# Research on the Innovation of Teaching Mode of Power Electronics and Power Transmission in Colleges and Universities

**Tan Enping**

Hubei Vocational College of Railway Transportation, Hubei, Wuhan, 430000, China

Email: 1143631539@qq.com

**Keywords:** Teaching Team of Power, Electronics and Power, Transmission Course Group

**Abstract:** It is of Great Significance to Establish an Education Group through a Course Group for Improving the Quality of Education and Strengthening the Cultivation of Students' Professional Skills. This Paper Analyzes Powerelectronics and Powercourse Group, and Based on the Clear Teaching Team and Work and Research, Puts Forward the Prospective Tasks and Specific Countermeasures of Teaching Team Construction.

## 1. Introduction

Power Electronics and Power Transmission Are the Second Level Training under the First Level Law of Electrical Engineering. Power Electronic Technology is the Knowledge of Power Electronic Technology and Practice. Students Can Get the Possibility of Using the Basic Theory of Electric Energy Conversion and Control, Mainly for the Important Route of Electrical Specialty in Universities and Colleges. Electric Drive Mainly Refers to Dc Speed Limit and Ac Speed Limit. Power Electronic Technology is an Important Foundation of Power Transmission[1]. Power Electronic Technology Plays an Important Role in the Whole Electrical Control. Based on the Teaching of the University Department, Improve the Quality and Efficiency of Teachers' Teaching, Improve the Overall Level of Teachers, and Form a Teacher Community with Scientific Structure, Clear Division of Labor, Unified Strength and Coordinated Responsibility[2]. Teaching Team Has Important Advantages in Knowledge Sharing and Innovation. in Order to Improve the Quality of Education, the Consulting Based Education Team Based on the Course Group of Power Electronics and Power Transmission Carries out Innovative Exploration and Research Based on the Integration and Optimization of Resources with Great Value.

## 2. Course Group of Power Electronics and Power Transmission

Power electronics and power transmission lines are in a strong position of power supply, conversion, control and application as the center in the fields of electricity, electronics and automation. The use of electric energy is mainly to convert electric energy into mechanical energy[3]. The course group has formed a relatively complete control system. There are theoretical and practical route support from the control object, as well as the control method of control system installation. That plays a very important role in this field of expertise[4]. It is the only way for students to do strong electricity work. The field relates to direct employment in the fields of electrical control, power electronics and power transmission. It is an important part of cultivating students' core competence, and it is also the ultimate embodiment of this professional characteristic. In the past two years, while building the course group, the system of theory and practice of the teaching professors in the course, and promoting the reform of teaching methods, in order to cultivate the core technology of students, the function of the expert guidance group has been strengthened, and the students participating in the course have played an important role in solid theoretical knowledge and high-quality technology. Competition strengthens the participation of students and business innovation, and starts the improvement of their ability. Finally, they are fully employed. Students' high research or professional on-site entrepreneurs can graduate stronger.

## 3. Teaching Teamwork and Research Basis

This guidance group is composed of young and middle-aged backbone teachers and theoretical and experimental teachers[5]. As the main body, it is a reasonable team with the structure of education and professional titles. From the education group, the teachers of electrical engineering and automation and the teachers of mechanical design and manufacturing are automation and logistics engineering. Such a group team structure improves students' innovation ability in the field. The independent continues to carry out the education reform of staff guidance activities and the establishment of related courses. Guidance is conscientious, responsible and bold to explore and try new teaching methods, and has accumulated rich teaching experience and good team spirit[6]. The reasonable and effective allocation of staff provides a strong protection for the establishment of inquiry guidance group. The basic education team building based on the course of power electronics and power transmission is based on the system group of motor and electrical system. Research basis. Electric power system lecture has been in operation for more than 3 years[7]. Some experience has been accumulated in the process and knowledge points, and some achievements have been made in this field. Several facial materials have been screened. It provides some guidance for the construction of education team. Basic materials and work experience.

Table 1 List of Students' Innovative Self-Help Topics

| subject | Number | Contents involved |
|---|---|---|
| 300 W photovoltaic two-stage grid connected power supply system | 5 | Photovoltaic cell characteristics, inverter, transformer, boost circuit, PQ control and V / F control, vector control, embedded system, local monitoring and remote monitoring |
| Dynamic voltage recovery device | 2 | Converter, transformer, capacitor \ embedded system, vector control, local monitoring and remote monitoring |
| Asynchronous generator control device | 2 | Asynchronous generator, vector control, embedded system, fault diagnosis and monitoring, remote monitoring |
| Speed control device of asynchronous motor for electric vehicle | 3 | Asynchronous motor, vector control, embedded system, fault diagnosis and monitoring, remote monitoring |
| Electric automation experimental equipment and instrument energy consumption detection device | 4 | Relay control, electric energy measurement, single chip microcomputer system, man-machine interface, Ethernet communication, software plug-in |
| Electric Grating Tester | 3 | Stepping motor and drive, embedded system, human-machine interface, image processing |
| Large range solar photovoltaic rotation tracking system | 3 | Stepping motor and drive, light measurement, MPPT, single chip microcomputer system, remote monitoring |
| Development of health guard device for lead-acid battery | 3 | Battery charging and discharging model, electric quantity detection, charging and discharging control, battery maintenance |

### 3.1 Electrical Machinery and Power System Course

The teachers of the group formed a mutual discussion. The mutual improvement organization project team can operate effectively. The members of the power electronic power query steering group provide the innate foundation and cooperation for completing the project of joint work. The course is based on the study of the course system of power electronics and power conversion. A lot of work is carried out on the establishment of the education team[8]. Based on the curriculum content system, it is conducive to the overall structure of the education team. Established. “Research and practice of electric mechanical power system construction” course group construction project has done more work in education reform and related course construction. Education module construction, content updating, research methods and evaluation structure of education guidance provide a good foundation for the construction.

### 3.2 Tasks and Measures of Teaching Team Construction

Countermeasures: the basic basis of vocational training plan and syllabus, the content of each theoretical course and the practical route of participation of the education group are based on the existing education experience of members of each leading group, route and experimental equipment

in order to determine the key points of knowledge. Teachers and target students are organically combined to form an overall framework system. Through this architecture system, we can clearly identify the relationship between each link, clearly mark the position of each team member, and carry out follow-up work on this basis.

## 4. Analyze the Internal Relationship between the Courses Involved in the Teaching Team

Guided by the core curriculum, revise and improve the curriculum system, curriculum outline and curriculum quality standards. Measures: the core courses of this leading group are motor and drag, power electronic technology, and the foundation of power drag automatic control system. These three routes are also the concentrated reflection of the characteristics of this specialty, most of which are the main routes. This team team builds relationships, which is the internal connection between the routes of the first group, analysis and improvement, the basic refinement of the specific teaching syllabus of the team related courses, professional development, in order to adapt to the team's various routes and reformulated quality standards. Then, establish the route of team quality assurance system.

### 4.1 Sort out and Update the Teaching Content to Keep Up with the Development Direction of the Major

In addition, the function of the relevant courses of the leading group strengthens the cultivation of the core competitiveness of the students of the experts, bridges the way for the students to work, actively innovates the ability of the students, starts business, and climax of more professional characteristics. Countermeasures: first, the leading content of the leading group is at the forefront of professional knowledge, and new technologies, processes and equipment often appear. This requires following up the development direction of the major within the specified time, selecting the latest authoritative textbooks, and correcting fewer new parts of textbooks through lectures. Secondly, according to the characteristics of the existing industry, the professionalism of the power industry and the active cultivation of technical talents, especially the strong related electrical knowledge content of the leading group, there is a huge social demand, so it is necessary to strengthen the professional ability of students in this field. Contribute to a better community. Finally, depending on the characteristics of the University, experts in special fields, according to their positions and the development direction of the country, take the special energy characteristics as the development, utilization and seeking of new energy power generation, such as marine energy[9]. The direction of innovation is inclined, and the research and study of College students and graduate schools are set. In the context of “mass entrepreneurship and innovation”, we should cultivate students' innovative ability, innovative entrepreneurship and specific practice to highlight the characteristics of this major.

### 4.2 Based on the Three Major Courses Involved in the Teaching Team

The characteristics of each venue respond to the reform of leadership methods and leadership methods, and actively promote mixed classes, classroom opening, promote the initiative of students' independent learning, and actively promote the school's EOL platform. The countermeasures are: according to the characteristics of each course, put the practical content into the course, and cover it, adopt a variety of teaching methods, mobilize the enthusiasm of students, and improve the teaching results. According to different teaching materials, different design guidance methods, combination of blackboard writing and CAI teaching, combination of theoretical calculation and computer simulation, combination of engineering cases and new technology. In order to improve students' interest and cultivate students' creative thinking, various educational methods such as exploration, discussion, participation and design are carried out in the classroom. On the basis of the existing teaching practice, it practices the classroom teaching method to promote the use of school EOL platform. 4.5 carry out the reform of examination methods and adopt more flexible examination forms establish and improve the test query database, and separate the guidance and test of related courses on the basis of teacher supplement. Measures: first of all, to establish the concept of

scientific evaluation and curriculum evaluation is to give up the concept of equivalent examination completely, classify the evaluation into categories, based on the curriculum evaluation process of the whole education process and regularly guessing puzzles, the knowledge problems of the pre class, and the mid-term test. Second, the realization of evaluation methods and the adoption of evaluation methods based on the nature of curriculum and educational characteristics. Finally, reform the content of evaluation and improve the rationality of evaluation. At the same time, based on the investigation of students' basic knowledge, the comprehensive abilities of project development, logical expression management and implementation of students are investigated to improve the rationality of evaluation. At the same time, on the basis of the existing educational practice, we should establish and improve the examination institutions, and implement the guidance of relevant courses and the separation of examination on the basis of teachers' supplement.

## 5. Conclusion

The purpose of establishing a consulting education team based on the course group of power electronics and power transmission is to gather the teaching ability of the team, ensure the high-quality education level, strengthen the training of professional knowledge and the comprehensive application of professional knowledge. In order to cultivate the ability of students, develop the ability of students, carry out the cause, and achieve fruitful results. Team building optimizes curriculum setting, further optimizes team education content system; completes teaching quality standards of all courses, analyzes the realization of learning objectives, establishes self employment objectives and trains working mechanism according to college students' innovation projects; explores and improves teaching methods and discipline teaching quality; improves evaluation methods and scientific evaluation; explores curriculum content reform, development and improvement Comprehensive large-scale assignments and design experiments; competitions and awards; realization of curriculum moral education function, spot check of curriculum moral education resources within the group, and list the key points and cases of curriculum moral education. Reform and form curriculum moral education system; life style and its normalization. This team building task is fully realized, followed up, the main University of the team, even outside the school, the platform is used as the training of students' entrepreneurs, the team's greater education is combined, the students' excellent self employment goal, and establish a good foundation.

## References

[1] J. M. MAZA-ORTEGA, E. ACHA, S. GARCÍA,. (2017). Overview of power electronics technology and applications in power generation transmission and distribution. Journal of Modern Power Systems & Clean Energy, vol. 5, no. 4, pp. 499-514.

[2] Suman Debnath, Madhu Chinthavali. (2017). Control of MMC-HVDC in low-inertia weak grids. 2017 IEEE 12th International Conference on Power Electronics and Drive Systems (PEDS). IEEE.

[3] Youjun Zhang, Guoqing Lu, Wajid Ali Khan,. (2019). Direct Power Flow Controller - A New Concept in Power Transmission. IEEE Transactions on Power Electronics, no. 99, pp. 1-1.

[4] Gongsheng Zhu, Chunmei Pei, Zhifang Cai. (2018). Application of Beidou Positioning and Navigation Technology in Power Transmission and Transformation Enterprises.

[5] Carlos E. Ugalde-Loo, Enrique Acha, Eduardo Licéaga-Castro. (2018). Analysis of the Damping Characteristics of two Power Electronics-based Devices using 'Individual Channel Analysis and Design'. Applied Mathematical Modelling, vol. 59.

[6] Londono-Hoyos F, Zamani P, Beraun M, et al. (2018). Effect of organic and inorganic nitrates on cerebrovascular pulsatile power transmission in patients with heart failure and preserved ejection fraction, vol. 39, no. 4.

[7] Flores F U, Seidman D N, Dunand D C, et al. (2018). Development of high-strength and high-electrical-conductivity aluminum alloys for power transmission conductors.

[8] Gu Xiaocheng, Zhao Zhengming, Feng Gaohui,. (2017). Visualization Design and Analysis for Power Electronics System Based on Energy Flow Topology. Transactions of China Electrotechnical Society.

[9] Jean-Charles Maré. (2017). Electric Power Transmission and Control. John Wiley & Sons, Ltd.