Course Name： Power Supply System for Urban Rail Transit（Including Experiments）

Course Code： 3273479

Credits： 2.0

Class Hour： 32

Course Description：

Students are expected to Grasp the systemic and professional knowledge of power supply system for urban rail transit, and get the basic exercise in power supply system analysis and design of urban rail transit. Hold a broad knowledge structure in the professional and technical fields, have the capability of application research, technology development, business management and so on, and realize the development in the scope of the discipline.

By experiments, students understand the actual power supply system for urban rail transit more deeply, and are ability to solve the problem of power supply system such as analyze, design, test, operate, maintain, and so on. Train students' scientific rigor and pragmatic engineering professional quality.

Course Name： Protection and Monitoring of Power Supply System for Urban Rail Transit

Course Code： 3273482

Credits： 2.0

Class Hour： 32

Course Description：

Protection and monitoring of power supply system for urban rail transit is an important guarantee to ensure the normal operation of urban rail transit power supply system, and plays a decisive role in the urban rail transit power supply system equipment. According to the actual situation of the course of technology development at the present stage of urban rail transit power supply system of relay protection application, the main study content including relay protection, relay protection principle, urban rail transit power supply system of AC voltage and current protection and monitoring system, transformer protection and monitoring, DC traction power supply system protection and monitoring, urban rail power supply microcomputer relay protection and monitoring system.

Course Name： Project on Power Supply System for Urban Rail Transit

Course Code： 0383002

Credits： 1.0

Class Hour： 32

Course Description：

Students are expected to Grasp the systemic and professional knowledge of power supply system for urban rail transit, and get the basic exercise in power supply system analysis and design of urban rail transit. Hold a broad knowledge structure in the professional and technical fields, have the capability of application research, technology development, business management and so on, and realize the development in the scope of the discipline.

By experiments, students understand the actual power supply system for urban rail transit more deeply, and are ability to solve the problem of power supply system such as analyze, design, test, operate, maintain , and so on. Train students' scientific rigor and pragmatic engineering professional quality.

Course Name： Urban Rail Vehicle Traction Systems & Control Systems（&Experiments）

Course Code： 3273649

Credits： 2.0

Class Hour： 32

Course Description：

This course takes urban rail transport (URT) vehicle as object, introduces the foundations of traction, traction system, auxiliary power supply system and braking system. Help students understand the generation of electric traction force, basic requirements of traction, etc; understand the structure and principle of traction and braking system of rail transport vehicle; understand the trends of electric traction system. Through the study of this course, students should have ability to analyze the principle of traction of urban rail vehicle, have fundamental knowledge for design and application of traction system of urban rail vehicle.

Course Main Contents: Basic theory of electric traction, Urban vehicle traction motor and its control, traction system of urban rail vehicle, braking system, auxiliary power supply system, medium & low speed maglev train, earthing of traction system and EMC, new

technologies of traction.

Course Name： Urban Rail Train Communication Network and Operation Control

Course Code： 3273483

Credits： 2.0

Class Hour： 32

Course Description：

Urban Rail Train Communication Network and Operation Control as a major foundation course for the undergraduate students at the 4th grade is suitable to the students in the major of electrical engineering and automatization specialty. Via learning the knowledge the students are able to gain the basic structure and function of the control system, meanwhile students could master the speed measurement technology, positioning technology, communication technology, block technology and other train operation control technology. This course is able to let the students to gain the ability of train operation control in the field of applied research, technology development, management and other related work; it contains strong engineering consciousness and practical ability also including ability of implementing theoretical knowledge, technology and engineering methods to solve practical engineering problems.

Course Name： Project on Maglev Suspension System

Course Code： 0383005

Credits： 1.0

Class Hour： 32

Course Description：

Electrical engineering professional courses. It teaches students the structure and system realization of electromagnetic suspension system in low speed maglev train, and it requires students to grasp the method to design suspension system.

Course Name： Electromagnetic Suspension and Linear Drive

Course Code： 3273648

Credits： 2.0

Class Hour： 32

Course Description：

Electrical engineering professional courses, it tells students the basic principles of electromagnetic suspension and linear drive and their applications in rail transportation, it also trains students engineering ability.

Course Name： Electronic machinery AI

Course Code： 0371094

Credits： 4.0

Class Hour： 64

Course Description：

The course of electronic machinery is the integration of physical problems and engineering problems, such as electricity, magnetism, force, motion, etc. Through the course, the fundamental theory, elementary knowledge of the electrical machinery could be acquired so as to prepare for further study of specialized courses. The task of the course includes: Understand the basic structure, control principle, operating characteristics experimental method of various typical motors commonly used. Master the analysis method of the motor, be able to establish the basic equations correctly and explicit energy transfer relationship. Have the basic ability to analyze a new type of motor or a motor which is not learned.

Course Name： Electronic machinery AII

Course Code： 3273456

Credits： 3.0

Class Hour： 48

Course Description：

Through the “Electrical Machinery AII” course students can enhance the understanding of operation principle and mechanical characteristics of dc motor, induction motor and synchronous motor. The knowledge and experiment of starting and speed regulation of motor could be helpful for students to prepare for further study of specialized courses.

The task of the course includes: Understand the basic theory of kinetics of electric drive system; master the mechanical characteristics of dc motor, induction motor and synchronous motor; understand and master the starting methods and speed regulation methods; understand the breaking methods and the four quadrant operation of motor; master the basic method and skills of motor drive experiments, know the concepts of rating, loss, heating and cooling, temperature rise ,and know the methods and steps to choose a motor for drive system.

Course Name： Electrical Machinery AI Experiment

Course Code： 3273490

Credits： 1.0

Class Hour： 32

Course Description：

Electrical Machinery AI Experiment is important and helpful for students to understand the basic structure of various typical motor, control principle of electric motors commonly used. Experimental method and operation skill is also improved at the same time.

"Electrical Machinery AI Experiment" is the experiment course for "Electric Machinery AI". The main content includes: Recognize experiments of DC motor and transformer，Single-phase and three phase transformer experiment ,Three-phase transformer connection experiment , Recognize experiments of induction motor and synchronous machine, Three phase windings and rotating magnetic field experiment, Operation characteristics of three phase induction motor experiment, Starting and speed regulation experiment of three phase induction motor, Variable frequency speed regulation of three phase induction motor experiment, Operation characteristic of synchronous generator, Synchronous Generators Combined in the Grid Experiment, Synchronous Motor Experiment.

Course Name： Electronic machinery B

Course Code： 0371093

Credits： 4.0

Class Hour： 64

Course Description：

The course of electronic machinery is the integration of physical problems and engineering problems, such as electricity, magnetism, force, motion, etc. Through the course, the fundamental theory, elementary knowledge of the electrical machinery could be acquired so as to prepare for further study of specialized courses. The task of the course includes: Understand the basic structure, control principle, operating characteristics experimental method of various typical motors commonly used. Master the analysis method of the motor, be able to establish the basic equations correctly and explicit energy transfer relationship. Have the basic ability to analyze a new type of motor or a motor which is not learned.

Course Name： Electrical Machinery B Experiment

Course Code： 3273489

Credits： 1.0

Class Hour： 32

Course Description：

Electrical Machinery B Experiment is important and helpful for students to understand the basic structure of various typical motor, control principle of electric motors commonly used. Experimental method and operation skill is also improved at the same time.

"Electrical Machinery B Experiment" is the experiment course for "Electric Machinery B". The main content includes: Recognize experiments of DC motor and transformer， Single-phase and three phase transformer experiment ,Three-phase transformer connection experiment , Recognize experiments of induction motor and synchronous machine, Three phase windings and rotating magnetic field experiment, Operation characteristics of three phase induction motor experiment, Starting and speed regulation experiment of three phase induction motor, Variable frequency speed regulation of three phase induction motor experiment, Operation characteristic of synchronous generator, Synchronous Generators Combined in the Grid Experiment, Synchronous Motor Experiment.

Course Name： Power electronics technology

Course Code： 3273488

Credits： 4.0

Class Hour： 64

Course Description：

“ Power electronics technology” is a specialty basic curriculum for electrical engineering and automation major in school of electrical engineering. In this curriculum, students will study the characteristics of power electronics component, topology and operating principle of the classical power converters, parameter design and calculation methods and the control rules of power converters. This course can provide a necessary foundation for students in the future course study and work. In addition, this curriculum introduces experimental methods and operating skills to train practical ability and understand theoretical knowledge of this curriculum for students.

Course Name： The application of power electronic technology in power system

Course Code： 0383009

Credits： 2.0

Class Hour： 32

Course Description：

With the expansion of power grid, the security and stability of electric power are becoming more and more serious. It is a fundamental solution to use modern power electronic technology to enhance the self-protection and regulation ability of power network.

Understand the main applications, developments and the latest progress of power electronics in power systems; Master the related basic knowledge of power electronic technology application in power system, for learning and engaged in engineering work related to the course and lay a good foundation; Master voltage-converter and control; Master HVDC, FACTS and wind power in power electronic equipment and operation mode.

Course Name： Modeling and Simulation of Power Electronics Systems

Course Code： 0383010

Credits： 2.0

Class Hour： 32

Course Description：

This course is a fundamental and professional course for part of EE and EIE students. The course aims to cover the principle and methodology of computer simulation of power electronics systems; and optimization design of power electronics systems based on the software Matlab/Simulink. After the course, students should be able to understand the popular technology of simulation, model of power switching devices, model of electric motor and transformer; students should be also able to use Matlab to carry out the simulation of power electronics converters and design of DC and AC control systems.

Course Name： Power Electronics & Electrical Drive System Design & Experiment

Course Code： 0371026

Credits： 2.0

Class Hour： 32

Course Description：

Course Task and Target: The main goal of this course is to develop students'ability to apply power electronics technology. It instructs the application method of power electronics devices and design method of control system of typical power electronics converter based on the combined experimental equipment of power electronics and power drive. This course also instructs basic methods to use MATLAB to carry out simulation of power electronics and drive system. It requires students to finish one or more designs, simulations and experiments. Through the study of this course, students can grasp the methods to apply power electronics devices and design power electronics and power drive systems.

Course Main Contents: This course includes five main aspects. The first aspect is the application of power electronics devices, which includes driver circuit, protection and heat dissipation. The second aspect is control system of converter, which includes rectifier control, chopper control and inverter control. The third aspect is controller, which includes the rectifier controller (based on 787), chopper controller (based on 3525), CPLD+MCU controller (based on DEPM7128STC100-15 and C8051F020). The fourth aspect is the simulation tools of power electronics and power drive (MATLAB/Simulink). The fifth aspect is experiments, which includes rectifier, chopper, inverter or other converters.

Course Name： Power Electronics Equipment And Control

Course Code： 0383011

Credits： 2.0

Class Hour： 32

Course Description：

As a following course of "Power Electronics Technology", "Power Electronics Equipment and Control" is a specialty curriculum for electrical engineering and automation major in school of electrical engineering. In this curriculum, students will learn how to solve the problems in power electronics system, such as heat dissipation of power semiconductors, design of magnetic elements, protection of power semiconductors, and etc. Students also learn several power converters, including the control rules, parameter design and calculation. This course can provide a necessary foundation for students in the future course study and work.

Course Name： Electric Traction Drive and Control（&Experiments）

Course Code： 3273477

Credits： 2.0

Class Hour： 32

Course Description：

"Electrical Traction Drive and Control" is one of the key courses for electrical engineering and automation major in school of electrical engineering, which is also one of these special railway transportation courses in Southwest Jiaotong University. Students will study the traction/brake characteristic, topology, operating principle, control and modulation schemes and simulation of electric traction drive systems through the studying of this course. The study of this curriculum can provide a necessary foundation for students in the future course study and work. In addition, Students are required not only to master the relative knowledge of this course, but also to cultivate the independent thinking and innovation ability, and engineering practice ability，scientific quality and engineering quality by utilizing the relative knowledge of this course.

"Electrical Traction Drive and Control" discusses about topology structure, traction

characteristic, operating principle of traction converter, control and modulation schemes for AC electrical traction drive system in railway application. The main contents of this course are as follows: Introduction to Electric Traction Drives, The Fundamental of Electric Traction Drives Design, The Fundamental of Variable Voltage Variable Frequency (VVVF) for Induction Motor, Modeling of AC Induction Motor, The Operating Principle and Control Design of Four Quadrant PWM Rectifiers, The Operating Principle and Modulation Scheme of Three-phase PWM Inverters, Field Oriented Control of Induction Traction Motor , Direct Torque Control of Induction Traction Motor, Simulation Design and Demonstration Experiment of Electric Traction Drive system.

Course Name： Course design of electric traction system

Course Code： 3273225

Credits： 1.0

Class Hour： 32

Course Description：

This course is designed for the students in the direction of electric traction and drive control a major course design. This course design will introduce the basic concepts and the design methods of electric traction system, including design steps, system configuration and system equipment capacity calculation. Through this course design process, let the students understand the design requirements of electric traction system, and complete the traction system design according to the specification requirements.

Course Name： Power System Analysis (Experiments)

Course Code： 3273651

Credits： 4.0

Class Hour： 64

Course Description：

With the course study, students will master mathematical models of power equipments (components) and power grid, the theory and method of power flow analysis and fault analysis. The ability is improved to solve problems related to electric power engineering

science and technology using the basic theories of electric circuits and electric machinery. The important foundation is laid for subsequent professional courses study, and for working and researching in related fields in the future. Throughout the course there are classroom theory teaching, laboratory experiments guiding and homework commenting. The final score includes mid-term, final examinations, routine assignments and experiments report.

Course Name： Power System Analysis B

Course Code： 3273243

Credits： 2.0

Class Hour： 32

Course Description：

This course is a professional basic course for electric traction, maglev direction. Through this course, student should master the mathematical model of the power system components and power network establishment, grasp the theory and calculation method of power flow analysis and fault analysis. The purpose of this course is to improve the integrated application of basic principles of circuit theory, electrical machinery and so on to solve the problems of power engineering science and technology. This course helps students to lay an important foundation for the following specialized courses, and for future work or scientific research in related fields.

Course Name： Overvoltage Protection and Insulation Coordination of Power System

Course Code： 3273462

Credits： 2.0

Class Hour： 32

Course Description：

In the course of power system overvoltage and insulation cooperation, we will be able to see the flash floods caused by lightning, and also learn about the surge rapids caused by the dam opening. Through this course, we will learn the principle of voltage generation and how to identify the special wave in the voltage wave. We will learn how to build an insulating levee and how to configure the thundering valve. We will learn how to build an ark of

grounding and protect the safety of personnel and equipment. From this course, you will get the basic knowledge about power grid insulation design, and the basic ways of analysis power grid failure safety. When you want to climb the heights of power system security research, this course can provide you the cornerstone.

Course Name： Design of Power System Protective Relaying

Course Code： 3143080

Credits： 1.0

Class Hour： 32

Course Description：

Design of power system protective relaying is a very important training course and an extension course of Power system protective relaying. The configuration scheme design, integral calculation, drawing and device selection of protective relaying are involved in this course. The course design enables students to combine the knowledge of the principles of protective relaying and the practical problems of engineering. Students can master the basic method and skills of engineering design, able to perform simple engineering calculation and drawing, familiar with office software, to grasp the method of data query and document retrieval, qualify the basic capability of engineering and technical personnel.

Course Name： Power System Protective Relaying (Experiments)

Course Code： 3273458

Credits： 3.0

Class Hour： 48

Course Description：

"Power System Protective Relaying" is a very important technical professional course for Electrical Engineering colleges. The basic principles of power lines and electric elements relay protection, with setting calculation principle, the basic unit and circuit of power system relay protection, the hardware and software of microcomputer relay protection and the basic concepts of smart substation are researched in the course. Learning through the course enables students to understand the important responsibility of relay protection for power

system safety, enhance their sense of responsibility and cultivate their rigorous and meticulous work style, which will lay the necessary foundation for future work.

Course Name： Power System Transient Analysis (Contain experiments)

Course Code： 3273464

Credits： 2.0

Class Hour： 32

Course Description：

Power System Transient Analysis is a major course of electrical engineering and its automation. It is a very strong theoretical and practical professional course. This course introduces the basic physical process and approximate solutions of synchronous generator under the situation of unload or load. Then it explains the relationship between electromechanical transient process and electromagnetic transient process. According to single machine-infinite system, this course introduces the electromechanical characteristics of synchronous generator and focuses on the basic concepts, analysis methods and calculation process. Finally the main measures are presented for improving the system stability.

Course Name： Power System Automatic Device

Course Code： 0371017

Credits： 2.0

Class Hour： 32

Course Description：

Power system automation device is a core course for students majoring in power system. This course is based on circuit theory, electrical machinery, power system analysis, electrical equipment, etc. It is characterized by strong practicality and practicality. The aim of this course is to enable students to grasp the functions and principles of power system automatic device, apprehend electrical safety procedures, the operation and maintenance of the power system automatic device, and eliminate common faults of the automatic devices. The course will help students to develop their talents for the operation, management, inspection, commissioning, and installation of power systems. The basic requirement is to master the

principle of various automatic devices in power system.

Course Name： Circuit Analysis AI/II

Course Code： 3273469/3273470

Credits： 4.0+4.0

Class Hour： 64+64

Course Description：

Course Task and Target: Circuit Analysis is a very important technical course in electric engineering specialty. Through studying the course, students are not only able to master the basic laws of circuit analysis, theorems, analytical methods and preliminary experimental skills, but also their abilities to analyze and solve problems are trained and improved. The technical abilities obtained by students lay will contribute to their subsequence specialized courses and scientific research.

Course Main Contents: Circuit Basic Concepts and Fundamental Laws, Resistor Circuit Equivalent Transformation, Methods Of Analysis, Circuit Theorems, Operational Amplifier, Sinusoidal Steady-State Analysis and Resonant Circuits, Magnetically Coupled Circuits, Three-Phase Circuits, Nonsinusoidal Periodic Circuits, Two-Port Circuits, First-Order Circuits, Second-Order Circuits, The Laplace Transforms and Its Applications, State Space Equations, Nonlinear Resistor Circuits, and so on.

Course Name： Electrical Measurement Technology(Including Experiments)

Course Code： 3273455

Credits： 2.0

Class Hour： 32

Course Description：

Electrical measurement technology is a professional basic course oriented for the major of electrical engineering and automation, which is also the important course to cultivate practical ability of students. After learning this course, students will have the basic knowledge of electrical measurement technology and capacity of constructing measurement systems, as well as the ability of innovation and solving practical problems.

This course mainly introduces the basic electrical measurement technology and basic modern measurement systems, including the composition of modern measurement system and its static and dynamic characteristics, measurement error analysis, the evaluation and expression of measurement uncertainty and measurement results, the basic principles, techniques and methods of signal detection, transformation, analysis and processing, as well as measurement technology of high voltage, high current, AC electrical quantities and so on.

Course Name： Introduction for electric engineering

Course Code： 0383016

Credits： 2.0

Class Hour： 32

Course Description：

Understand the related knowledge of rail transit electric engineering, master all kinds of content of rail transit electric engineering, and understand the working principle of each component and related technology. So that the foundation for course learning, research and design in the future could be laid. For part of the content, the heuristic teaching can be adopted, and the students' ability to analyze and solve problems could be cultivated.

Course Main Contents: Basic concept of remote monitoring technology is introduced; Basic knowledge of power system; Electrified rail transit; High-speed abstract; Traction power supply system; Catenary basis; Power system relay protection; Remote monitoring technology; Electric locomotive and the emu and so on.

Course Name： Conditional monitoring of electrical equipment(Including experiment)

Course Code： 3273643

Credits： 2.0

Class Hour： 32

Course Description：

“Conditional Monitoring of Electrical Equipment (Including experiment)” is an important course for studying the basic knowledge and skills of electrical equipment design,

operation analysis and conditional assessment. Course consists of three parts, the basic theory of dielectric, material and structure of electrical insulation in the equipment, electrical insulation monitoring and diagnosis technology. A systematically grasp of this course can enable students to identify, express and analyze of complex engineering problems, on basis of the basic science and professional theory knowledge, further to design the solution of engineering problems, including design experiments, analyze and interpret data, and get effective conclusions.

Course Name： Electronic Process Practice

Course Code： 0371117

Credits： 2.0

Class Hour： 160

Course Description：

The Course type is an important practical link in university's engineering specialty teaching planning. Learning through this course enables students to master the contents below:

1. Understand the basic functions of electronic circuit drawing software; can skillfully draw circuit schematic diagram and PCB diagram; Learn to edit the schematic diagram of the component library files and add and modify PCB packaging components.

2. Master the structure, type, naming method, main index parameters and use of electronic components, such as semiconductor tubes, resistors, capacitors, three terminal components, integrated chips, transformers, etc.

3. Familiar with printed circuit board manufacturing process.

4. Familiar with printed circuit board manufacturing process.

5. Master the principles and methods of circuit design.

6. Master the basic knowledge of production practice

7. Master the common tools (multimeter, oscilloscope, function generator, transistor, voltmeter, frequency meter, etc.) the use of methods.

8. Master the welding technology, debugging technology and method of electronic circuit.

Grasp the types of electronic circuit fault, and through the electronic circuit fault phenomenon, the use of theoretical knowledge for comprehensive analysis, troubleshooting. Master the commonly used electronic circuit maintenance methods.

Course Name： Electronic Market Research

Course Code： 9990494

Credits： 1.0

Class Hour： 32

Course Description：

In order to enhance the practical skills of the students and make full use of social resources, the undergraduate students carry out electronic market research in groups, the aims are as following.

1. Research commonly used electronic components and instruments, understand the properties, shapes and prices, establish the concepts of product cost.

2. Research and understand the structure and software system of the computer, establish the cost-effective concept.

3. Develop students' self-management, social communication and team cooperation abilities.

Develop students' word processing software skill and the ability to use modern information technology to obtain information by writing investigation reports.

Course Name： Secondary system curriculum design

Course Code： 0373018

Credits： 2.0

Class Hour： 32

Course Description：

The secondary system curriculum design is mainly through the comprehensive application of knowledge and practical exercises to help students to establish the secondary system design steps, design content of the overall understanding, deepen understanding of how to complete the main substation relay protection configuration and tuning calculation,

how to achieve fault diagnosis, network reconstruction design. To cultivate students' engineering design ideas and basic literacy, to improve students in the actual design of the problem and the ability to deal with the problem, to achieve the purpose of training students' comprehensive ability. The final results consist of a student's classroom performance, a design report and a comprehensive assessment of the overall report.

Course Name： Electrical Parts of Power Plant (Including Experiments)

Course Code： 3273463

Credits： 3.0

Class Hour： 48

Course Description：

This course is the backbone of electrical engineering discipline, and is the follow-up and practice of the course - power system analysis. It has the characteristics of multi-discipline, practicality and comprehensiveness. The course mainly deals with the working principle, basic structure, operation theory, calculation method and design steps of the primary system of the electrical part in the power plant and substation. Through the study of this course, students can master the basic theories and methods to the calculation and selection of power plant and substation, and understand the principle and performance of the main electrical equipment; further, grasp the design principle of main electrical system of power plant and substation. The course will lay the foundation for the science research, design, testing, operation and management of power system for the future.

Course Name： Wind Turbine and Photovoltaic Systems

Course Code： 3273646

Credits： 2.0

Class Hour： 32

Course Description：

Wind turbine and Photovoltaic systems is a new professional course which is based on many preliminary course such as electric machines, power Electronics and electric Drive, semiconductor physics, micro-chip computer and automatic control etc.

This course will give students the knowledge of wind energy conversion, photovoltaic systems and their engineering implementations. Through the study of this course, the students will get to know the structure of wind turbine system, the application of solar energy and their development status. They also learn and master the basic theory and skills of new energy conversion and the control technology. The aims of this course is to provides students a profound foundation for them to do engineering works relating to new energy conversion.

Course main contents include:

1.Overview of new energy and the principle of sun radiation;

2. Knowledge of PV：Physics of PV cell，The basic theroy of PV cell, PV Systems , PV System Design ;

3.Knowledge of Wind Power: Wind Turbine, Wind Generators, Wind power electrical Equipment, Wind Energy systems, Performance and Operation Management.

Course Name： High Voltage Technology

Course Code： 3273457

Credits： 2.0

Class Hour： 32

Course Description：

This course is a multidisciplinary integrated professional foundation course. It is the main way that students master the "high voltage and insulation technology" discipline knowledge. This course aims to correctly handle the contradiction between over-voltage and insulation in the power system, and make students grasp electrical characteristics of all sorts of dielectric and insulation structure, power system over-voltage and its protective measures, and the knowledge of insulation and high voltage test.

Course Name： Integration of four Power Sub-system for High Speed Railways

Course Code： 0383019

Credits： 2.0

Class Hour： 32

Course Description：

Master the relevant knowledge of high speed railway; understand the four power Sub-system of the whole system. On this basis it can be realize the integration of the four sub-systems, and master relevant content, such as the integration of technology. So that the foundation for system design, operation and maintenance work of high speed railway in the future could be laid. And the students' ability to analyze and solve problems could be cultivated.

Course Main Contents: Basic concept of remote monitoring technology is introduced; Introduction of the high-speed railway; Technology of high-speed train; Traction power supply system; High-speed train operation and control technology ; Communication technologies for high-speed railway , System integration, and so on.

Course Name： Technology for high voltage electrical apparatus

Course Code： 0383020

Credits： 2.0

Class Hour： 32

Course Description：

Through the studying of the course, Students can master the basic knowledge and operating principle of high voltage electrical apparatus, know key parameters and testing method, have the initial ability of design management and maintenance for high voltage electrical apparatus.

Course Name： Engineering Electromagnetic Fields

Course Code： 0383021

Credits： 3.0

Class Hour： 48

Course Description：

The Course type is Major Course, “Engineering Electromagnetic Fields” is a very important technical basic course for Electrical Engineering colleges. Learning through this course enables students to master the contents below:

1. After the course, the basic theory and analysis should be established; Undergraduate student have the ability to make use of the knowledge to their work in development, meanwhile the relevant professional requirement for the field are also given;

2. Gaining the comprehensive application of Engineering Electromagnetic Fields knowledge to solve problems by analyzing the actual system. The students can analyze the engineering problems;

3. Having a good control of English both in reading and oral, especially on a large mount of vocabulary and material related to one's major.

Course Name： Calculation and analysis of engineering electromagnetic field

Course Code： 0383022

Credits： 3.0

Class Hour： 48

Course Description：

The Course type is Major Course, "Calculation and analysis of engineering electromagnetic field" is a very important technical basic course for Electrical Engineering colleges. Learning through this course enables students to master the following ability:

1. Through theoretical teaching, guide students to master the basic theory of engineering electromagnetic field and j calculation analysis method； cultivate students' ability to solve practical engineering problems with electromagnetic field theory

2. Through the teaching, make students understand the use of finite element software for electromagnetic field simulation and operation method;

Having a good control of English both in reading and oral, especially on a large mount of vocabulary and material related to one's major.

Course Name： Power Supply and Transform Technology

Course Code： 3273230

Credits： 2.0

Class Hour： 32

Course Description：

Course Task and Target: The purpose of this course is to make students to master the basic theory, operating principle of electrical equipment and primary system, design calculation and operational analysis of power supply and transformation technology.

Course Main Contents: Introduction to power supply and substation equipment for rail transit、High-voltage apparatus and switchgear、Main electrical connection scheme and its' design and operation、High voltage switchgear and apparatus arrangement、Control, signal, monitoring circuit and operation power supply of substation system、Rail transit traction substation design.

Course Name： Curriculum Design for Power Supply and Conversion Technology

Course Code： 3046119

Credits： 1.0

Class Hour： 32

Course Description：

Curriculum design for power supply and conversion technology is a major training course of electrification and automation for rail transit. The students need to understand the basic design information and build the basic model in the project design for power supply and conversion.

The students must grasp the design method and have the ability for simulation and calculation. The students also understand the relative standards and rules, and use the project management method and economic decision-making method. In addition, the students can write the design report based on the information retrieval technology.

Course Name： Power Supply System

Course Code： 3273459

Credits： 3.0

Class Hour： 48

Course Description：

Help students mastering the structure of traction power system of electrified railway, the relationship between utility grid and traction power system, and design method of traciton

power system. By the theoretical classroom teaching, help students grasp of the traction calculation method; Let students understand the calculation way of each power quality indicators and assessment；By the experiments teaching, students can verifiy the related theory of traction power system, further understanding the theory. Focus on the ability improvement of linking up theory with practice, applying theory to practice and system design and analysis. Strengthen the ability of practical problem solution and work independently.

Course Name： Power Quality Analysis of Rail Transit System

Course Code： 0383024

Credits： 2.0

Class Hour： 32

Course Description：

Power quality analysis of rail transit system is a major course of electrification and automation for rail transit. It is a very strong theoretical and practical professional course. This course introduces the basic definition of power quality and the classification of power system disturbances as well as the effects of power quality problem. The students need understand the characteristics of traction load of rail transit system, grasp the measurement and analysis method of power quality based on the standards and guidelines. The students need understand the power quality control techniques and grasp the operation principle of different power quality compensator and its application in field, which can reduce the effect on power grid caused by traction power supply system.

Course Name： Computer Aided Motor Design and Experiments

Course Code： 3273222

Credits： 1.0

Class Hour： 32

Course Description：

"Computer aided motor design training" course is one course of expansion and improvement of the “Electrical machinery”.The main research interest is the synthesis

problem of electromagnetic relationship on the electrical and mechanical structure. The students are asked to master the motor design with the computer (software) as auxiliary means, and finally have the preliminary design ability to meet the technical requirements, the economic indicators and the reliability of the motor designed.

The contents of the course include the overall design parameter, the motor magnetic circuit calculation, parameter calculation, loss and efficiency, heating and cooling, structure design, noise and vibration. In the computer aided design, Matlab programming and finite element electromagnetic simulation software are mainly adopted, aim to the parameters design and optimization of ordinary motors which include DC motor, induction motor, synchronous motor, transformer etc.

Course Name： Computer-controlled systems

Course Code： 0471012

Credits： 2.0

Class Hour： 32

Course Description：

This course is mainly to the computer-controlled theory and its realization technology, including computer-controlled system basic theory and design method, the realization of the computer- controlled system, in order to enable students to understand and master the computer-controlled systems from design to implementation of the entire process. The computer control basic theory is a major part including the composition of computer-controlled system, the signal form of computer-controlled system, system mathematic model and its characteristics; another part is the design methods of computer-controlled system, including design method of discretization of continuous time domain, direct discretization method and the state space method; the last part introduces the realization technology of the computer-controlled system.

Course Name： Computer Networking and Communication

Course Code： 3273491

Credits： 2.0

Class Hour： 32

Course Description：

1. Systematically study the computer network layered architecture and the principle of TCP/IP protocol, understand the related professional knowledge of computer networking; Learn about the trend of technological development in this field.

2. Have strong engineering consciousness and ability of practice, skills of computer networking; Have ability of using theoretical knowledge, technology and engineering methods to solve practical engineering problems.

3. Have ability of project management; Be able to analyze, realize, maintain computer networking system.

Course Name： Measurement Technique and Fault Diagnosis

Course Code： 3273221

Credits： 2.0

Class Hour： 32

Course Description：

Measurement Technique and Fault Diagnosis is a main course for electrical engineering or automation students. This course can help students develop the basic design capabilities of measurement and control system.

Through this course, students can understand the basic structure and functional characteristics of measurement and control system，select and design the sensor circuit, signal preprocessing circuit, data acquisition system，get the basic design ability of anti-interference, learn the definition of fault diagnosis technology, methods and involved knowledge areas, understand the commonly used measure and fault diagnosis equipment in railway transportation.

Course Name： Engineering of Overhead Contact Line System

Course Code： 0371011

Credits： 3.0

Class Hour： 48

Course Description：

The basic concepts of Traction Power Supply System should be grasped by the students; Basic knowledge about the Overhead Contact Line system (OCS), Pantograph and their interaction should be grasped by the students. The students should systematically grasp the design calculation and standards related to the Overhead Contact Line engineering and fully understand the construction, management and maintenance of Overhead Contact Line System. All these contents will provide the students with solid foundation for their further work in electrical railway or mass transit.

Course Name： Curriculum Design of Engineering of Contact Line System

Course Code： 3040800

Credits： 1.0

Class Hour： 32

Course Description：

Curriculum Design of Contact Line System is a successive course of Contact Line System Engineering, which is used for training the ability of the students of putting the knowledge available into solving the real problems. In the course, the students are asked to complete the layout plane of contact line system for a specific station, which includes the detail calculation procedure, explicit technical scheme comparison and selection, statistical list of engineering amount and budget. All these provide the students with solid foundation for their further work in electrical railway or mass transit.

The course covers the basic concepts of traction power supply system; the characteristics of pantograph; the basic principle for determining the key parameters of OCS, which include both electrical and mechanical parameters; the typical structure and equipment of OCS; the plane layout of OCS; the erection and safety operation of OCS; the dynamical interaction between OCS and pantograph, and the related standards to evaluate the dynamic performance between them and etc.

Course Name： Management and Maintenance of Contact Line System

Course Code： 0383027

Credits： 2.0

Class Hour： 32

Course Description：

Management and Maintenance of Contact Line System is a successive course of Contact Line System Engineering, which is used for training the ability of the students of putting the knowledge available into solving the real problems. In the course, the students are asked to grasp the basic ideas of management and maintenance of contact line system, understand the failure mode and effect analysis of this system and known the preventive maintenance strategy and provisional measures for the system

All these provide the students with solid foundation for their further work with Contact Line System in electrical railway or mass transit.

The course covers the basic concepts of management and maintenance of contact line system, the failure mode and effect analysis of this system and the preventive maintenance strategy and provisional measures for the system and etc.

Course Name： Train Control Network and Monitoring（&Experiment）

Course Code： 3273647

Credits： 2.0

Class Hour： 32

Course Description：

The basic characteristics, topological structure, scope of application and typical train control network protocol are introduced in this course. Through the studying of this course, the students can systematically master the basic knowledge of control network and understand the current situation and development trend of train control network technologies. Through the studying of this course, students will obtain the necessary skills of train network design, construction and repair, which should be useful to lay the foundation for further education of students on control network technology.

Main content of the Course:

1.Field bus and train control network ;

2. Basic Conceptions of computer network;

3.The Commonly used field bus network standard;

4. TCN standard;

5. The Application examples Of train control network.

Course Name： Distributing Network Automation

Course Code： 3046121

Credits： 2.0

Class Hour： 32

Course Description：

Distribution network automation is a limited elective course. Through the course of study, mainly to enable students to understand the distribution network topology, neutral grounding, distribution automation and function, small current grounding system fault line selection and fault isolation and power supply recovery and other major professional knowledge. The classroom teaching is mainly taught by theory. Through the engineering examples, the students can master the theory of applying theory to engineering practice, give the topic or free topic, and use the group form to train students' data collection, screening and analysis, and analyze the ability of conclusion. The final results are given by the above several sections.

Course Name： Traction motor and electric appliances

Course Code： 3273476

Credits： 2.0

Class Hour： 32

Course Description：

The traction motor and electric appliance is backbone course of power electronics and power drives in professional teaching plan. It is to cultivate students with a characteristic of railway traction drive professional courses.

Main contents of this course: the basic principle, structure, test, characteristic analysis, control method and design thinking of various types of traction motor; The function, structure and working principle of electric locomotive main type and other related appliances.

The students have the ability of cognitive practice in traction motor and electrical appliances and related important equipment, to lay a solid foundation for future work and scientific research in related fields.

Course Name： Producing Practice（Second Direction）

Course Code： 9990495

Credits： 3.0

Class Hour： 96

Course Description：

Producing Practice（Second Direction）is an important practice course of electrical engineering and its automation major. This practice introduces the main characteristics and development of power system, the electrical equipment and its function used in transmission and distribution systems. By applying the theoretical knowledge in practice, the ability of solving the project problem can be improved for the students.

In addition, the effect of actual project on the society, the safety and culture can be understood and interpersonal skills can be improved as well as the team spirit.

Course Name： Microcomputer-based Relay and Substation Automation System

Course Code： 0371014

Credits： 2.0

Class Hour： 32

Course Description：

Systematic grasp of professional knowledge of microcomputer-based relay and substation automation system. Through theoretical teaching, guide the students to master the operational principles of hardwares of microcomputer protection, the design of digital filters, microcomputer-based protection algorithms, and the composition and function of substation automation sytem. Train students to know the ability of applied research and technology development towards microcomputer-based relay and substation automation system, which will make the students learn relevant national and industry standards in this technical field.。 To learn the recent development of microcomputer-based relay and substation automation system.

Course Name： Microcomputer Theory

Course Code： 3273473

Credits： 4.0

Class Hour： 64

Course Description：

This course introduces the hardware and software architecture of microcomputer and its working principle, and trains students to apply the basic knowledge and basic skills of microcomputer. Through learning of this course, the students can grasp the structure, function, working principle of the microprocessor system, semiconductor memory and peripheral interface devices, preliminary understand the hardware system design method in microcomputer application system, grasp the instruction system function and assembly language programming, can write simple program with assembly language, master debugging method of the assembly language program.

After completing this course, students can analyze the more complicated microcomputer system and be able to design and debug the hardware and software of simple microcomputer system.

Course Name： Modern AC Motor Control Systems

Course Code： 3273465

Credits： 2.0

Class Hour： 32

Course Description：

This course is a professional basic course. This course is an object with ac induction motor and synchronous motor, through teaching make students master the scalar control and vector control and direct torque control principle of the asynchronous motor. Course Main Contents include Scalar control of induction motor; Coordinate transformation and motor dynamic model of space vector; The vector control of induction motor.

Course Name： Signals and Systems (Including Experiments)

Course Code： 3273471

Credits： 3.0

Class Hour： 48

Course Description：

‘Signals and Systems’ is a very important technical basic course of electrical engineering in higher engineering colleges. Through the study of this course, students can master the basic theory and methods of time domain, frequency domain, complex frequency domain analysis, state variable analysis of discrete signal and system (linear time invariant), time domain and Z domain of discrete signal and system (linear time constant), which cultivate students' abstract thinking ability and comprehensive application of knowledge to solve the problem of ability for the future study and research.

Through this course, the students can master the contents below.

(1) Continuous Signals and Systems (LTI) in the time domain, frequency domain, frequency domain analysis, state variable analysis, the basic theory and methods of discrete signals and systems (LTI) in the time domain and Z- domain analysis.

(2) The abstract thinking ability and comprehensive application of knowledge to solve problems by analyzing the actual system, and the ability to abstract objects to build the system or object model. The students can analyze the engineering problems, create an abstract model, simulate the preliminary abstract model, and analyze the results of a physical explanation.

(3) By the signal simulation experiments, students can analyze experimental results and validation capabilities. The ability to grasp the preliminary design of experiments, the general process of the operation and the results of treatment, able to experiment errors and debug procedures to resolve, with the experimental data analysis and processing, compared to theoretical predictions and experimental results, error analysis, the completion of the experiment reported.

(4) Master the English vocabulary, read equipment manuals and information in English, with the ability to query the English scientific literature.

Course Name： Project on Primary System

Course Code： 0373017

Credits： 2.0

Class Hour： 32

Course Description：

Cultivate students' engineering design ideas and basic attainment, improve students' ability to analyze problems and deal with problems in practical design, and lay a certain foundation for students to work on the design, analysis, operation and maintenance of a system for transformer substation. The main contents contain the basic information and design requirements of the design object, at the same time, guiding the students to independently complete calculation of the load, selection of the main transformer wiring type, standby mode and capacity, design of the main wiring, power loss, power quality and calculations of other operational specifications, calculation of short circuit current, equipment selection and stability verification, design of lightning protection grounding, meanwhile drawing the main wiring diagram and substation plane layout plans and so on.

Course Name： Remote Supervisory and Control Technology

Course Code： 3273641

Credits： 2.0

Class Hour： 32

Course Description：

The basic concepts about remote supervisory and control technology of power systems and electrified railway traction power supply system should be grasped, and the basic principles of remote communication should be understood. The main principles and composition of the remote supervisory and control technology based microcomputer can be understood and grasped, so that the foundation for monitoring system design , operation and maintenance work in the future could be laid. Developing the integrated use of knowledge and practical ability of students.

Course Main Contents: Basic concept of remote monitoring technology is introduced; information transmission technology; data communication network; reliability of monitoring

system; structure and principles of data communication network of monitoring system; electrification railway monitoring system, and so on.

Course Name： Couse project of Remote Supervisory and Control Technology

Course Code： 3273642

Credits： 1.0

Class Hour： 32

Course Description：

To understand the basic information and design requirements of the design object, include the substation of electrified railway traction, city rail transit traction substation, power system or other power supply systems and related equipment.

Through the theoretical teaching, students should to master the design steps of the remote monitoring system and design content and so on, training the ability of engineering practice, design and operation management, to enable students to understand the relevant policies, rules, norms and regulations.

Through the curriculum design, to enable students to master the design, calculation, application and drawing method of remote monitoring system, cultivating students' future in the field of application of the knowledge of the system analysis, design, operation and maintenance ability, to cultivate students' scientific rigor, truth-seeking and pragmatic engineering occupation quality.

Course Name： Smart grid practice

Course Code： 0383031

Credits： 1.0

Class Hour： 32

Course Description：

Through this course, understand applications of the basic technology in smart grids, including photovoltaic power generation system, fuel cell power generation system, wind power generation system, energy storage system, the microgrid dispatch system etc., in order to improve the ability of solving the key technologies and scientific problems in smart grids;

grasp widely the knowledge structure in the professional technology field, understand the current situation and frontier development trend of the technology in the field.

Course Name： Principles of Automatic Control

Course Code： 3273472

Credits： 4.0

Class Hour： 64

Course Description：

This course is targeted to convey a basic concept of system and control, and provides an introduction of the analysis and design of feedback systems for electrical and electronic information engineering students.

Topics covered include: time domain and frequency domain mathematic modeling, properties and advantages of feedback control systems, time domain transient and steady state analysis, stability analysis, root locus method, Nyquist criterion, basic controller design techniques and stability analysis of nonlinear systems.