelligent and networked functions. However, the teaching content and teaching method of the current course are not ideal in actual teaching, which is quite different from the plan, the application of the course is not strong, and there are still some differences with the skills required by the applied undergraduate. Therefore, the project realizes the teaching reform of electrical control intellectualization and networking through teaching reform driven by project. Through teaching reform, students' practical ability is improved to meet the skill requirements for applied undergraduate. At the same time, from point to surface, the research results of this course can be copied to other similar courses.

Keywords: Teaching reform; Intelligent; Energy.

1. Introduction

This course is a professional elective course for students majoring in electrical engineering and automation in our school. It is expected that through the course, students can master the knowledge related to electrical control intelligence and networking technology, so that students can apply new technologies such as intelligence and networking to the field of traditional electrical control, so that traditional electrical control has the functions of intelligence and networking. Through the teaching of this course, the teaching goal of providing intelligent and network related technology and support for product design, system implementation, operation management and other work in the field of electrical control should be achieved.

This course mainly introduces the basic concepts of intelligent and networked electrical control, the basic principles of electrical control, the implementation scheme of intelligent and networked electrical control system and other related technologies. Through learning this course, students should be able to understand the basic principles of electrical control, intelligent and networking technologies, understand the application of intelligent and networking related technologies in the field of electrical control, and consciously use intelligent and networking technologies to improve the technical level of products or systems in the design, implementation, operation and management of electrical control systems, so as to achieve national or social reliability Relevant standards on economy and safety[1,2].

2. Organization of the Text

However, the following problems are found in the teaching feedback.

Although the course content closely follows the needs of the times and includes some examples of electrical applications, due to the limitation of class hours, it is impossible to explain the course content in depth, and there is still a gap between what students have learned and the actual application.

Students have poor initiative in class. There are several reasons for this: First, students are now graduating classes, so they need to prepare for employment and test. They have less time and energy to devote to courses. Second, because the content of existing courses is based on books and textbooks, which are relatively old and cannot meet the needs of students and the times, students are not enthusiastic about taking classes.

3. Curriculum reform methods

3.1. Problems to be solved in the reform

Based on the above problems, the research and reform content of this project is mainly to design appropriate "application projects", take the application projects as the driving force, connect the electrical control intelligence and networking related knowledge points, so that students can learn by doing, learn by doing, better grasp the relevant knowledge points, and achieve the purpose of application. The key issues of this project mainly include the following: how to select a suitable applied project, which should have practical application value and include relevant knowledge of the course; How to reasonably design theory and practice courses, mobilize students' initiative, and use extracurricular time to participate in project design. How to realize the process assessment and improve the enthusiasm of students' participation [3,4].

3.2. Reform Implementation Plan

In view of the above problems, the specific implementation of this project is divided into two years. In the first year, the project selection, module design, teaching method design and assessment method design of project-based teaching were carried out and applied to actual teaching. The second year, summarize the teaching process of the previous year and adjust the teaching content of the previous year. At the same time, summarize experience. During the implementation of this project, the most important thing is to select the right project, and the election of this project is crucial. The key to the successful reform of the course to meet the requirements

of applied undergraduate is the selection of applied projects. The project of this course is based on the "Optical Storage Integration Project". The main basis for selecting the project is as follows: the project is consistent with the major of the students, and has strong electrical professional knowledge as the background; The project is a hot spot in the market at present, with good employment prospects, and meets the requirements of applied undergraduate courses; The knowledge points included in this course can cover all the knowledge points of electrical control intellectualization and networking.

The project leader has been engaged in this research in the early stage, and has realized the development of this project, so this project can be successfully applied to this teaching and reform research, and this teaching reform will also be successful.

3.3. Setting of reform content

For this course, the project of project-based teaching is reasonably designed. The project is a control system based on optical storage integration project. Optical storage integration refers to a comprehensive integrated system that integrates photovoltaic power generation, electric energy storage and household electricity. It solves the problems of power generation, power storage and power consumption. His structure is as follows:

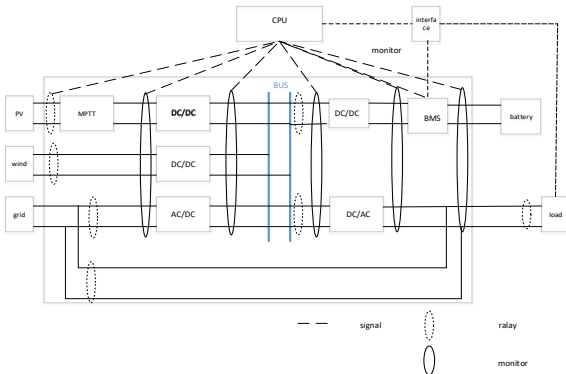


Figure 1. Optical storage integrated structure

The specific functions of the optical storage integration project are as follows:

- 1) Each power supply can supply power at the same time, and the voltage to the DC bus is the same;
- 2) Each module of MPTT, DC/DC, AC/DC and DC/AC has an independent CPU, which works independently and is not controlled by the CPU. The output voltage can be adjusted automatically;
- 3) Can multiple DC/DC modules be made into a single DC/DC module with multiple inputs and single outputs;
- 4) The relay module is controlled by CPU;
- 5) Full energy storage control module: CPU controls the charging and discharging mode of energy storage, which can realize the adjustable charging and discharging power; Realize the calculation of energy storage SOC; There is automatic constant voltage, constant current and other charging mode switching.
- 6) Monitoring module: calculate the input and output power of each module to obtain the power loss of each module;
- 7) The CPU has a communication interface to communicate with the load.

3.4. Part of circuit hardware design

The core modules in this project mainly include can, rs485

and AD modules, and their corresponding hardware circuit diagrams are designed as follows:

The hardware circuit diagram of CAN is as follows:

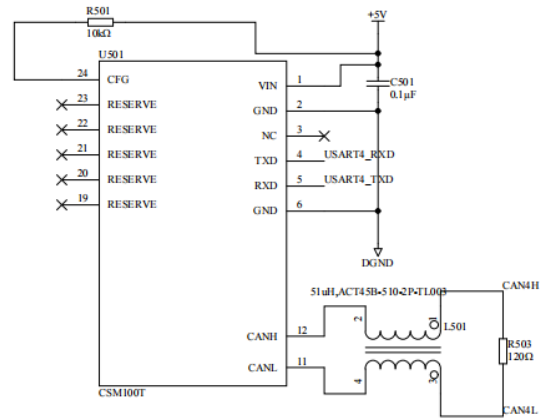


Figure 2. CAN circuit

The circuit diagram of AD module is as follows:

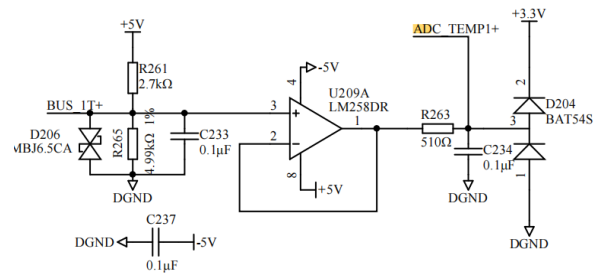


Figure 3. AD circuit

RS485 circuit is as follows:

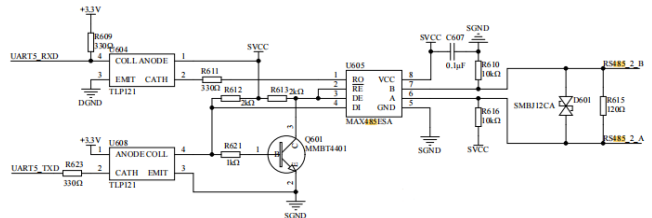


Figure 4. RS485 circuit

3.5. Assessment Settings

For project-based teaching, the assessment method is also very important. In the process of assessment, students' practical ability should be emphasized. However, due to the project-based form, students cannot complete their homework in class, so they can submit large homework after class. The final submitted project needs to include the functions of the involved modules, and the score proportion of each module should be specified. The assessment form is as follows:

Table 1. Assessment Method

Number	Module	Score
1	RS485	15%
2	CAN	15%
3	AD	15%
4	Timer	15%
5	Final examination	40%

Through the above teaching reform, not only the enthusiasm of students in class has been improved, but also

the practical ability of students can be effectively improved, and the teaching goal of this course has been achieved.

4. Conclusion

Compared with other teaching reforms, the innovation of this project has the following points: the innovation of this project is to take the applied undergraduate course as the goal and the project-based curriculum design as the guidance; The project selection of this project is targeted and applicable. The actual scientific research achievements of the project leader in the early stage are selected. This project has practical application value, and the knowledge taught can help students to successfully engage in relevant industry posts in the future; This course adopts the applied project as the guidance, and through the project modular teaching the project leader in the early stage are selected. This project has practical application value, and the knowledge taught can help students to successfully engage in relevant industry posts in the future;

This course adopts the applied project as the guidance, and through the project modular teaching method, it realizes learning by doing, learning by doing, and truly improves the students' practical ability and their application.

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