

## Research on Teaching Reform of "Motor Design"

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### Abstract

The "Motor Design" course is a core professional course for electrical engineering and automation majors, and it occupies a very important position in the entire electrical major teaching. The characteristics of the curriculum are strong theoretical, abstract concepts, and obvious professional characteristics. At the same time, the basic theories and knowledge covered in the curriculum are wide, and the teaching process is more difficult. With the development of professional technology, it is required to reform the teaching mode and assessment method of the course. The motor design course combines the actual teaching situation of the electrical engineering and automation majors of Shenyang Institute of Technology, combined with the school's educational philosophy of integration of theory and practice, and conducts research on the course content, theoretical teaching methods, practical teaching methods and assessment systems of the "motor design" course.

### Keywords

Motor Design; Teaching Mode; Assessment System.

### 1. Introduction

The "Moto Design" course is theoretically strong, and its basic principle is based on relatively abstract theories such as electromagnetic induction. It conducts magnetic circuit calculations, parameter calculations and loss calculations, and at the same time carries out partial structural design. It is a comprehensive course. Subject. Because electromagnetic theory is very abstract, students generally think this subject is difficult to learn. The teaching mode of this course has always been based on theoretical teaching, but the understanding of manufacturing knowledge is only taught in a theoretical way, and it is difficult for students to understand and master.

The "Moto Design" course is a professional course for students majoring in electrical engineering and automation. Students must not only master the basic principles of electromagnetic induction and other theoretical foundations, but also have the ability to calculate specific product parameters and be able to carry out partial structural design. It is a comprehensive course. Strong subjects. It is of great significance to the application of theory to practice, and plays an important role in the professional ability of motor design, graduation design and other links.

### 2. Course Content

Motor design mainly teaches three parts of knowledge, namely magnetic circuit calculation, parameter calculation, and asynchronous motor design. Starting from the relationship between the main parameters of the motor, the basic content of the basic parameters of the motor design will be introduced, so that the students will first have a conceptual understanding. Then explain the motor magnetic circuit calculation, so that students understand the composition of the magnetic circuit and the purpose of the magnetic circuit calculation, and then master the motor's excitation current and no-load characteristics. Then explain the calculation of

parameters, and calculate the resistance and reactance of the motor. At the same time, pay attention to the combination of theoretical knowledge and experiment, calculate the structure and specific parameters of the asynchronous motor, and carry out part of the structure design at the same time, to strengthen the training of students' ability to analyze and solve problems and practical hands-on. In view of the actual situation of the school's applied undergraduate, in the theoretical knowledge teaching, the students' professional knowledge should be broadened as much as possible, but the depth should be appropriately lowered; in the application ability, the students' ability of analyzing problems and drawing drawings can be improved.

### **3. Teaching Content Design and Improvement Methods**

#### **3.1. Theory Teaching**

By teaching theoretical knowledge about motor design in class, the course is divided into three parts: magnetic circuit calculation, parameter calculation, and asynchronous motor design, with a total of 40 hours. The basic content is the calculation of air gap magnetic pressure drop, tooth magnetic pressure drop and yoke magnetic pressure drop, the calculation of winding resistance, and the general calculation of winding reactance. The theoretical knowledge is explained in blocks, and students are guided to sort out the scattered knowledge points, so as to be able to grasp the parameters and expected knowledge of the motor as a whole. After studying this course, students will be able to master the current principles and design methods based on motor design and other related technologies.

#### **3.2. Practical Teaching**

Divide students into groups, use the method of discussion between groups to design the structural drawings, and evaluate the drawings of each group and count them into the assessment results to stimulate students' enthusiasm for learning, cultivate students' spirit of cooperation and teamwork, and enter the work in the future Lay the foundation for the post.

#### **3.3. Teaching Improvement**

Carried out practical teaching to add simulation, first, let students learn to master the product parameters in motor design, secondly, learn the corresponding relationship between each parameter in the professional module of simulation software and motor design product parameters, and finally, demonstrate specific practical methods and operate, and Ask open questions based on teaching content. Give full play to the abundant modeling resources of the Ansys software simulation environment, establish a simulation model, and get a cloud map. Analyze simulation results and calculation results, and optimize the design of product parameters.

### **4. Update Teaching Content**

As a professional instructor, you need to continuously learn to improve your own knowledge literacy. You also need to participate in scientific research projects, investigate the industry dynamics of the profession, and participate in training to improve your own level. At the same time, it is necessary to pass on industry trends and other information to students of this major, encourage students to participate in various college student professional competitions, and teachers actively guide. Instruct students to learn how to use Ansys simulation software to model and simulate by consulting data, master the parameters and performance of motor products, adjust the design plan according to the simulation results, and finally complete the optimization plan to improve students' design thinking and practical ability. Higher education should be based on the syllabus, reference textbooks, and content determination is mainly completed by the participation of the teacher in order to promote the progress of the subject.

## 5. Assessment System

The formulation of the assessment system has a great impact on students' learning. A single assessment of theoretical knowledge cannot fully reflect the degree of students' mastery of the curriculum. It is necessary to use students' practical ability as an important reference for assessment results. At the same time, the practice links are used to enhance students' practical ability, so that students' enthusiasm and self-confidence in learning are improved.

## 6. Summary

"Motor design" is an important professional course in the electrical direction. However, with the rapid development of the electrical industry, teachers need to add new technologies and new ideas in their teaching at any time, and through reforms and explorations, students' knowledge can be expanded and strengthened. Cultivate their comprehensive application ability, closely link theory teaching with engineering application, and achieve the goal of cultivating applied talents.

Starting from the actual situation of teaching and industry trends, taking the highly engineering course of electrical machinery design as the object, the reform of the course teaching is mainly carried out from the two aspects of theory and practice. And the introduction of simulation technology into the practical teaching of motor design can strengthen students' understanding of the structure and working principle of the motor. Using this mode can stimulate students' interest in the course, learn actively, and improve learning efficiency. Through the integration of theory and practice, students' enthusiasm for learning this course can be improved, and the quality of teaching can be improved. In particular, good results can be achieved in improving students' innovative spirit and analyzing and solving problems. The "Electrical Design" course can better cultivate advanced application-oriented talents who meet the needs of scientific and technological development.

## References

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