

Virtual Simulation Experiment of Electricity Generation and Transmission Principle

Course code: 323003

Title: Experiments of General Physics III

Experiment name: Virtual Simulation Experiment of Electricity Generation and Transmission Principle

Experiment code: 32300316

Experiment type: compulsory

Class hour: 4

Credit: 2

Duration: 1 semester

Restricted to: undergraduates majoring in Physics

Introduction to the course

Generation and transmission of electricity involves energy conversion, the law of electromagnetic induction and Ohm's law in Physics. Power system in real life is made up of huge equipment and spans vast space, and therefore, it is impossible to conduct experiments in lab using actual equipment. To make students better comprehend the operating principle of the power system and cultivate their ability in relating theory to practice, the current course adopts virtual simulation to form a "Virtual Simulation Experiment of Electricity Generation and Transmission Principle", featuring huge equipment, large space span and multi-knowledge fields.

This experiment course consists of four parts: overview, instruments and equipment required, preview and entry into the experiment. Experiments and operations involving power source, generator, transformer, transmission cable and user load will be carried out. The virtual simulation experiment teaching method is innovative, technologically advanced and can be executed repeatedly.

**Experiment Card of Virtual Simulation Experiment of Electricity
Generation and Transmission Principle**

No	Item	Details
1	Title	Experiments of General Physics III
2	Code	323003
3	Name of Experiment Item	Virtual Simulation Experiment of Electricity Generation and Transmission Principle
4	S/N of Experiment Item	32300316
5	Network Experiment	5
6	Number of Group Member	Finish the task online.
7	Class hour	4
8	Experiment type	Compulsory
9	Experiment purpose	Application of energy conversion, electromagnetic induction law, Ohm's law and other related principles applied in high-voltage power grid
10	Experiment Contents	<ol style="list-style-type: none"> 1. Measurement and calculation of energy conversion 2. Measurement and calculation of generator-related parameters 3. Measurement and calculation of transformer-related parameters 4. Measurement and calculation of transmission cable loss 5. Measurement and calculation of user load and power factor

11	Experiment Principle	<p>The power system is an electric energy production and consumption system composed of power generation, transformation, transmission, distribution and consumption.</p> <p>It is a process of converting the mechanical energy in nature into electric energy, light energy, thermal energy and mechanical energy, etc., through various equipment and applying the principle of energy conservation, so as to provide various forms of energy required in daily life.</p>
12	Experiment Type	1. For demonstration <input type="checkbox"/> ; 2. For verification <input type="checkbox"/> ; 3. Comprehensive <input type="checkbox"/> ; 4. Designing experiment <input type="checkbox"/> ; 5. Research experiment <input type="checkbox"/> .
13	Experiment personnel	Undergraduates
14	Instruments and Equipment	Water conservancy power source, generator, transformer, iron tower, transmission line, electric motor, electric stove, light bulb, voltmeter, ammeter, oscilloscope and other 3D interactive software models
15	Time of Issuance	201803
16	Name of Teaching Institute	College of Physics
17	S/N of Teaching Institution	32
18	Name of Experiment Institution	Physics Experiment Teaching center
19	S/N of Experiment Center	
20	Name of Experiment Site	General Physics Lab

21	S/N of Experiment Site	Tang Aoqing Building, B317
22	Name of Disposable Materials	NA
23	Disposable Materials	NA
24	Applicable Majors	College of Physics: majors of Physics, Applied Physics, Optoelectronic Information Science and Engineering, Nuclear Physics Related majors in science and engineering across Jilin University
25	Writer of the Experiment Item Card	Kang Zhihui
26	Reviewer of the Experiment Item Card	Zhang Hanzhuang