

# The Master's Program of Electrical Engineering

## Program Code and Name of the First Level Discipline:

**0808** Electrical Engineering

## Program Code and Name of the Second Level Discipline:

**080801** Electric Machines and Electric Apparatus

**080802** Power System and Automation

**080803** High Voltage and Insulation Technology

**080804** Power Electronics and Power Drives

**080805** Theory and New Technology of Electrical Engineering

**Coding Unit: School of Automation**

**Version: 2017**

## 1. Discipline Overview

The electrical engineering discipline of Central South University has a solid foundation and distinctive characteristic of the railway electrical, the scientific research and teacher conditions are superior, the equipment of the laboratory is complete. There are 28 full-time teachers, including 13 professors, 9 associate professors, one chief expert of the National 863 Major Project Overall Project Team, one winner of Outstanding Youth of Hunan Province and one New Century Excellent Talents in University. Meanwhile, it owns power electronic control and optimization engineering laboratory of Hunan Province.

Over the past five years, has undertaken National High-tech R&D Program of China, National Key Technology Research and Development Program of the Ministry of Science and Technology of China, National Natural Science Foundation of China more than 10 items, won 1 item of the National Science and Technology Progress Award, 20 items of the provincial and ministerial level scientific and technological progress award, national invention patent and software copyright more than 40 items, published more than 150 papers. A series of research results has been made in micro-grid, matrix converter system and application, power harmonic dynamic detection and control, electric traction system and its fault diagnosis.

This discipline aims at the leading edge of electrical engineering discipline and the vital demand of national science and technology development. Over the years, it has cultivated a large number of excellent graduate students, a number of well-known scholars and entrepreneurs have emerged, and the students graduate employment rate is 100%. In recent years, the subject has made great progress, and formed the following stability research directions: power electronic energy-saving control and equipment, distributed generation systems, electricity quality control technology, train traction and drive control and intelligent control and intelligent automation systems, etc.

## 2. Major Research Direction

- 3.1 Power electronic energy-saving control and equipment
- 3.2 Distributed power generation system
- 3.3 Power quality control
- 3.4 Electric traction and drive control
- 3.5 Intelligent control and intelligent automation system

## 3. Educational Objectives

The students should has a rigorous scientific attitude and work style, good professional ethics, humanities

and scientific literacy and a strong sense of social responsibility, love the motherland, law-abiding. Meanwhile, the students need to master the basic theoretical knowledge in the field of electrical engineering, the advanced expertise of the research direction, and use the basic theory of electrical system design, manufacture and operation to carry out the work which is related to electrical system design and development.

The students should have the basic theory and technology of mathematics, electrician, electronics, modern control theory, information processing and computer technology, mastering the basic theory and technology of power electronics and electric power transmission technology, power system and its automation, railway electric traction automation and so on. In addition, the students must have systematic professional knowledge, master a foreign language and have a strong integrated application capability.

The students should be familiar with the forefront of the discipline and the development trend, has an independent engaged in scientific research, science and technology development and organization and management capabilities in the field of the discipline. Furthermore, the students should have strong ability to innovate research and independent ability to solve practical engineering problems, competent for electrical engineering and related fields of scientific research, engineering, management and teaching work.

#### 4. Education System and Study Duration

According to the registration administration of Central South University for international graduate students, the minimum length and longest length of study for master students are 3 years and 5 years respectively, including 1-year course study.

#### 5. The Credit Requirements and Course Arrangement

According to the rules, the training program covers 3 years, including course study, and thesis writing. The credits should be more about 29 (including Training Courses), in which degree courses (public courses and core courses) require 15 credits. Credits obtained in each semester cannot be more than 17 credits (excluding training courses).

The *Survey of China and Communicative Chinese* are compulsory courses, which will be arranged by the International Exchange and Cooperation Office and taught in Chinese language.

Degree Courses for Master Students Majoring in Electrical Engineering

Courses Category	Courses Number	Courses Name	Hours	Credit	Term	Remarks
Public Courses	11000008101	Communicative Chinese	64	3	1	Compulsory
	10000008102	Survey of China	32	2	1	Compulsory
Core Courses	46080811201	Fundamentals of Electrical Drives	32	2	2	Compulsory (more than 5)
	46080811301	Modeling and control of Power Electronic System	32	2	2	
	46080811203	Modern Power Electronic	32	2	1	
	46080811204	Modern Motor Control Technology	32	2	1	
	46081111207	Scientific Writing and Academic Regulation	32	2	1	
Professional Courses	46080811401	Introduction to Smart Grid	32	2	1	Compulsory

	46080811403	Renewable Energy Power Generation Technology	32	2	2	(more than 2)
Optional Courses	46080811407	Power Electronics Equipment and System	32	2	1	Compulsory (more than 1)
Academic Exchanges and Academic Report	00000000505	Academic Exchanges and Academic Report		6	1,2	Compulsory
Training Courses	00000000602	Thesis Proposal		1	3	Compulsory
	00000000603	Research Training		1	1,2	
The total credits should be more than or equal 29.						

## 6. Thesis Proposal

During the first year, master students under the guidance of their supervisors should determine the direction of thesis research. More than 60 literatures should be reviewed for the thesis topics and each student should write the public report on the direction of thesis research which should have certain academic significance or application value, or have some practical merit on the national economy, education, cultural and social development. The reports on thesis topics are held openly with faculties. The student should fill “*the thesis proposal towards Master’s Thesis at Central South University*” in the “*Graduate Education Management Information System*” online. If the report has been adopted, the Graduate School of Management Office will keep it on file. If not, the student should redo it within the next 6 months.

## 7. Research Training

Research Training is a required course for master students. Each master student should participate in at least one research project. The purpose of this training is to enforce international master students to obtain the right research method, develop their capability to conduct research or special technique. The credit will be given to students once their supervisors approve that they have met the requirement.

## 8. Academic Exchanges and Academic Report

In the condition that master students have obtained the necessary credits for those required, optional and training courses, it is encouraged to improve the weight of research discussion and communication in the master program credits. On one hand, it is necessary to give more time to the master students and their supervisor, in order to actively promote the interaction between the students and their supervisor. On the other hand, it is necessary for the international master student to participate high-level academic exchange activities, in order to improve those students’ academic performance.

A seminar will be held each year for research discussion and cooperation between foreign graduate students and Chinese graduate students. Each foreign graduate student must submit a full paper to the seminar for getting a certain credit, which is a summary of the research work done. The seminar is open to all the graduate students of the whole departments. Several advisors will be invited to attend the seminar for giving direct tutoring.

For the “academic exchanges and academic report” training course, the specific requirements are as follows.

(1) 3 credits will be given to the “project study”, which will be held in the first year. No more than three students can be grouped to do a project, which will be evaluated three times during the whole process. Initially, a project proposal report needs to be submitted. In the mid-term, a report on technical scheme needs to be

submitted. Finally, a summary report needs to be reported, and an oral defense is also required. In each of the above three steps, the advisors' supervision is required. The credits will not be given without the advisor's prove.

(2) 1 or 2 credit will be given to those master students, who attend academic reports 10 or 20 times, respectively.

(3) Each master student must submit a paper to the Academic Annual Conference organized by School of Automation. The accepted papers will be counted as 1 credit. 1 credit will be given to those master students, who make an academic presentation in the Academic Annual Conference of our school.

(4) 3 credits will be given to those master students, who attend an academic conference recognized by CCF as class A, B, or C. 1 credit will be given to those master students, who attend other domestic or international conference.

(5) 1 credit will be given to those master students, who attend summer school, organized by domestic or international universities, and obtain course certificate or other verified documents.

## **9. Progress and Assessment of Thesis**

The school reviews the progress of thesis, phased results of the thesis, the problems in the thesis, and the gap between the thesis and the expectation. The examination will be carried out in the early October each year. If the student cannot pass the examination, sanctions will be imposed on the student according to the rules.

## **10. Requirements on Academic Papers**

One of the following requirements on academic achievement must be met as a pre-condition for thesis defense.

(1) publish (or accept) a paper in a journal indexed by SCI, EI, or CSCD recognized by School of Automation, CSU;

(2) publish (or accept) an international academic conference or the domestic level of the institute (including its subordinate special committee) academic papers published at the annual conference;

(3) An authorized patent or a patent application that has been accepted;

(4) An excellent paper recognized by the academic annual conference for CSU graduate students.

## **11. Thesis**

The shortest working hours on the master's thesis shall not be less than 12 months. Thesis should be completed independently under the guidance of the supervisor, and in accordance with the school format. Thesis should demonstrate that the student has achieved the requirements of training objectives.