Advances in Engineering Research, volume 113

International Forum on Mechanical, Control and Automation (IFMCA 2016)

Engineering Curriculum Reform and Research on The Construction of "Power System Analysis"

Xin Yao [1, a], Dejun Liu[1, b]

[1] Electrical and Information Engineering of Beihua University,in Jilin City, Jilin Province.New Hill Street, Longtan District,JilinCity,JilinProvince

[a]yaoxin19800518@163.coml,[b]14145277@qq.com

Keywords: Engineering curriculum;Power system analysis;Strengthen practice

Abstract. The analysis of reform and practice of excellent course of the power system, follow the outstanding project, strengthen the practice of the principle of teaching in ideology, system, teaching contents and methods and improve the quality of teachers made a number of reform and practice, has gained valuable experience. Through the construction of excellent courses, training work drive the work of discipline construction and the teachers, the teaching quality to a new level

The current situation of the development of curriculum

"Power system analysis" is a professional required course of electrical engineering and automation. It is also the main courses of major power. In order to adapt to the development of the concept of modern teaching, the curriculum at home and abroad in terms of course content and teaching methods have had a qualitative change. In terms of the content of the course, A lot of the early theory of curriculum hours, Covering the entire contents of the steady-state and transient, Theory calculation, formula derivation complex, in particular for the part of the power flow calculation by hand calculation, large amount of calculation, lower accuracy. Along with the computer technology and the rapid development of modern power electronic technology The number of teaching hours experiment Theory of reducing class hours, So lay particular stress on the combination of theory and practice of curriculum content, Formula derivation of a large number of reduction, Power flow algorithm tends to computer programming, greatly reduce the difficulty of learning of students, improve the operation ability of practice, the course is more close to the engineering practice. With the experimental console of the application of the integrated automation of electric power systems and the development of power system simulation software The experiment contents had breakthrough of development, improve the students' practical operation ability. In the aspects of teaching methods, From the original gradual integration of multimedia teaching in the teaching of writing on the blackboard, Animation demonstration, the teacher-student interaction, the diversification of teaching elements such as lecture, etc., Analysis of power system the curriculum reform has entered a new stage of development. In order to make the course more practical and engineering, the reformation and construction of the curriculum system is the necessary process in the development of electrical engineering and automation.

The project-based curriculum reform and the significance of the construction

"Power system analysis" course is the basic specialty course in electrical engineering and its automation specialty, In the teaching and training of students plays a very important role in teaching and cultivation of application-oriented professionals scheme occupies a very important position. This course mainly researches in the normal operation and fault running state of the power system analysis and calculation method Is to train students into the core courses of study and research in the field of power system, In a major hub between the basic courses and professional ones, So students are required to master and understand the basic concepts of power system, the basic theory, calculation method and to strengthen students' basic analysis of the problem of the electric power engineering and

computing power. With the computer technology, Modern control technology and application and rapid development of modern power electronic technology And in the introduction of the power system of electric power market The original teaching mode has been unable to meet the needs of the construction of course, does not reflect the trend of the development of modern education, mainly in the following several aspects.

The teaching content pay attention to imparting knowledge, emphasizing the rigor of the theory, ignore the origin of physics and engineering problems related to the social background of the economic environment.

Teaching methods, analysis, ignoring comprehensive, ignoring the parts of the connection between knowledge and the role in the power system engineering.

On the Organization of teaching, the classroom teaching and practice teaching, ignore the cultivation of students' interest in learning. That "the project is not outstanding, in practice few and scattered, no extracurricular activities.

In order to "power system analysis" curriculum implementation-oriented professional, For the results of the teaching of engineering, Its teaching content, teaching idea and teaching method reform and construction of the system is part of it is imperative in the construction of electrical engineering and automation.

The curriculum reform of power system analysis-oriented engineering design

In order to make the content of the course of power system analysis is more close to the engineering, Conducive to the effective use of the students' learning, Aiming at the application-oriented undergraduate course of electrical engineering and automation has its own distinctive, Should be from the engineering aspects of the reform and construction, the concrete method is as follows:

Determines that the general idea of the course reform and construction.

Put forward a main line, both two, three combinations "teaching reform mode, that is, the three conventional calculation as the main line; Both theory and practice, both teaching and self-learning; Curriculum Design and simulation of power system, curriculum experiment and out-of-school practice, the combination of teaching and practice of innovation. The characteristics of the engineering oriented personnel training.

Reorganize the course content, to strengthen the knowledge system of students' knowledge structure and the coherence and clarity of train of thought, the realization of the "one-line" strategy.

In order to let students grasp the profound theoretical calculation, Teachers adjust teaching content of the related arrangements, the main line runs through the whole teaching content to the "power system analysis" to.

To establish a multi-level, three-dimensional practical teaching system, teaching methods with the multi-angle, perfect the process of laying equal stress on the "two".

On the basis of the original verification experiment teaching, the application of computer in calculation of power system should be strengthened, with a focus on the cultivation of practice ability. And the establishment of open laboratory, Setting the corresponding experimental results of the teacher gave the whole of the follow and help, The basic theory of students has been consolidated, practical ability has been improved, to achieve both theory and practice, the purpose of enhance the ability of power engineering consciousness of students.

On the problems in the teaching of "from two aspects, one is the" teaching "method, and the other is the ability to" learning ".In the "teaching" method is to adopt the combination of multimedia with writing on the blackboard teaching form diversification. In the capacity of "learning" concept of learning by ways of cooperation, through the big layout of the form of operation, let the students to complete. Eventually reach teaching and learning in parallel, the aim of the cultivation of students' creative thinking.

Strengthen the "three combinations", to strengthen the practice ability of the students' comprehensive quality.

Curriculum design and simulation of power system, strengthening the innovation ability of students.Take the form of self-subject course design for a week, and with a full range of laboratory corresponding power system simulation software design.

Curriculum experiment and out-of-school practice, strengthen the students' practical ability.

In the verification experiment on the basis of design, Innovative experiment, The experiment carried out in schools and with out-of-school practice, Through the internship, Dynamic Simulation and practice in the form of thematic reports, To enable students to fully understand the practical application of various devices in the power system, improve students' comprehensive application of all kinds of power the ability of technology to solve engineering problems.

The combination of teaching and scientific research to cultivate students' scientific research ability of innovation.

In order to better knowledge of the theory of power system and the combination of scientific research, The establishment of the corresponding practice of "scientific and technological innovation team", in order to enable students to understand the forefront of science, and open up their horizons, to stimulate students' interest in learning this course.

The concrete implementation of the reform and construction method

All members of the research group discussions, According to the content of the curriculum reform and the construction of a clear division of labour (the literature data collection, Investigation on the inside and outside school, The improvement of multimedia courseware, Summary of the distribution of the integration of the content of the course, The redistribution of experiment content, The implementation of the reform of curriculum design, determine the form of outside-school practice, such as the establishment of innovative experimental group) and to make the corresponding parts of the planned arrangements.

Access to information, To understand the situation of the creation and teaching of this course in foreign countries, And the actual investigation and study, In view of my school electrical engineering and its automation specialty students were investigated, Mainly includes the content of teaching, The teaching method, the content of the reform of practice teaching and engineering, according to the survey results the study as the basis for a series of reforms.

In-depth study of power system analysis the content of the course, Under the premise of not changing the syllabus, To the three theoretical calculation of short-circuit calculation, power flow calculation, the calculation of stability) as the main line, Will be re-integration of curriculum content, Not in accordance with sections of teaching, Three calculation as the main body is divided into three stages of teaching, and then all the content of the course into three sections, and the distribution of the specific content of the report.

In order to realize the reform of teaching methods, will be made of the corresponding formula is deduced to extract the contents of the form of the teaching plan, the teaching of writing on the blackboard; The phasor diagram and equivalent circuit diagram of the dynamic visual interface in the form of multimedia teaching, to develop all the content of the multimedia making process.

The integration of the experiment the content of the course, Adjustment of verification, Design, the proportion of innovative experiments, And open laboratory of engine room automation of electric power systems, further optimize the simulation software, to provide students with better design of experiment platform. To change the course design mode of power system analysis, to study the self-development of the main topics, to design a set of management of students in the course design of the programme.

The integration of all the elements of the reform, Will be "one of the main line, both two, three combinations" teaching reform model is applied to the two classes of electrical engineering and automation major at its 13 session, in the course of power system analysis On the evaluation and analysis on the effect of the whole process of teaching and learning, including self-evaluation, self-evaluation and mutual evaluation of teachers of teachers.
By comparing the summary of the evaluation of the curriculum reform and construction.

Conclusions

In order to better improve the course of reform and construction, the electric power system analysis To enable it to meet the learning needs of the students, To meet the needs of the construction of the project, the content of the course should be fundamentally conforms to the actual engineering, the increase for engineering course reform and construction.

Acknowledgements

The work is funded by the Research on the innovation and entrepreneurship education of electrical college students and the cultivation of entrepreneurial ability（DQJZW2016002）。

References

[1]Xiaohua Zhang,Chensong Zhu..Laboratory Research and Exploration ,01(2013),p.42-45.In Chinese

[2] Jing Ni, JunlongFang,MingLi . China Electric Power Education ,15(2012),p.25-27.In Chinese

[3] YuanHuang, TianqiLiu .Journal of electrical and electronic teaching,4(2016),p.:56-59.In Chinese

[4]ShilinLiu,XiaodongZhang.China Electric Power Education,02(2013),p.34-57.In Chinese

[5]YongWang,XinGao.Journal of electrical and electronic teaching ,02(2010),p.77-79.In Chinese